



## Circular Economy in Taiwan

### Why Taiwan

The Netherlands is at the forefront of the transition to a Circular Economy (CE). Since the new government in Taiwan (May 2016) made CE part of its national economic policy, Taiwan is keen to learn from the Netherlands how circular economy has been developed in terms of policy making and implementation, and to learn how the Netherlands copes with the challenges ranging from the periodic water and energy shortages, the dependency on fossil fuels, regeneration of industrial parks and urban planning, to food surplus, and the high ratio of waste landfill and incineration. Netherlands Trade and Investment Office (NTIO) has already assisted several government ministries and agencies (EPA, MOEA, etc.) to learn from the Netherlands in CE policy making and implementation. NTIO collaborates closely with the Taiwan Circular Economy Network (TCEN) (MOU in 2015), and co-organized a large delegation of 25 Taiwan government officials and company CEO's to join the Netherlands Circular Hotspot Conference in April 2016. NTIO- and TCEN- invited media for CE tours and organize national CEO conferences have brought CE to the attention of all stakeholders in Taiwan (industry, academia, government, NGO's). NTIO facilitated in a number of visits by Taiwan ministers (Ministry of Science and technology, EPA) and city mayors to the Netherlands to learn more about CE policy making, CE implementation by regions and company visits.

CE was also one of the major themes in the Taiwan-Netherlands City Innovation Roadshow and Forum (October 2016), NTIO's successful project that introduced 10 city innovation solutions to the city government of Taiwan's seven major cities. Result of these activities is that the Netherlands is now seen as the world's leading country in CE policy making and implementation.

### Government plans

In order to develop green innovative materials (new materials), Taiwan government is promoting the "Application Scheme for establishing the **Nationwide Circular Zone Pilot Project** and **New Material Circular Industrial Park Project**". Aiming at enhancing the waste-to-resources rate to 2%, and reducing the waste landfill and incineration rate to 3% by 2020, the government will develop a number of pilot projects to fulfill the plan; e.g. a regional energy supply center and a waste-to-resources circular center, and the government will complete the planning and design works for a regional water recycling center. As to the establishment of the New Material Circular Industrial Park, Kaohsiung City Government is commissioned for the land acquisition at Dalin Pu village where it is planned to set up a circular industrial park. The early stage investigation and assessment report will be completed by end of 2017. The complete plan (including budget plan) for the construction of this New Material Circular Industrial Park should be finished by 2021. Furthermore, Taiwan government will facilitate at least 2 projects annually in the development of green innovative materials.

Furthermore, Taiwan has just announced a "Forward-looking Infrastructure Construction Program" that requests NTD880 billion (€27.12 billion) government funding to embark on the infrastructure needs for the next 30 years, in order to upgrade the efficiency of inter-regional resources circulation and to build up a smart and resilient Taiwan in responding to climate change.



## Opportunities and potential projects in Taiwan

### 1. *Circular economy scan for cities and regions:*

- Circular Economy is included as part of the “Five plus two (5+2)” national economic development policy. To translate the “5+2” national economic development policy into nationwide “Forward-looking” Infrastructure Development Program, government in Taiwan is expected to pour in approximately NTD 882.49 billion (Euro 25.95 billion) in the next 8-year. Forward-looking Infrastructure Development Program:  
[http://english.ey.gov.tw/News\\_Hot\\_Topic.aspx?n=25C679A2A240627E&sms=AD98DD3139D04F2E](http://english.ey.gov.tw/News_Hot_Topic.aspx?n=25C679A2A240627E&sms=AD98DD3139D04F2E)
- Taoyuan city is where Taiwan’s main international airport is situated, and it is developing an aerotropolis (airport city) next to the airport. Circular economy is the main concept behind the development plan. The CE development at Amsterdam Schiphol Airport and its surrounding area developed by SADC has been taking as the main reference for the future development of Taoyuan aerotropolis.
- Kaohsiung city is a harbor city where most of Taiwan’s oil refineries, shipbuilding yards, and heavy industries are located. The city government has the ambition to transform Kaohsiung into an ecological, low-carbon emission, sustainable, and livable city by planning many projects in developing green mobility, wetland eco-corridor, green buildings, and the use of solar power generation.
- As foreseeing a great number of public procurement projects will be taking place while government in Taiwan is going to implement the forward-looking national development program, circular procurement is definitely a topic that Dutch organization could share knowledge and experience with Taiwan. In this April, Public Construction Commission (PCC), European Economic and Trade Office (EETO), Bureau of Foreign Trade (BOFT) of Ministry of Economic Affairs (MOEA), Taiwan External Trade Development Council (TAITRA) and EU Business and Regulatory Cooperation Programme in Taiwan (EBRC) organised the EU-Taiwan Green Public Procurement Seminar that invited experts from EU to share with Taiwan the policies and strategies on the GPP, and the best practices on green project, including approaches to tendering and tender evaluation process.

### 2. *Industry parks adopt the CE implementation:*

- Government in Taiwan takes Dalinpu Industrial Park in Kaohsiung as the first pilot circular industry park in Taiwan. According to the Industrial Development Bureau of MOEA, circular economy concept will be implemented when a newly developed industrial park is taking place. Dutch organizations that are able to contribute their knowledge in systematic planning and design on the flows of energy, resources, waste material and water that occurred during the production process for the industrial park, a matchmaking with relevant counterparts in Taiwan could be arranged during the CE mission to Taiwan.
- Together with Tainan City Government, central government is building up a Green Energy Science Park (City) at Shalun in Tainan covers an area of 22.3 hectares, and will allocate NTD 31.9 billion (€982 million) to this project. This future park will spur R&D and serve as a demonstration site for green energy



technology; e.g. energy creation (solar and wind power), energy storage (fuel cells), energy conservation (green architecture) and systems integration (smart grids). To achieve that, this science park will apply the low carbon / smart environmental approach to layout its infrastructure. Two verification platforms will be built to serve the green energy industry and the technology development for regional energy storage. Creates a 3<sup>rd</sup> party testing and verification center for the investment on the renewable energy, as well as a residential zone for the science park.

- Experiences in performing CE scan on the industrial park(s) could be very helpful and knowledgeable to assist government in Taiwan for planning and designing a circular industrial park
- A forum on circular architecture has just been held by TaiSugar on June 15th. TaiSugar takes the Shalun Green Energy Science Park which is planning to build a new residential project in the park, as the first building project in Taiwan that will apply the concept of circular economy into its construction process. Speakers from the Netherlands, UK, and Taiwan are all contributing their experience and knowledge to better shape this project towards more circular. The public tender for this first circular architecture project is expected to be announced in the next two months. TaiSugar a state-run cooperation and as one of the largest land owners in Taiwan, has the ambition to develop the future construction projects (e.g. public housing) all in circular.

### 3. *Water purification / recycling:*

- Government's "Forward-looking Infrastructure Construction Program" is request to allocate NTD 3.5 billion (€108 million) for building up at least 6 reclaimed water projects nationwide. Furthermore, it is required the newly built industrial park has to equipped with a water reclamation plan, because it is a compulsory that companies/factories located in the industrial park has to use certain percentage of reclaimed water in their manufactory. Furthermore, introducing technology for extracting chemicals (e.g. phosphate) from the waste water to Taiwan could be the extra value-added to Water Resource Agency, Industrial Park Administration (MOEA and/or MOST), regional government officials (Economic Development Bureau and Water Bureau), and more could be the water-related project owners.
- The nationwide water environmental demonstration plan tends to build up 43 demonstration sites in Taiwan by installing water permeable pavement, green roof, ecological water detention facilities, planting ditch, infiltration side ditch/well to low down the impact on urban development.

### 4. *Training program on CE:*

- The Netherlands is recognized as one the foremost frontrunners in CE in Taiwan. Taiwan is enthusiastic to learn from the Netherlands how CE has been developed in terms of policy making and implementation, as well as the best practices. A well-developed training program on CE (maybe issue a certificate for completing courses in a specific sector) will definitely be appreciated in Taiwan. Potential local partners could be universities, research institutes, and CE organizations (e.g. TCEN) in Taiwan.



- Knowledge that are specifically required by local (knowledge) parties:
  - Giving knowledge and advices (application of circular thinking) to the results from Substance Flow Analysis (SFA) /or Material Flow Analysis; e.g. specific sector knowledge
  - Knowledge on how to upcycle the waste materials from various industries
  - Sharing best practices and case study; e.g. new circular business model user behavior, circular supply chain management
  - Circular design method; production process re-design
  - Quantitative study on environmental economic benefit of circular economy
  - Knowledge for schools

**Why innovation mission to Taiwan:**

1. Meeting and workshop with ministerial government officials
2. Meeting Workshop with city government officials
3. Seminar/forum on sharing and exchange knowledge regarding CE development in the Netherlands and Taiwan
4. Site visits to CE parks and companies in Taiwan
5. Explore and discuss projects for cooperation
6. Business matchmaking
7. Networking event