Kingdom of the Netherlands

Circular Economy in Thailand

Thailand is looking into transforming its business models and operations towards a Circular Economy, as demand for green consumption grows and companies continue to develop innovative ways to use waste and by-products. Backed by government support, Thailand's resource constraints and challenges are turning into opportunities for Dutch solutions that can harness advanced technologies to 'close the loop.'

Developments

Thailand is well-positioned to capitalise on the global shift towards a Circular Economy (CE). Some companies have already incorporated the CE concept in their practices, and government policies provide an attractive business climate for those looking to add value to raw materials or turn waste and plastic into green industries.

Until recently, many Thai consumers had little awareness of global environmental issues. The recent story about a young dugong that died from ingesting plastic has made a significant impact on many Thais and changed the way they think about ecological conservation and plastic waste.

The shift towards green consumption and the call for environmentally responsible business aim to accelerate Thailand's transition from the linear 'take-make-dispose' model, to the circular paradigm of 'make-use-return,' generating more business opportunities for CE companies and startups.

Resource Consumption and Waste in Thailand

Thailand has made remarkable progress in social and economic development, moving from a low-income to an upper-income country in less than a generation. The economy grew rapidly at an average annual rate of 7.5% in the boom years of 1960-1996 and around 4-5% following the Asian Financial Crisis from 1999-2019.

The economic development in Thailand has resulted in the enlargement of the middle-income class, an expansion of the urban community, and an increase in domestic consumption, leading to the rapid growth of waste generation. In 2018, Thailand created over 27 million tons of municipal solid waste (MSW). While the majority of MSW was recycled (34%) or properly disposed of (39%), only about 25% of the plastic waste was adequately treated.

According to the research of Thailand Plastics Institute and Chulalongkorn University, in 2018, the plastic waste from consumers was 2.1 million tons. Of this amount, 1.5 million tons ended up in landfills or incineration. Only 0.4 million tons were recycled while 0.01-0.03 million tons were likely to leak from the system into the ocean.

Thailand is the world's 10th largest marine plastic polluter as ranked by Mass of Mismanaged Plastic Waste, with over 30,000 tons of plastic waste leaking into the oceans annually. About 80% of this litter comes from land-based activities and the rest from sea-based activities such as fishery and tourism. Thailand's plastic waste in the sea is mostly bags (13%), straws (10%) and food containers (8%). Nevertheless, the country is more aware than ever of the threat that plastic waste poses on the ecosystem and the environment.

Circularity Transition in Thailand

Repairing, replacing, recycling and recovering have been around for some time. However, circularity in Thailand seems to centre around the reuse of products and raw materials, rather than the prevention of waste and harmful emissions.

Nevertheless, the concept of 'Closing the loop' is adopted more and more by Thai operators. CE principles are increasingly incorporated into strategies, operations and business models. See the boxes for examples of CE initiatives by leading corporations in Thailand.

Magnolia Quality Development Corp, a real estate developer, focuses on passive design as a CE principle. The company uses the 3D modelling stage during the design process to make sure that the natural resources are optimised, and efficient equipment or materials are added into the building. It also reuses plastic waste in property development projects.

Opportunities for Dutch Business

Thailand is paving the way towards a sustainable circular industry, fueled by industry transformations and adjustments in the policy framework. Together with changing consumer behaviour and the introduction of green consumption, the market for CE and eco-friendly products is growing.

However, the supply has not yet met the demand. Several challenges in Thailand could turn into opportunities for Dutch business. Thailand is looking for solutions, starting with changing the way people think about products and the production processes (rethink), redesign, recycling technologies, and resource recovery.

Circular Design

While more companies are aware of the environmental impact of their production process and are starting to incorporate CE concept into their business strategies, many companies have focused on the lower part of the R-ladder (repair, remanufacture, recycle, and recover).

The Dutch **knowledge on circular design principles,** based on 'Products that Last' and the high-grade sustainable reuse of materials, would help to 'close the loop.' These Dutch principles can support the reshaping of the mindset and system by reducing dependency on primary materials and energy, by creating new products and inventing new production processes as well as changing business models.

Urban Waste Management

Thailand's waste management plan calls for 75% of total solid waste to be properly disposed or recycled by 2021. However, unsorted waste, open dumping, and impractical recycling system remain prevalent, particularly in large cities such as Bangkok Metropolitan.

Since the composition of waste in Thailand is dominated by organic waste followed by paper, plastic, glass, and metal, no single method of MSW management can deal with all materials in an environmentally sustainable way. Therefore, a suitable approach should be an integrated approach in which complementarities between different parts of the waste management chain are utilised to ensure maximum value.

Dutch solutions for **sorting, separating, segregating, and recycling of urban waste** could fill in the gaps Thailand is facing (see further details under Waste to Energy). This also includes **developing an application or creating an incentive system** to encourage households to participate more in the process.

Siam Cement Group has manufactured asphalt for roads made in part from recycled glass and bottles, reconditioned waste that can be used as an alternative to fuel, and innovative packaging which requires less raw materials yet maintains the same durability.

Waste to Energy (WTE)

Thailand's energy demand is expected to increase by 70% in the next two decades. The country that currently relies heavily on energy imports has to plan for energy security through improved efficiency and greater use of renewable energy sources. The revised Power Development Plan calls for gradually opening up investor participation in WTE power projects, setting the goal of 500 megawatts or 30% of total renewable resources from such fuel by 2037.

WTE technology in Thailand includes incineration, refuse derived fuel utilisation, anaerobic digestion, pyrolysis, gasification, and landfill gas recovery. Thailand WTE market is well developed in relation to waste collection and landfilling, waste incineration, and the availability of policy and government driven feed-in tariffs.

Turning solid waste into energy will continue to grow with high potential as energy demand and MSW output will rise significantly while open dumping is prohibited. A clean, alternative to landfills, with more hygienic treatment will be high on the development agenda.

Considering Thailand's challenges on spatial waste distribution, waste characteristics, and the pre-treatment of raw waste before entering into the process, Dutch expertise on **the integrated recovery of renewable energy and resources from waste** can be complementary to the Thai WTE market.

Wastewater Treatment

(Also see Factsheet The Water Sector in Thailand)
Wastewater is a prominent environmental problem for Thailand. Increasing population, urbanisation, agricultural and industrial expansion, as well as pollutants from human activities, have contributed to the degradation of water quality.

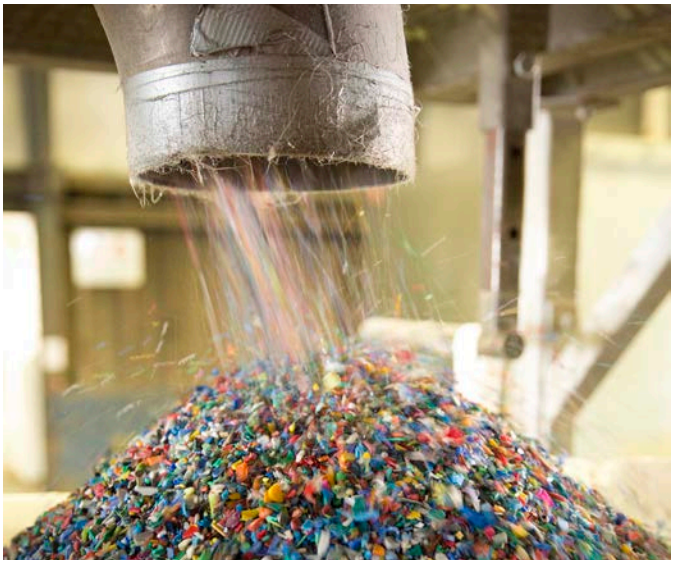
Measures have been adopted to improve the collection and treatment of wastewater, including new regulations, standards, and plans to establish new wastewater treatment facilities. These measures will lead to new investment flows from both the public and private sectors.

CE opportunities for Dutch companies could include **the recovery of resources from used water and urban waste treatment plant sludge.** The laws of the Ministry of Industry require factories to comply with the installation of pre-treatment water systems before discharging wastewater into their main sewage systems which will also stipulate demand for new **water reuse systems** in the treatment of industrial waste.

Plastic Waste Management and Treatment

Thailand's waste management system is not efficient enough to handle the deluge of unwanted plastic waste. The various types of plastics produced by the industry are not yet addressed by law, and neither is their labelling, which causes difficulties in sorting plastic for reuse and recycling. Moreover, plastic is wastefully used during the production process and consumption. According to the Pollution Control Department (PCD), plastic waste in the country continues to increase at an annual rate of 12%. Furthermore, 80% of the total plastic waste consists of single-use plastic bags, dumped along with wet garbage and accumulated in the environment.

In this field, there are opportunities for Dutch **technologies ranging from collecting plastic waste, sorting and separating plastic waste from other garbage, and pre-treatment of plastic waste before entering into the process, all the way to recycling plastics and recovering the compound.**



Green Chemicals

Bioplastics and biodegradable plastics are sets of materials that are becoming a popular replacement for single-use plastics as consumers demand green alternatives.

Unfortunately, bioplastics and biodegradable plastics are not a magic-bullet solution. Single-use plastics and Styrofoam-container producers have been exploring **new chemical innovation to substitute plastics** and are willing to cooperate on R&D efforts to engineer alternative materials which provides an opportunity for Dutch companies.

E-waste Handling and Recovery of Valuable Materials

Despite a ban on e-waste imports, the e-waste industry in Thailand is booming, particularly after China closed its borders to foreign e-waste in 2018. At least 28 new recycling factories have opened in Chachoengsao province. While the government has intensified efforts to close all possible gaps of the law to prevent e-waste from entering into Thailand, the country is also struggling with e-waste produced within the country.

Besides attempts to enhance knowledge and awareness, Thailand is still looking for **modern technologies and tools for sorting and recycling e-waste.** This provides opportunities for Dutch involvement in every step of the process from collection, sorting, dismantling, and material recycling, to turning it into a resource or energy recovery.

Upcycling Food Waste

Staggering amounts of food waste are being generated in Thailand through agricultural processing, food transportation and storage, and human consumption activities. According to PCD, 64% or about 17.6 tons of Thailand's municipal waste is made up of food waste. This figure did not include trash that was managed by private waste management contractors.

Efforts are being made to reduce food loss and waste along the food supply chain. However, problems remain as only a small part of the waste is being recycled. The main culprit, similarly to other types of waste, is the lack of a waste sorting system. The Bangkok Metropolitan Administration is able to recycle only 2% of the food waste collected. The rest goes to landfills, where hygiene is not a priority.

This offers promising opportunities for Dutch technology **on food waste recycling and resource recovery.** Incineration and composting are first-generation of food waste processing technologies. Moving forward, there should also be a focus on the advancement of food **waste valorisation** alternatives to tackle the food waste issue.

Circular Agriculture (CA)

Agriculture is vital to the Thai economy, with a contribution of 10% to its GDP. However, the sector is threatened by the adverse effects of global climate change and limited land and water resources. To strengthen the agricultural value chain, Thailand is deploying transformations in the agro-sector to increase cost-effective productivity through precision technology.

The Thai agricultural system has diversified not only the commodities or crops, but also the geographical factors and the market. While farmers' major commodity crops generate their primary income, agricultural waste and by-products are utilised to create new products which create an additional income for farmers.

Rice and sugarcane, the traditional, vital economic crops of Thailand, provide examples of CA. The by-product from rice production is used for rice bran oil, organic fertiliser, and biomass for silage usage. Sugarcane also presents opportunities for the utilisation of by-products to produce food, feed, and other products for the agro-industry in the form of food ingredient, bio-energy, and household products.

Thailand strives to be a part of the digitalised agro-industry which connects farmers, industries (processors), knowledge (R&D), and consumers while accounting for nature through 'Sustainable Agriculture,' 'Integrated Farming,' and CA. Since the Netherlands is internationally recognised for being an active provider of **innovative approaches towards technological development,** there are ample business opportunities for collaboration between the Netherlands and Thailand on CA.

Challenges

While awareness is rising, the country is in an early stage of its transition towards CE. In this stage, policy frameworks are being adjusted, and the industry is gradually transforming. One should not expect a quick turnaround or large capital expenditures as CE might not be of utmost priority in some instances.

For CE projects, particularly those related to public infrastructure, many agencies and stakeholders will likely be involved. As a result, overlapping responsibilities, conflicting interests and a lack of coordination could cause delays or discontinuity of CE projects.

It is also vital that companies look into their level of competitiveness. Furthermore, being present physically or having a local representative is recommended. Moreover, note that in the case of foreign entities, more opportunities are foreseen for subcontracts than winning direct contracts.

Key Stakeholders

Public Sector

- Pollution Control Department (PCD) www.pcd.go.th
- Department of Environmental Quality Promotion (DEQP) www.deqp.go.th
- Department of Marine and Coastal Resources (DMCR) www.dmcr.go.th
- Department of Industrial Works (DIW) www.diw.go.th
- Department of Alternative Energy Development and Efficiency (DEDE) www.dede.go.th
- Office of National Higher Education Science Research and Innovation Policy Council (NXPO) www.nxpo.or.th
- Wastewater Management Authority of Thailand (WMA) www.wma.or.th

Associations and Institutions

- Thailand Environment Institute (TEI) www.tei.or.th
- Thai Bioplastics Industry Association (TBIA) www.tbia.or.th
- Plastic Institute of Thailand (PIT) www.thaiplastics.org
- Water and Environment Institute for Sustainability (WEIS), Federation of Thai Industries www.weis.fti.or.th

Related Trade Fairs

- Recycling & Recovery Expo www.bigspring-events.com/
- ASEAN Sustainable Energy Week www.asew-expo.com/
- Future Energy Asia www.futureenergyasia.com/
- Recycling & Recovery Expo www.bigspring-events.com/event-recycling-recovery-2021/
- Thai Water Expo www.thai-water.com/

We Support your Business

The Netherlands Embassy in Bangkok offers active support to Dutch companies already present in Thailand, Laos and Cambodia, and Dutch companies interested in doing business in these countries. Our main services include the following:

- Providing information on sectors and rules and regulations.
- Finding potential business partners.
- Supporting trade missions and visiting programs to Thailand.
- Organising meetings with relevant authorities at local, provincial or government level.

Business Support Instruments

The Dutch government has developed several instruments to support Dutch companies in doing business in Thailand.
For more information, please visit the Netherlands Enterprise Agency (RVO) at www.rvo.nl/Thailand

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