



Key Innovative Industries in Taiwan

Circular Economy



Information
Security

Next-Generation
Vehicle

Communications
Industry

Internet
of Things

Semiconductor
Industry

Biopharmacy
Industry

Smart
Machinery

**Circular
Economy**

Green
Energy

Service
Industry

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Policy Initiatives — Circular Economy Promotion Plan

Taiwan has adopted the development of a circular economy as an important policy objective. The government announced the "Circular Economy Promotion Plan" in December 2018 and the Ministry of Economic Affairs was assigned to implement the plan and establish the "Circular Economy Promotion Office." The Plan integrates resources from different government agencies with the aim of incorporating the concepts of the circular economy and sustainable innovation into all kinds of economic activities.



Specifically, the government has adopted four major implementation strategies including the "promotion of circular technologies and material innovation, and establishment of an R&D center," "creation of a new circular economy demonstration park," "promotion of green consumption and exchanges," and "integration of energy resource integration and promotion of industrial symbiosis." The plan is designed to help key industries (e.g. metallurgy, petrochemicals, and other materials industries) develop innovative material technologies and increase the value of renewable resources. It will also tap into the capabilities of industry, government, academia, and research institutions to implement a new circular economy demonstration park, and to share the experience that the government has accumulated in the process of integrating resources and planning for the implementation of its strategies (see Figure 1).

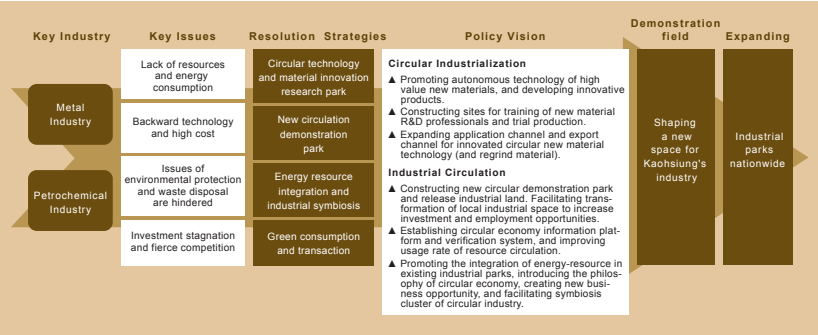


Figure 1 Overall Blueprint of the Circular Economy Promotion Plan

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Overview of Industrial Development

1 | Output Value |

Taiwan, as a world leader in resource recycling, is similar to many European countries in terms of the high population density and lack of resources. Therefore, it has made significant investments in environmental protection over the past 20 years. In 2019, Taiwan's industrial waste reuse rate reached 80% and the output value of the resource recycling industry was NT\$73.4 billion. In addition, there have been many successful cases of industrial symbiosis.

Taiwan began preparing to integrate energy and resources for industrial parks in 2009 and achieved significant results in ecological and recycling industrial parks. Kaohsiung Linhai Industrial Park is Taiwan's most successful industry symbiosis case study to date. Plans for regional energy integration with China Steel as the core have been implemented since 1993. China Steel uses a cogeneration system and recycled waste heat to produce steam. It works with 14 companies to create an energy cycle that includes the supply of byproducts such as steam, oxygen, nitrogen, and argon, which increase the usage efficiency of energy and water. These resources were provided for the company's own use and supplied to nearby petrochemical firms, chemicals firms, and downstream steel makers to achieve significant energy and resource integration, thus achieving the following: 2 million tons/year in energy resource linkage, reduced fuel consumption by 122,000 tons, and reduced carbon dioxide emissions by 378,000 tons.



2

Domestic Industries' Accelerated Investments in the Circular Economy

Many industries in Taiwan have voluntarily formed alliances and integrated resources for investments in the circular economy. They have formed voluntary promotion alliances for individual industries. Electronics, textiles, plastics, petrochemicals, and steel industries have also accelerated the consolidation of the abundant resources of private enterprises since the second half of 2018 to develop integrated alliances across different industries.



3

Industrial and Government Support for Nationwide Circular Economy: Establishment of Taiwan Circular Economy 100 (TCE 100)

The "Taiwan Circular Economy 100 (TCE 100)" was established at the "Asia Pacific Circular Economy Roundtable" on October 17, 2019. More than 220 entities from industry, government, academia, and research institutions have joined TCE 100 and pledged their full support for the circular economy era and implementation of strategies and measures for achieving a circular economy.

The TCE 100 seeks to leverage collaboration between the public and private sectors to concentrate industrial innovation capacity. It aims to duplicate the successful experience of production, consumption, and recycling in order to create new service models based on the circular economy. It shall serve as a role model and exert influence while forming strong foundations in the industry, and shall continue to strengthen international connections and open up a new era of a circular economy with a solid foundation in Taiwan to facilitate global expansion. The TCE 100 shall invite all sectors to take part in the initiative and welcome international partners to form a collaborative platform and jointly create a sustainable supply chain for Taiwan. Together, the partners shall jointly venture into the era of the circular economy and create a better future.



Figure 2 Inauguration of the TCE 100 (October 17, 2019)

Potential Investment and Collaboration Opportunities in Taiwan

1

Development of Market Opportunities for New Materials

The government is promoting green production processes and introducing smart manufacturing for the development of environmentally-friendly, safe, and high value-added products, high-value new materials, and is developing new environmentally-friendly and low-carbon materials. The government welcomes international companies to engage in investments, cooperation, technology transfers, or joint development in Taiwan to develop the new materials market in the Asia-Pacific region.

2

Partnership with Local Industries for Promoting Pilot Programs for the Recycling Industry

According to the "National Recycling Zone Pilot Program and New Material Recycling Industrial Park Application and Establishment Plan," the government has identified the establishment of "circular economy industrial parks" as an important long-term task. It provides international companies with brand new development zones for the development of green and high-value materials.



3

Business Opportunities in the Refining of High-Tech By-products

Taiwan is an important global export hub of high-tech parts and components, and the production processes yield large quantities of high-tech by-products each year. The conditions for investment in Taiwan are favorable to international businesses with technologies for resource refining and reuse.

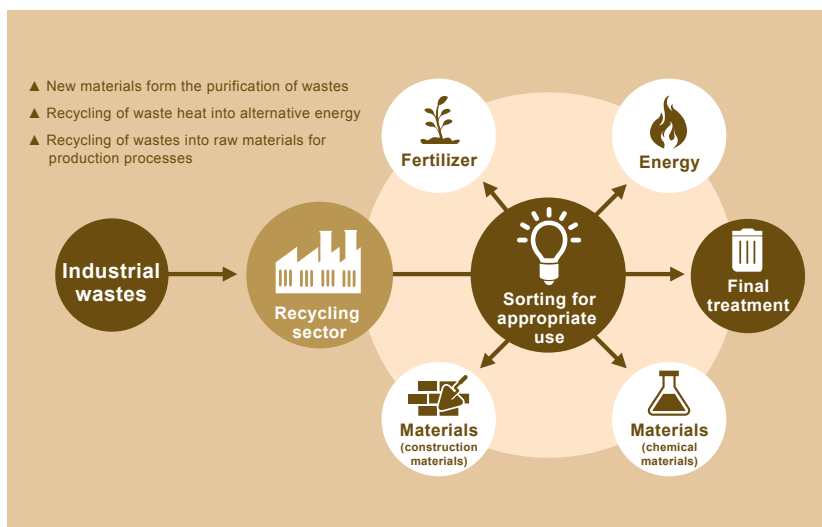


Figure 3 Circular Economy Market Opportunities in Waste Produced by High-Tech Industries in Taiwan



Investment Incentive Measures

1 | Tax incentives |

Taiwan's profit-seeking enterprise income tax rate is 20%. To encourage foreign companies to invest in Taiwan, support industrial innovation, and promote industry-academia collaboration, foreign companies are eligible for the following preferential taxes (Table 1):

Table 1 Preferential taxes

Item	Incentives
R&D and introduction of technology or mechanical equipment	<ul style="list-style-type: none">• Up to 15% of the company's R&D expenditures may be deducted from its profit-seeking enterprise income tax for current year.• Royalty payments to foreign companies for imported new production technologies or products that use patents, copyrights, or other special rights owned by foreign companies is, with the approval of the Industrial Development Bureau, MOEA, exempt from the corporate income tax.• Imported machinery which local manufacturers cannot produce are eligible for duty-free treatment.

Item	Incentives
Investment in smart machinery / 5G	<ul style="list-style-type: none"> • Smart machinery: Automatically scheduled, flexible, or mixed-model production lines that utilize big data, AI, and IoT. • 5G: Related investment projects include 5G communication systems, and new hardware, software, technology, or technical services. • For investments of no less than NT\$1 million and no more than NT\$1 billion, either "5% of investment spending deducted from profit-seeking enterprise income tax (current FY)" or "3% of investment spending deducted from profit-seeking enterprise income tax, if total spending spread over three years" may be selected, but the total amount deducted may not exceed 30% of corporate income tax that year. • The applicable periods are January 1, 2019 through December 31, 2021 (smart machinery) and January 1, 2019 through December 31, 2022 (5G).
Technology investment / Stock-based employee compensation	<ul style="list-style-type: none"> • The worth of shares acquired through technology investment/stock-based employee compensation can be excluded from the taxable income for that year (up to NT\$5 million). In addition, those that meet related criteria are eligible for reduced taxes based on "acquisition price" or "transfer price," whichever is lower.
Foreign Special Professionals	<ul style="list-style-type: none"> • Foreign special professionals who meet criteria are eligible for a 50% deduction of total income tax for amounts exceeding NT\$3 million.
Setting up operations in industry parks	<ul style="list-style-type: none"> • Companies that set up operations in export processing zones, science industrial parks, or free trade ports are eligible for exemptions on import duties, commodity tax, and business tax for the import of machinery and equipment, ingredients, fuel, materials, and semi-finished products for their own use.
Others	<ul style="list-style-type: none"> • Companies that use undistributed earnings to engage in substantive investments may exclude the amount when calculating their profit-seeking enterprise income tax.



2 | Subsidies |

1.The Global R&D Innovation Partner Program

Some foreign companies have a high degree of complementarity with Taiwan's industries. To encourage them to engage in R&D and innovation activities in Taiwan, such companies, after gaining approval from the MOEA, will be eligible for subsidies of up to 50% of total R&D expenditures if they: (1) have technologies that are not yet mature in Taiwan or overseas, and could create strategic products, services, or industries over the course of future industrial development; (2) have potential to help Taiwan produce leading technologies or significantly enhance the competitiveness and increase the added value of important industries; or (3) engage in key and common technology R&D, vertical or horizontal technology integration, and can create an industrial value chain.

2.Integrated R&D Program

Companies, once approved by the MOEA, will be eligible for subsidies of no less than 40% but no more than 50% of total project funding if they: (1) engage in key and common technology R&D, vertical or horizontal technology integration, and can create an industrial value chain; (2) establish industry standards, protocols, or platforms; or (3) establish applications, services, and innovative business and marketing models with technological content, and increase industry's added value.

3.Taiwan Industry Innovation Platform Program

The MOEA Industrial Development Bureau and the Ministry of Science and Technology are jointly implementing the "Taiwan Industry Innovation Platform Program" to guide industries to develop towards greater value, and to encourage companies to enter high-end product application markets to increase industry's overall added value. For companies owning R&D teams in Taiwan, the program provides 40-50% of the funding required for theme-based R&D projects, and up to 40% of funding for R&D projects proposed by the companies themselves.

To support innovative R&D programs for resource recycling and reuse, the Environmental Protection Administration has provided subsidies since 2012 to corporations with capacity for R&D, firms that handle recyclable waste, and private-sector waste disposal entities. The Ministry of Finance has also issued the "Regulations Governing Application of Investment Tax Credits for the Purchase of Equipment and Research Expenditures for Resource Recycling" on July 31, 2007 in accordance with Article 23, paragraph 2 of the "Resource Recycling Act." The Regulations apply to the types of businesses described in Article 15, paragraphs 2 and 4 of the "Resource Recycling Act." Entities that meet the aforementioned requirements may also apply for related tax reductions and exemptions.

In the future, the government shall continue to assist companies in actively driving the transformation of production and consumption, so as to solve the problems of resource scarcity and waste pollution at the source. This approach will provide brand-new business models, profit models, and job opportunities to create value for the circular economy.





Successful Examples of Foreign Companies

1 | International Brands and Taiwanese Businesses Jointly Develop the Circular Economy Value Chain

Major international brands such as IKEA and Decathlon have worked with suppliers in Taiwan to establish a circular economy value chain to demonstrate the green value of their brands. For instance, IKEA plans to reduce overall carbon emissions by 80% from their 2016 level, and to implement the use of sustainable or renewable materials for all products by 2030. Decathlon plans to reduce the carbon emissions of individual products by 40% from their 2016 level by 2026.

Major international manufacturer Dell has successfully worked since 2014 with strategic partners in Taiwan in the establishment of a green supply chain and led the IT industry in the creation of innovative collaboration models for the circular economy to significantly reduce its impact on the environment. Wistron and Dell jointly developed the "Closed-loop Plastic Electronic Waste Recycling Solution" and have recycled 21.5 million pounds of closed-loop plastic materials in more than 125 product lines (including computers, monitors, and servers), which reduced their carbon footprint by 11% compared to original plastic materials. In addition, Wistron, Solar Applied Materials Technology, and Tripod Technology worked with Dell in recycling the gold from computer motherboards in 2017 and successfully introduced the process into the closed-loop recycling cycle.

2 | Investments in Resource Recycling and Reuse

Japanese companies JX Nippon Mining & Metals and Tanaka Precious Metals have invested in the recycling of gold, silver, and copper in Taiwan. They recycle and reproduce metals as functional materials based on customer requirements. NIPPON REFINE and World Resources Company from the United States have invested in the recycling of metals such as copper, nickel, and zinc. The RETHMANN Group from Germany operates the recycling of plastic bottles for the production of long-fiber plastic materials.





3

Enhancing Energy Recycling and Reuse Efficiency in Plants

German company Merck has three entities in Taiwan engaged in R&D and production work involving special materials, and has implemented energy conservation projects since 2006. These projects have improved the dehumidification efficiency of the company's air-conditioning system, reuse wastewater recycled from processes, and recover rainwater to continuously reduce carbon dioxide emissions and waste of water resources.



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