

## **Sustainable Growth/Circular Economy Award**

Award #2: Government authorities

Award Criteria-There is an urgent need for transition to a more sustainable and circular socio-technical systems - now is the best time when we can witness how the health of the planet is connected to the human well-being and vice versa. The most accepted definition of the sustainability is defined by the Brundtland Commission in 1987; sustainability is seen as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Circular Economy (CE) can be defined as a regenerative system in which resource input and waste, emission, and energy leakage are minimized by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling.

As the UN's 2030 deadline for change fast approaches, we explore what role the circular economy has to play in mitigating the impacts of climate change and how the technology industry can learn from it. It is a popular idea as it places an emphasis on designing out waste and pollution, thus keeping products in use for longer and facilitating the regeneration of natural systems. Now, as the world faces an imminent climate crisis, the IT and technology industries are starting to sit up and notice. ICT systems have influenced every aspect of modern life and the CE is no exception. Cutting-edge technologies, such as big data, cloud computing, cyber-physical systems, internet of things, virtual and augmented reality, and blockchain, can play an integral role in the embracing of CE concepts and the rollout of CE programs by governments, organizations, and society as a whole. Many countries are advancing circular electronics initiatives to encourage longer product lifetimes, but legal, policy, and economic support must exist for an open repair environment to motivate consumers to opt for repair over replacement.

This award will recognize Individuals, academic institutions, corporations, NGOs or governments that adopt effective and innovative local, regional or global initiatives that promote local production and use, local renewable energy sources, and adoption of circular and participatory practices for circularity in digital devices, software, internet access and services.

**YOUR NOMINEES (limit three nominations per award category).** *Please specify whether the nominee(s) are for the private or public sector category.*

Kaohsiung City Government, Chinese Taipei

**REASONS FOR NOMINATION** (NOTE: It is important that you make a detailed description of the nominee and why you think the nomination is justified. The absence of a detailed summary of qualifications as they *relate* to the above-mentioned award description will make it difficult for the awards committee to make an appropriate assessment of the candidate):

### **Overview**

Kaohsiung is a city in transformation. While global climate change is creating more extreme weather events, the Kaohsiung City Government has long been committed to promoting mitigation and adaptation actions. Energy-saving, carbon reduction and circular developments are the top priorities in building more livable and sustainable city. According to the latest data, the net CO<sub>2</sub> emissions of Kaohsiung City in 2020 were 53.31 million metric tons of CO<sub>2</sub>e, which was 19.4% lower than the base year (2005), far exceeding the 2025 target set by the central government.

Under our framework for climate adaption, the transportation sector in 2020 accounted for 4.159 million greenhouse gas emission, which is around 7.3% of the total greenhouse gas emission by Kaohsiung City. Vehicles on the road accounted for more than 97.2% of the transportation sector, as this is largely due to the 2.02 million scooters and 940 thousand cars that run on gasoline. On average, every citizen owns more than 1 scooter, and every one out of three citizens owns a car.

Kaohsiung City aims to be net-zero in 2050, and is committed to tackle this problem by introducing carbon reduction measures, which include having an orange and red line for MRT, and circular light rail, an introduction of shared vehicles including electric scooters and bikes such as YouBike 2.0 and Goshare for last mile travelling. Furthermore, the city also upgrades the current fleet of buses and boats with electric buses and boats. Lastly, the MeNGo (Mobility-as-a-Service) integrates the diversified transportation into one single large network to finish the last piece for the comprehensive completion of the interconnected and multimodal transportation network in Kaohsiung City.

The measures we have taken in the transportation sector had contributed to this. Kaohsiung City has been promoting the adoption of green public transport. The

government is committed to building more rental stations and paths, as well as increasing space for bike parking.

Kaohsiung, being the first city to implement MaaS in ASEAN, the green and low-carbon transport network is made complete, as at present, 35% of the citizens who use MeNGo cards are transferred from the original car and motorcycle owners. It is obvious that such innovative services can indeed attract the public to change their habits of transportation, thereby reducing air pollution and the accident rate of riding motorcycles. MeNGo 2.0 had replaced the need of the MeNGo card with the QR code feature app on the portable phone, both on android and iPhone. As of February 10, 2022, the members have exceeded 44,000. A cumulative 210,000 monthly passes have been sold, with over 12 million users.

### **Challenges**

Due to its special geographical characteristics, the population distribution in Kaohsiung is uneven. 95% of the population lives in the metropolitan area that only accounts for 25% of the city's overall area. Kaohsiung City's transportation sector is faced with around 7.3% of the total greenhouse gas emission. Vehicles on the road accounted for more than 97.2% of the transportation sector, as this is largely due to the 2.02 million scooters and 940 thousands cars that run on gasoline.

In Chinese Taipei's metropolitan area, the source of air pollution that is accountable to transportation and mobility is around 30~37%, of which private vehicles and trucks account for 22%. Tom Tom Traffic Index in 2019 shows Kaohsiung City's congestion is ranked 87<sup>th</sup>, with private vehicles ownership around 80%, and public transportation usage was only 9.3%.

There's a need for a better way of transportation in Kaohsiung that is green and low-carbon. Citizens that travel on scooters and cars need better ways of transit. Although there were many public transportation services available, a lack of integration of them can discourage citizens from using them. This had created the need for a transportation hub in Kaohsiung, and this is the integrated service MaaS, with the orange and red MRT lines, and a circular light rail that runs through them as the core of the network, the MaaS service also integrates the shared bikes and electric scooter services for the last mile travel.

## **Strategies**

- 1. Kaohsiung City's GHG Emissions Regulatory Action Plan**
- 2. Transportation Sector Revamped in Kaohsiung**
- 3. Promotion of MaaS and MeNGo**

### **Kaohsiung City's GHG Emissions Regulatory Action Plan**

The first phase of Kaohsiung City's GHG Emissions Regulatory Action Plan spans the period from 2018 to 2020, during which time different sectors formulated policies and concrete action plans in their responsible areas. The target of this phase is to reduce the carbon dioxide from the transportation sector by 108,000 metric tons. These include:

- Build multifunctional bike lanes to promote low-carbon means of transport
- Provide discounts for renting YouBike to increase people's willingness to use the service
- Install more YouBike stations to expand service
- Provide discounts for transferring between public transit
- Provide shuttle buses in different regions
- Digitalize bus services (such as installing smart bus stops or improving how bus information is updated) to enhance efficiency and increase the number of users.
- Build circular light rail in the City
- Integrate high school and vocational school student IDs with iPASS
- Replace old diesel-fueled ferries with electricity-powered ones
- Purchase low-carbon or clean energy-fueled cars for the government fleet
- Promote low-emissions means of transport by introducing electric or low-carbon busses
- Implement fuel tax exemptions for electric cars
- Impose high parking fees for cars and motorbikes
- Install more bike stands to create a cyclist-friendly environment
- Offer subsidies or discounts for replacing old motorbikes with electric scooters
- Replace old diesel cars manufactured before June 30, 1999

<p>Transportation</p>	<ul style="list-style-type: none"> <li>●Build multifunctional bike lanes to promote low-carbon means of transport</li> <li>●Provide discounts for renting YouBike to increase people's willingness to use the service</li> <li>●Install more YouBike stations to expand service</li> <li>●Provide discounts for transferring between public transit</li> <li>●Provide shuttle buses in different regions</li> <li>●Digitalize bus services (such as installing smart bus stops or improving how bus information is updated) to enhance efficiency and increase the number of users.</li> <li>●Build circular light rail in the City</li> <li>●Integrate high school and vocational school student IDs with IPASS</li> <li>●Replace old diesel-fueled ferries with electricity-powered ones</li> <li>●Purchase low-carbon or clean energy-fueled cars for the government fleet</li> </ul> <p>Promote low-emissions means of transport by introducing electric or low-carbon busses</p> <ul style="list-style-type: none"> <li>●Implement fuel tax exemptions for electric cars</li> <li>●Impose high parking fees for cars and motorbikes</li> <li>●Install more bike stands to create a cyclist-friendly environment</li> <li>●Offer subsidies or discounts for replacing old motorbikes with electric scooters</li> <li>●Replace old diesel cars manufactured before June 30, 1999</li> </ul>	<p>Kaohsiung Mass Rapid Transit, Transportation Bureau, Environmental Protection Bureau, Finance Bureau, Tourism Bureau, Education Bureau, Department of Administrative and International Affairs</p>	<p>10.8</p>
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### Transportation Sector Revamped in Kaohsiung

Kaohsiung City has constructed green transportation network in order to accomplish its energy-saving and carbon-reduction goals. The comprehensive, and interconnected network includes the core hub – MRT and light rail, and the electrification of the vehicles, and the upgrade of last mile travel with sharing network.

#### 1. MRT, light rail and train

There are two MRT lines (the Red Line & the Orange Line of KMRT) and one circular light rail system, which figures the first light rail in Chinese Taipei. KMRT has a total length of 42.7 km and 37 stations. The circular light rail system has completed its first phase (C1 to C14) on September 26, 2017, and the second phase started commercial operation on March 1, 2021. The light rail integrates cultural and creative industries and waterfront development, gradually enriching the connotation of tourism industry in Kaohsiung. It is estimated that as the construction of the Asia New Bay Area completed, there will be around 4 million tourists every year. The light rail is expected to alleviate congestion. The picture below shows the Red and Orange Line and the Yellow Circular Line for Kaohsiung’s metropolitan area.



In addition to several national and provincial highways to all parts of Chinese Taipei, Kaohsiung City is served by the Railways Administration's Western Line, and High Speed Rail also serves Kaohsiung City at Zuoying Station in northern Kaohsiung City. Kaohsiung International Airport and Kaohsiung Port are the main bases for international transportation.

## 2. Electrification

As of the first half of 2021, the total number of barrier-free buses in Kaohsiung has reached 596, including 192 electric buses.

The rise of electric cars is pushing other industries, such as freight transport, aviation, and shipping, to get electrified as well. Riding on the tide of electrification, Kaohsiung City replaced old ferries sailing between Qijin and Gushan District with electric ones: Chi-Fu No. 1 and Chi-Fu No. 2, respectively. Furthermore, in pursuit of sustainable development, the City government has dedicated itself to promoting electric buses. By September 2021, the government had introduced 192 electric busses to the City, which accounted for 19.03% of vehicles in its bus fleet. The government aims to push the percentage to 60% by 2025 and offer fully electric city buses service by 2030.



Kaohsiung City has been promoting the adoption of green public transport. By September 2021, the government had already replaced 197,000 scooters with two-stroke engines, surpassing every other region in Chinese Taipei. In addition, the government also built bicycle tracks alongside MRT stations, spanning 1,035.3 kilometers.

As for private motorized transport, there are 919,000 passenger cars and 2.038 million scooters in Kaohsiung by 2020. In order to overcome the air pollution, the city government actively encourage the replacement of high-pollution diesel vehicles. In 2020, 25,113 two-stroke motorbikes and 2,046 diesel vehicles were eliminated, both were top-ranked in Chinese Taipei.



### **3. Upgrade of last mile travel with sharing network**

In addition, there are 5 transportation network companies in the city, providing 1,200 shared electric bikes, 2,645 shared electric scooters and 100 shared cars. The service scope covers 13 administrative districts, including Zuoying District, Fongshan District, Lingya District and Yancheng District.

The City's bike-sharing system also underwent a major update. In July 2020, the old C-bike system was replaced by the upgraded version, YouBike 2.0, with service run by the eponymous company YouBike. The upgrade installs a solar panel on the bike so that transactions for the rental can be done on the bike, and it is run by the solar power. In December of the same year alone, the service had been used over one million times. In March 2021, the service also saw its highest daily usage number of 48,000. By August of the same year, the service had been used over 10 million times, and the City had also reached its target of setting up 1,000 bike-sharing stations.

Figure 3-7 Convenient and widely-available YouBike 2.0 rental station



Figure 3-8 A public-sharing electric scooter in Kaohsiung

### Promotion of MaaS and MeNGo upgrade

As more and more transportation are made available and upgraded and forming an interconnected and multimodal transportation network, MaaS has an important role to be the integrator to provide citizens the access and convenience to Kaohsiung's complete transportation network. MaaS's role, besides the integration of various transportations, it has to solve the problem of the difficulty of citizens making transits, as the switching from one transportation to another might require different payments and travel distances. MaaS solves this problem by providing connectivity through shared vehicles and giving citizens discounts. Through technological



such as four extra ferry trips, exemption of YouBike 2.0 fee for the first thirty minutes of rental, and an extra 200 or 600 MeNGo points, which can be used to pay for taxis, public electric scooter rentals, or monthly pass of MRT parking. On October 1, 2021, the government expanded the MeNGo options to offer 24-hour, 48-hour, and 72-hour passes, encouraging people to use busses, MRT, and other forms of public transport to move around in the City. With this upgrade, MeNGo became smarter to include the QR Code feature from the phone. Via MeNGo, the City hopes to improve the public transportation system in Kaohsiung and fulfill its responsibility to improve air quality and cut GHG emissions.

### **International Activities**

Kaohsiung City has made outstanding achievements in promoting MeNGo transportation action services. It is the first city in Asia to promote Mobility as a Service(MaaS), attracting many Asian cities to come and learn our experience. On April 19th, 2022, the Kaohsiung City Transportation Bureau and Tokyo's Odakyu Electric Railway Co. ,Ltd. had signed a MOU, and the two parties will jointly promote innovative MaaS services in the future and enhance transportation exchanges between Chinese Taipei and Japan.

In May, Institute of Transportation, Ministry of Transportation and Communications & the Transportation Bureau of Kaohsiung City Government's "Mobility as a Service : MeNGo Program-New Opportunities for the Digital Transformation of Transportation Services" had also won the silver medal award from 17 member economies and 65 projects in the Smart Transport category in APEC 5th ESCI Best Practices Awards Program.

**SUPPORTING INFORMATION:** Please send any supporting information to the address above, including information from candidate (i.e. excerpt from program description, web site print-out, press release, etc.)

Video: <https://www.youtube.com/watch?v=acUfRfSj4YA>

### **NOMINEE CONTACT INFORMATION** (for award follow up and coordination)

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