2022

Kaohsiung City
Voluntary Local Review

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Words from the Mayor

In a city geared to international standards, Kaohsiung City Government published the first Voluntary Local Review (VLR) last year (2021). To respond to the spirit of "leaving no one behind" of the Sustainable Development Goals (SDGs), a comprehensive review with 17 indicators was conducted. The compilation of Kaohsiung City VLR has officially entered its second year. In response to the international trend, this year (2022) we are taking sustainable net zero as the theme, and incorporate the four transformation strategies: energy, industry, life, and society of the "General Statement of Taiwan's 2050 Net Zero Emission Path and Strategies" to echo the net zero strategy of the City. In addition, SDGs policies and indicators are reviewed as guidelines for the City to move towards net zero and becoming an international sustainable city.

In the past, Kaohsiung City was associated with a large factory, a culture desert, a victim of heavy industry development, and a bearer of environmental costs. Now Kaohsiung City is actively pursuing SDGs. In June of this year (2022), we launched three policies at a time. By formulating the "Kaohsiung City Autonomous Act of Net Zero City", we announced the net zero path. The establishment of the "Net Zero Industry Alliance" demonstrated our determination to reduce carbon. We also actively developed high-tech smart industries, such as semiconductor S-corridor, 5G, and AIoT to build a sustainable smart city, while achieving the goals of net zero and digital dual-axis transformation.

Apart from the industrial transformation, we also embarked with the citizens on the sustainable net zero life transformation from different aspects. We promote measures such as mass rapid transit, light rail transit, shared vehicle, low-carbon community, resource recycling, and green consumption and production; implement the net zero life on every aspect. Also, we pass the sustainable seeds onto the citizens and the next generation through net zero education, fostering care for the environment and a sense of mission, and jointly protecting our Earth.

Net zero in 2050 is not only the goal of our country but the goal of Kaohsiung City. Through four major transformations, 18 specific strategies and climate laws, the City Government will actively work with citizens, industries, non-governmental organizations, and academia to defend the climate change, reduce risks and impact on life, implement SDGs, and build a green, sustainable, and smart Kaohsiung together.

Mayor of
Kaohsiung City 陳其邁

Introduction

Extreme weather is becoming increasingly severe and reducing greenhouse gas is an inevitable challenge too. According to the sixth assessment report (IPCC AR6) of the United Nations Intergovernmental Panel on Climate Change (IPCC), global warming will increase the temperature of the earth's surface by 1.5 degrees Celsius in nearly 20 years. Not only is the climate model affected, but it also impacts the ecology that is extremely sensitive to the environment, and promotes extreme weather, including: heat waves, droughts, forest fires, heavy rains, and floods, causing energy, food, and water resource crises. The United Nations Climate Change Conference called for more urgent climate action to halve global greenhouse gas emissions by 2030 and reach net zero by 2050 to mitigate the impact of the climate crisis.

According to the statistics on net zero tracker (as of early 2022), more than 130 countries have declared net zero emissions as their goal. Our President also made the declaration on the Earth Day on April 22, 2021, and for the first time included the goal of net zero emissions in the "Climate Change Adaptation Act" draft. In order to implement the goal of net zero transformation, the National Development Council announced the "General Statement of Taiwan's 2050 Net Zero Emission Path and Strategies" in March 2022 as the direction for the country's net zero development.

As the largest industrial city in Taiwan, Kaohsiung City Government has promoted industrial low-carbon transformation and carbon reduction policies for various departments over the years. In 2020, Kaohsiung City's net emissions had been reduced by 19.4% compared with that in the base year (2005), far exceeding the national target for the same period (10%). In the face of city net zero and sustainable issues, Kaohsiung City actively implements coping policies and continues to move forward. At present, the City Government has set a target of 30% reduction by 2030, formulated four major transformation strategies and law foundations, supplemented by the specific policies of going green and reducing carbon, smart technology, resource recycling, green transportation, low-carbon community, and sustainable rooting. Also, our goal will take root through sustainable net zero education to jointly implement SDGs with citizens, industries, non-governmental organizations, and academia to move to become a 2050 net zero harbor city.

Sustainable Development Goals

In September 2015, the United Nations published “Transforming our world: the 2030 Agenda for Sustainable Development”, which divided the 17 goals in the SDGs into 5Ps: People (of social value), Prosperity (of economic value), Planet (of environmental value), Peace, and Partnership (of implementation level). Under the core spirit of “leaving no one behind”, this will achieve the goal of sustainable common prosperity and common good.

Kaohsiung City also expects to implement all SDGs by 2030 and releases the VLR every year to reveal the annual implementation results. In the process of net zero transformation, it will become a new model of a smart and sustainable harbor city.

People

End poverty, hunger, and promote well-being; ensure that everyone can live an equal and healthy life; realize the pursuit of self-worth and goals.

Prosperity

Let all people enjoy a prosperous and fulfilling life, and realize coexistence and co-prosperity with nature through economic, technological development and social progress.

Planet

In the face of severe climate change, we must take actions, such as: conserve the dwindling and increasingly deficient planet through sustainable production, sustainable consumption patterns and management of natural resources so that future generations can live and work in peace and contentment for a long time.

Peace

Peace and sustainable development are two sides of the same coin. All people deserve to live in peaceful, just, and inclusive societies free from violence and fear.

Partnership

To strengthen and consolidate the global partnership, all countries, stakeholders and even the people must work together, focus on caring for the needs of the disadvantaged and poor groups, and realize sustainable general mobilization.


Kaihin Park
海浜公園

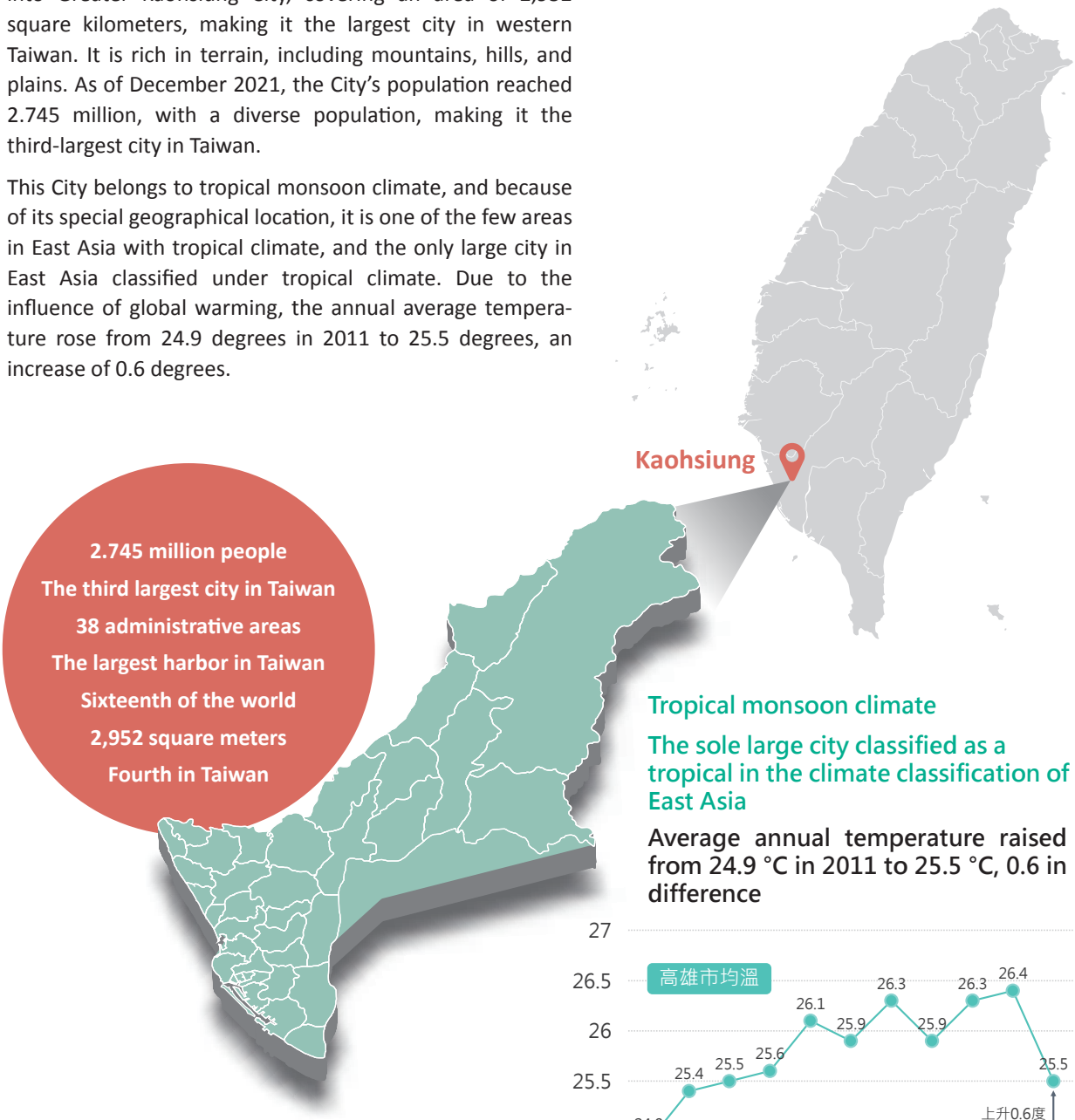
An Overview of Kaohsiung

Current Situation of Geographical Environment

Kaohsiung City is in the southwest part of Taiwan. The special geographical environment and the ocean have always been the sources of important industrial power and the core of the City's identity. It has the Port of Kaohsiung, the largest harbor in Taiwan and the 16th largest harbor in the world, and Kaohsiung International Airport. Also, it is the first city in Taiwan to have a seaport, airport, railway, MRT and light rail at the same time. Due to the regulation of the marine climate, it is sunny and pleasant throughout the year, and has the unique characteristics of an "ocean capital".

On December 25, 2010, Kaohsiung County and City merged into Greater Kaohsiung City, covering an area of 2,952 square kilometers, making it the largest city in western Taiwan. It is rich in terrain, including mountains, hills, and plains. As of December 2021, the City's population reached 2.745 million, with a diverse population, making it the third-largest city in Taiwan.

This City belongs to tropical monsoon climate, and because of its special geographical location, it is one of the few areas in East Asia with tropical climate, and the only large city in East Asia classified under tropical climate. Due to the influence of global warming, the annual average temperature rose from 24.9 degrees in 2011 to 25.5 degrees, an increase of 0.6 degrees.

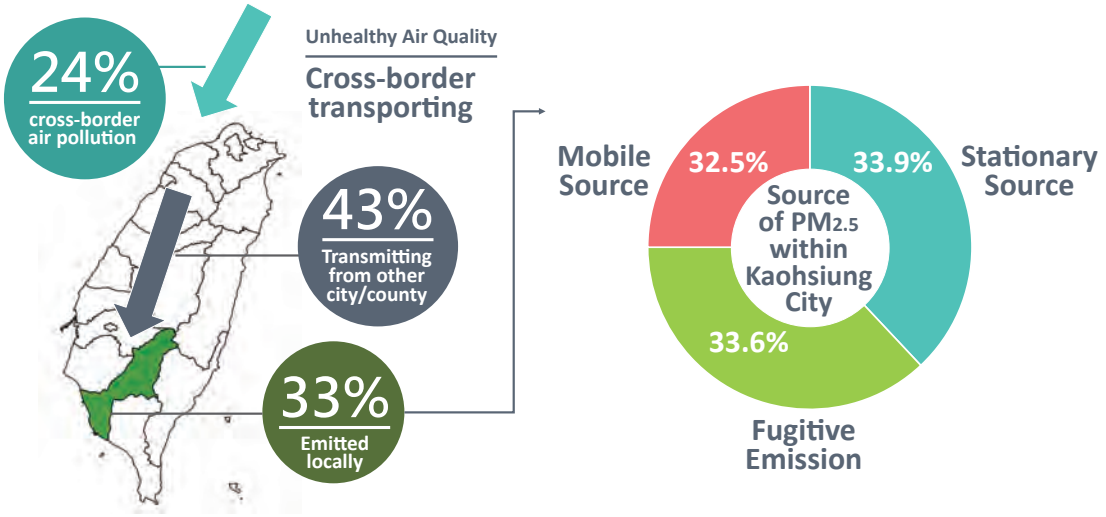


(La Niña was observed in 2020 and 2021)

Environmental Load

Due to the prevailing northeast monsoon in autumn and winter (October to March) and Kaohsiung being in the weak wind outflow and leeward, the pollutants are not easily dissipated after being introduced. According to data from the Environmental Protection Agency (EPA), 33% of air pollution in Kaohsiung City is locally generated, and it is easily affected by overseas areas and counties and cities north of Kaohsiung. The air quality to be improved is more severe than that of other counties and cities. According to TEDS11.0 of the EPA, the proportion of pollution in Kaohsiung City is 33.9% from stationary sources, 32.5% from mobile sources and 33.6% from fugitive sources.

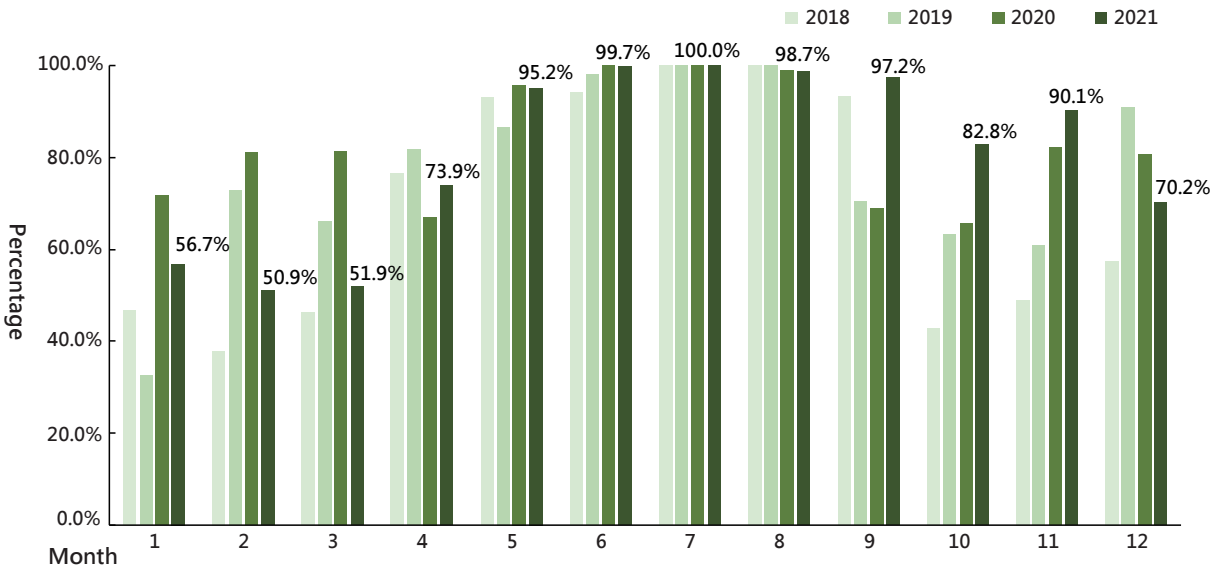
Source of Air Pollution in Autumn/Winter in Kaohsiung



Current Situation of Air Quality

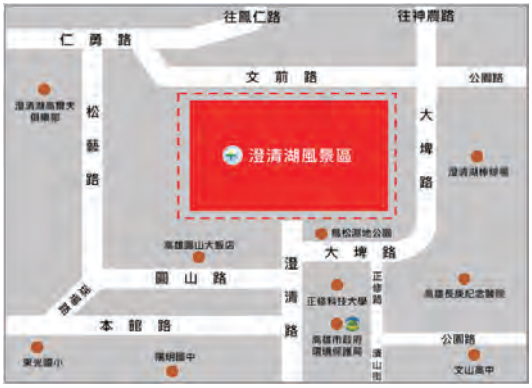
The air quality yield rate (AQI≦100) in the City is improving year by year. The air quality yield rate in 2021 is 80.7%, an increase of 10.5% compared with that in 2018 (69.9%). The air quality yield rate has exceeded 80% for two consecutive years.

Monthly Statistics of 12 Monitoring Stations(AQI≦100) in Kaohsiung



Air Quality Maintenance Zones

In order to protect public health and improve air and leisure quality, on August 5 2021, the Kaohsiung City Government announced the designation of the "Phase I Air Quality Maintenance Zone", which covers three scenic spots, including Shoushan Zoo, Pier-2 Art Center and Chengcing Lake. Subjects are required to comply with the regulations in order to have unrestricted access to the air quality maintenance zone.

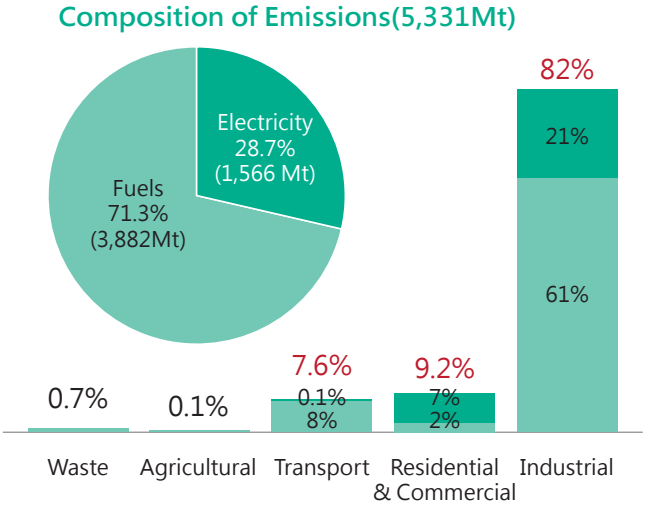


Current Situation of Greenhouse Gas Emissions

Greenhouse gas emissions in Kaohsiung City are mainly divided into six sectors: energy, manufacturing, residential/commercial, transportation, agriculture, and environment. In terms of sector of emission, the industrial sector accounts for the highest City's total emissions (82%), followed by the residential/commercial sector (9.2%) and the transportation sector (7.6%). The environmental and agricultural sectors account for only 0.7% and 0.1%, respectively.

In 2020, the total greenhouse gas emissions were 54.48 million tons, and the net emissions were 53.31 million tons. The main greenhouse gas emissions were Scope 1, with an emission of 38.82 million metric tons, accounting for 71.26% of the total; Scope 2 is mainly the emission of purchased electricity, with an emission of 15.65 million metric tons, accounting for 28.74% of the total.

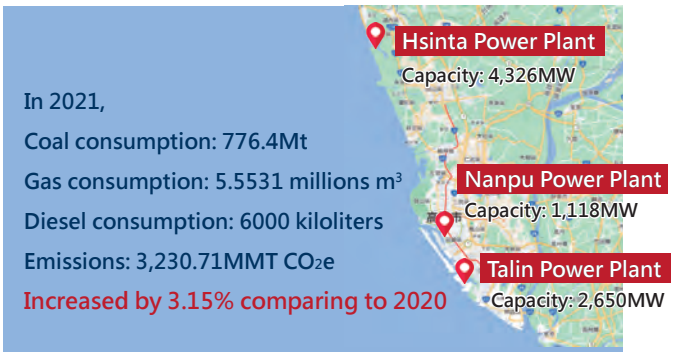
▼ GHG Emissions of Kaohsiung in 2020

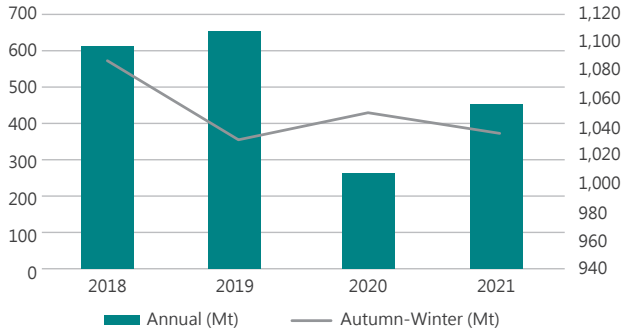


Current Situation of Electricity Consumption and Coal Combustion

There are currently three Taipower plants in Kaohsiung City: Hsinta Power Plant (installed capacity: 4,326MW), Nanpu Power Plant (installed capacity: 1,118MW) and Talin Power Plant (installed capacity: 2,650MW). In 2021, the coal consumption of the three power plants was 7.764 million tons (greenhouse gas emissions of 20.7816 million metric tons of CO_2e), natural gas consumption of 5.5351 million cubic meter (greenhouse gas emissions of 11.5094 million metric tons of CO_2e), and diesel consumption of 6,000 tons kiloliter (greenhouse gas emissions of 16,100 metric tons of CO_2e). The emissions in 2021 was 32.3071 million metric tons of CO_2e, an increase of 3.15% compared to the emissions in 2020 (approximately 31.3205 million metric tons of CO_2e).

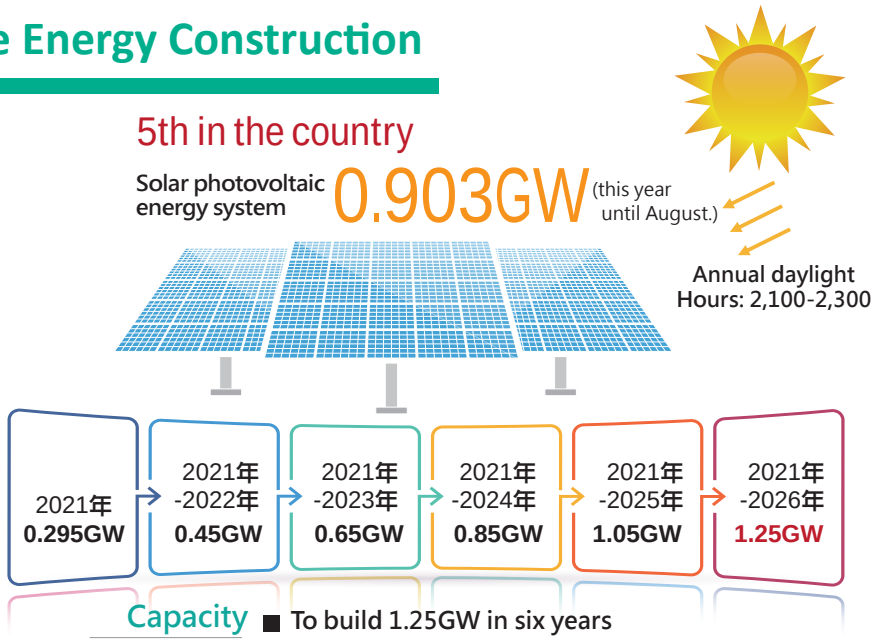
In 2021, the coal consumption of power plants (Hsinta, Talin) and other cogeneration plants was 10.555 million tons. According to the statistics on coal consumption in recent years, in 2020 and 2021, there was a downward trend in the amount of coal consumption whether for the whole year or autumn and winter as we actively complied with the coal reduction measures.





Status of Renewable Energy Construction

Kaohsiung City has good sunshine conditions, with annual sunshine hours as high as 2,100-2,300 hours, and the annual power generation of 1GW is about 1.162 billion kilowatt-hours, which is suitable for setting up a solar photovoltaic system. The installed capacity set up in Kaohsiung City has reached 0.903GW (as of August), ranking fifth in cumulative installed capacity. In the future, it will move at full speed towards the goal of 1.25GW in 6 years (2021-2026). It is estimated that the annual carbon reduction can reach 820,000 tons. In addition to carbon reduction benefits, it can also promote the development of green energy industries.



Sustainable Development Promotion Process

In line with the vision of sustainable development, Kaohsiung City Government re-adjusted the indicator structure with reference to the SDGs and "Taiwan Sustainable Development Goals" in 2020 and set 80 sustainability-related KPI indicators for 2020-2024. The core goals of key development include: ending poverty, improving quality of life, clean water resources, industrialization, innovation and infrastructure, sustainable urban and rural areas, responsible production and consumption cycles, climate change countermeasures, and continuous improvement through rolling reviews. In December of the same year, Mayor Chen Chi-mai's 100-day policy report also promised to start the compilation of VLR of Kaohsiung City, demonstrating the City's determination and achievements in promoting sustainable development.

At the beginning of 2021, the Environmental Protection Bureau immediately invited the relevant bureaus and divisions of the City Government to gradually focus on the highlights of the sustainable development of Kaohsiung City through a number of cross-department meetings, citizen cafes, achievement display workshops, and expert consultation meetings. Furthermore, to respond to the SDGs spirit of "leaving no one behind", a comprehensive review of the 17 SDGs core goals was completed, and the first VLR of Kaohsiung City was completed in August of the same year. It is also publicly disclosed at the Institute for Global Environmental Strategies (IGES) VLR Lab platform.

At the end of March 2022, in response to the announcement of the "General Statement of Taiwan's 2050 Net Zero Emission Path and Strategies" by the National Development Council, Kaohsiung City will follow the country's footsteps and focus on the sustainable net zero goal. This year, we composed "2022 Kaohsiung City Voluntary Local Review" with "Sustainable Net Zero City" as a project. Also, we checked various policy strategies and actions of Kaohsiung City through six themes: going green and reducing carbon, smart technology, resource recycling, green transportation, low-carbon community, and sustainable rooting, and demonstrated the achievements of the City in promoting climate action over the years, including 9 priority promotion goals: SDG4, SDG6, SDG7, SDG9, SDG11, SDG12, SDG13, SDG15 and SDG16, in gradually moving towards a net zero sustainable city by 2050.

SDG4
Quality Education

SDG9
Industry, Innovation and Infrastructure

SDG 13
Climate Action

SDG6
Clean Water and Sanitation

SDG11
Sustainable Cites and Communities

SDG15
Life on Land

SDG7
Affordable and Clean Energy

SDG 12
Responsible Consumption and Production

SDG 16
Peace, Justice and Strong Institutions

Adjustment and integration

After the merger of county and city, the Kaohsiung City Sustainable Development and Climate Change Adjustment Commission was consolidated with six teams and three aspects

2004

Start of sustainable development

Kaohsiung County and City has established the Sustainable Development Committee

2005

Establishment of regional cooperation

The Sustainable Development Commission for the Kaohsiung-Pintung Area was established while a sustainable assessment system was developed

2010 | 2012

Kaohsiung City Sustainable Development and Climate Change Adjustment Commission

Sustainable Economy,
Sustainable Vision,
Sustainable Safety,
Sustainability Education,
Sustainable Environment

No. 1 in Taiwan

Upgraded to Kaohsiung City Sustainable Development and Climate Adaptation Committee, a top-tier platform organization to promote climate and sustainable development. 10 teams are in the Committee.

2016

Response to climate change

Develop adaptation strategies to achieve the vision of a resilient and green ecocity

2017

Self-assessment for international standards

Adjust the indicator structure based on the UN SDGs Mayor Chen Chi-mai's 100-days policy address promising Kaohsiung to start to compile the Voluntary Local Review for demonstration of Kaohsiung's commitment and achievements in sustainable development. Early 2021, several interdepartmental meetings, citizens' cafes, outcome presentation workshops, and expert meetings were held to gradually identify highlights of sustainable development for Kaohsiung City to focus on. Kaohsiung's first Voluntary Local Review was completed in August in the same year.

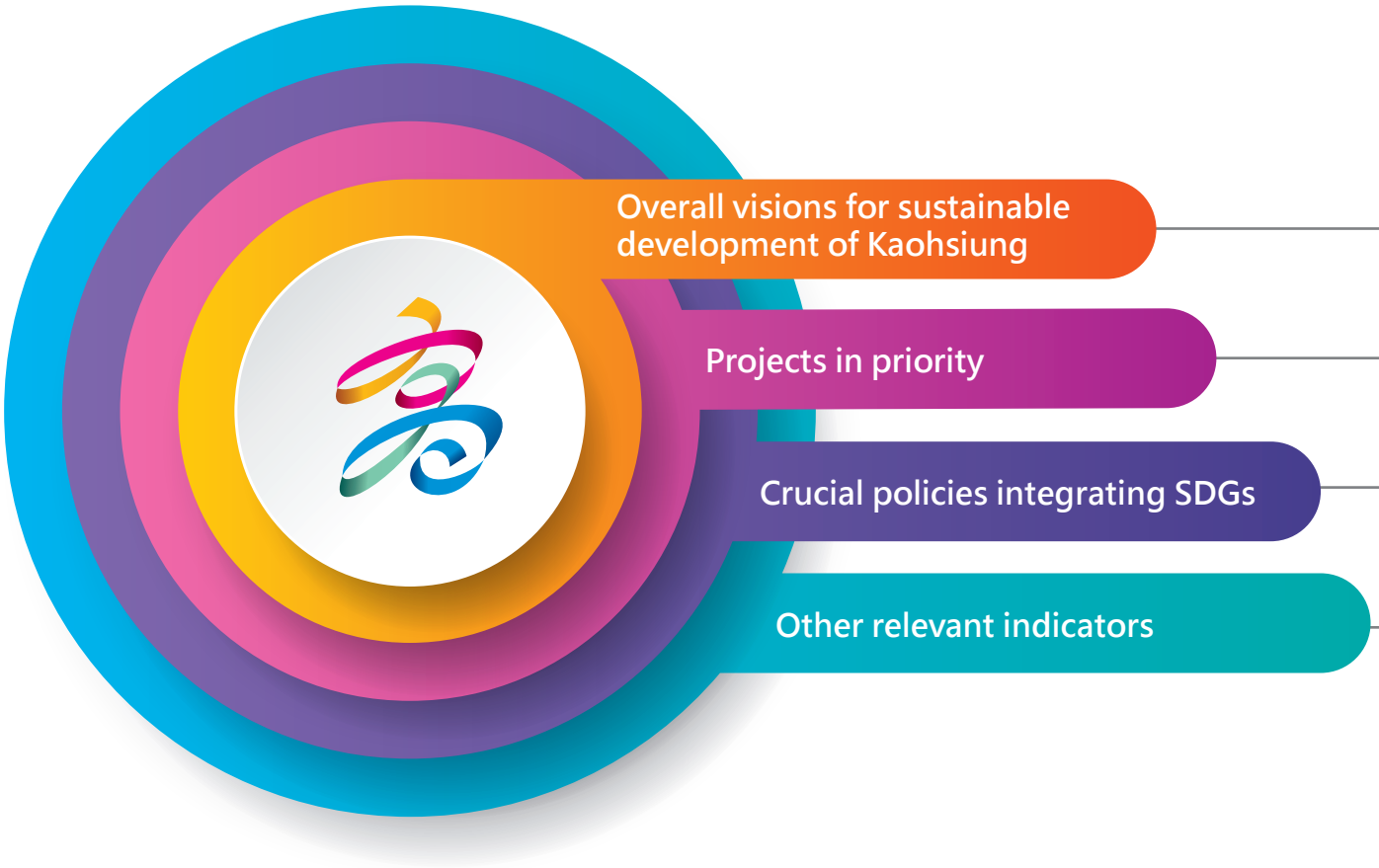
2020

2022

The organizational structure has been adjusted to 5 teams. The second Volunteer Local Review was published while the Kaohsiung announce the "Roadmap of Kaohsiung Race to Zero 2050" and established Net-Zero Industry Alliance.

Methods for Voluntary Local Review

More than half of the world's population lives in cities, and cities and human settlements will be key to achieving the SDGs. The United Nations Sustainable Development Solutions Network published a report in 2016 on how to promote SDGs in cities, explaining that "urban SDG" will build strong partnerships and obtain more resources for cities. Kaohsiung City also refers to the UN's "Global Guiding Elements for Voluntary Local Reviews (VLRs) of SDG implementation", the review methods of counties and cities at home and abroad, and the City's relevant policies to define the City's VLR level and introduce review methods.



01 Level One

General Vision for Sustainable Development of Kaohsiung City

Kaohsiung is currently in the critical period of net zero transformation. Mayor Chen upholds the “spirit of rushing forward” and makes every effort to promote municipal construction, actively implement “industrial transformation”, “increase employment”, “traffic construction”, and “air pollution improvement” as priority policy goals. Also, he takes knowledge and technology as the core of future development. Meanwhile, he employs resources and opportunities to create an attractive and comfortable environment to build the ideal marine capital.

02 Level Two

Kaohsiung City SDGs Priority Promotion Project

With the theme-oriented model adopted this year, plus the international net zero trend in recent years, we have selected the sustainable development goal highlight draft. After being finalized by the city government, “Sustainable Net Zero City” was finally selected as the promotion project for this year.

•With the spirit of "Leaving no one behind."
•Inspect other SDGs relating to policy and assessment indicators.

With Topics such as "Go Green and Reduce Carbon", "Smart Technology", "Circular Economy", "Green Transport", "Low Carbon Community", "Local Sustainability", checking the relevance between SDGs and Kaohsiung City.

Composing the 2022 Volunteer Local Review, based on the project of "Sustainable and Net Zero City".

Policies focus on the priority of industrial transition, employment, transport infrastructure, and reducing air pollution.

03 Level Three

Linking up Kaohsiung City's Policy Focus with SDGs

In response to the national four major transformational strategies, we mainly review the connection between the sustainable development goal to be prioritized this year (2022) and the existing policies of the city with the themes of "going green and reducing carbon, smart technology, resource recycling, green transportation, low-carbon community, and sustainable rooting". We then set the stage goals and schedules for 2025, 2030 to 2050, and observe the synergistic relationships among the sustainable development goals.

04 Level Four

Other Relevant SDGs Policies and EvaluationIndicators of the City

In response to the spirit of "Leaving no one behind", when compiling this report, the City's sustainable development strategy plan is used as a benchmark for comparison. Meanwhile, we review other relevant SDGs policies and evaluation indicators, and connect with the national environmental protection plan and relevant indicators of the City.

Sustainable Net Zero City »

Goals and Strategies

In 2021, the 26th Conference of the Parties (COP 26) of the "United Nations Framework Convention on Climate Change (UNFCCC)" reached the Glasgow Climate Emergency Pact, whose primary task is to control the increase in global temperature to below 1.5 degrees Celsius. The problem of climate change continues to affect the daily life of human beings. For the mutual benefits of the next generation, countries have proposed net zero goals. Our country also announced the "General Statement of Taiwan's 2050 Net Zero Emission Path and Strategies", proposing four major transformation strategies of energy, industry, life, and society, as well as two governance foundations of technological research and development and climate law, supplemented by "Twelve Key Strategies". It is hoped to integrate forces from all sectors of industry, government, and academia to implement the country's goal of net zero transformation by 2050.

2050 Net-Zero Emissions

4 Major Transition Strategies
2 Governance Foundations

Transition Strategies

Energy Transition	Industrial Transition	Lifestyle Transition	Social Transition
The expansion of renewable energy grid infrastructure including wind, solar energy, and new renewable energy (ex., hydrogen, geothermal and ocean energy)	Hi-tech industry, traditional manufacturer. Building sector, vehicle electrification. Food, agriculture, and forestry, circular resource.	Green transportation Environment electrification Business and household(behavioral change)	Just transition Public participation (and social dialogue)

Governance Foundations

Technology R&D	Climate legislation
net-zero technology negative-emission technolog	regulation and policy carbon pricing and green finance

With reference to domestic and foreign strategies, the City sets four transformation strategies for energy, industry, life, and society according to local conditions. Through the 18 specific strategies, achieve the four goals of "reducing carbon emission factor of electricity" is expected: "building low-carbon industrial chains", "net zero lifestyle", and "helping the disadvantaged so that no one is left behind".

To demonstrate the determination of net zero, Kaohsiung City Government held the "Press Conference for the Release of Kaohsiung City's 2050 Net Zero Path and Establishment of Industrial Net Zero Alliance" on June 20, 2022 and announced Kaohsiung City's 2050 Net Zero Path. Meanwhile, Mayor Chen invited industry leaders such as China Steel Corp., CPC Corp., Taipower Company, Innolux Corp., and Green Environment Engineering Incorporation to jointly establish "Industrial Net Zero Alliance". Through industrial leaders' guidance and state enterprises' setting an example, they can share carbon reduction technologies and achievements, and jointly build a low-carbon industrial chain. In addition, Kaohsiung City has formulated the "Kaohsiung City Autonomous Act of Net Zero City" to strengthen the climate law based on the four major transformations of energy, industry, life, and society.

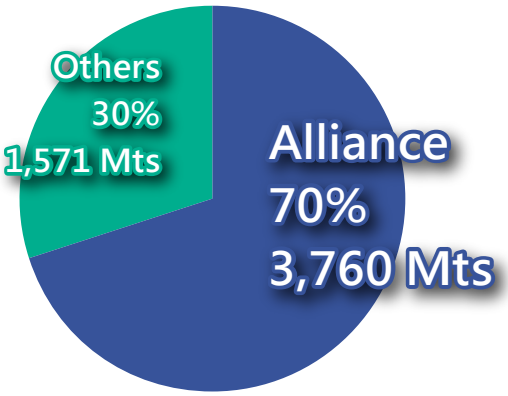
Net-Zero Industry Alliance

The top industry leads the rest. The national industry demonstrates first.

Mission: Sharing the emission reducing technology and promoting the cooperations across different industries. For example: hydrogen smelting, coproduction between steel and petro-chemical plants, energy and resource integration.

Kaohsiung City's Net-Zero Office

- Steel and others — CSC
- Petrochemistry and Paper — CPC
- Electronics — Innolux
- Energy — Taipower
- Circular Economy — Green Environment



Total Carbon Emissions in 2020

Kaohsiung 2050 Net Zero Transformation

4 Transformations/4 targets/

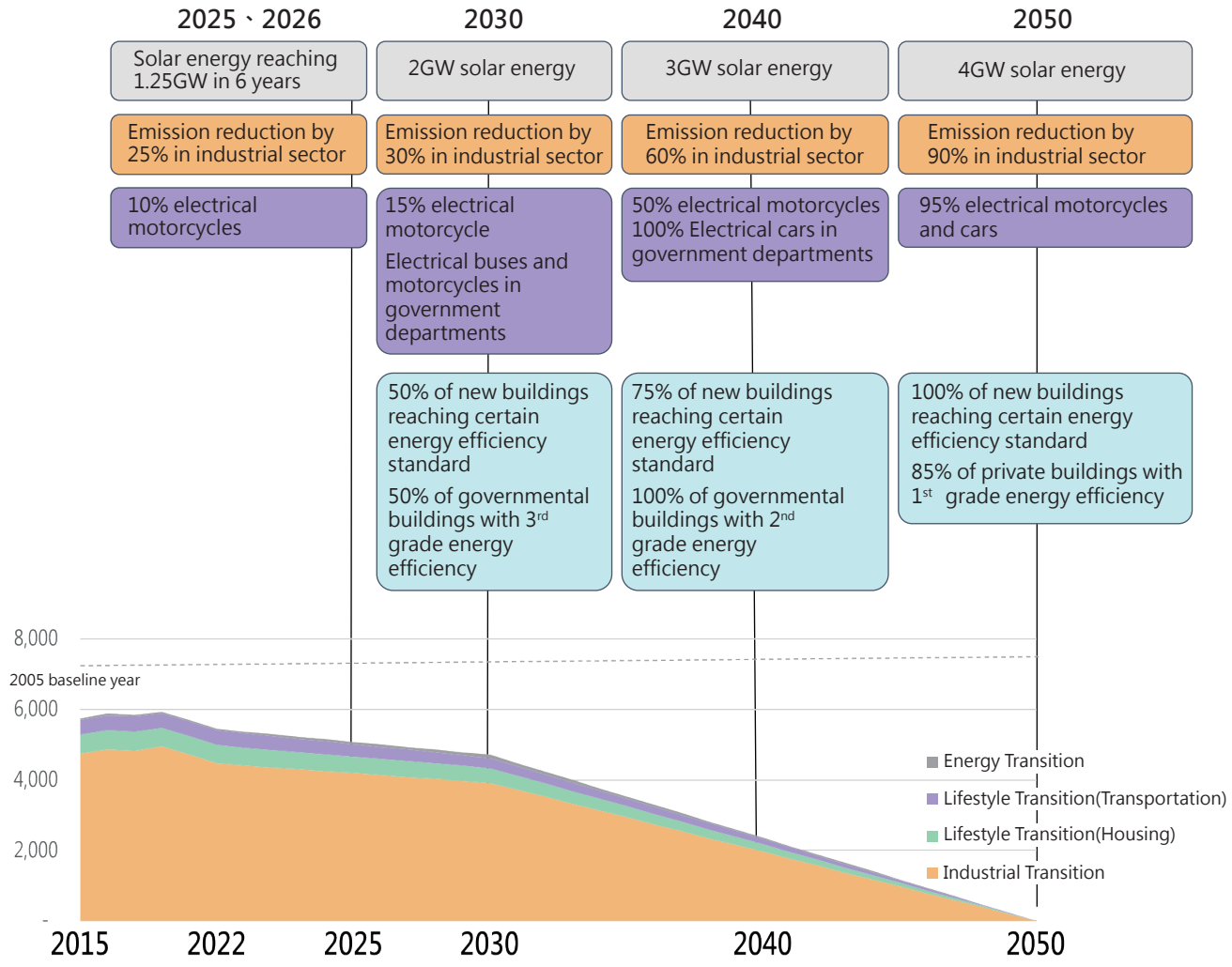
Energy | Industry | Lifestyle | Society

	Lower down the electricity emission factor	Create low-carbon industrial chain	Net-zero lifestyle	Support the poor Leave no one behind
Target				
Strategies	Strategy on gas implementation and coal reduction Build renewable energy	Net-Zero Industry Alliance Enlarge GHG Inventory Energy and Resource Integration Coproduction between steel and petrochemical plants Carbon Capture, Utilization and Storage Hydrogen Smelting Circular/Green Economy	Kaohsiung Building 4.0 Energy saving building Light Rail and MRT Vehicle Electrification Shared Vehicle Low-Carbon/Net-Zero Community	Net-Zero Education Public Participation Just Transition

Kaohsiung City Net Zero Emission Path

To achieve the goal of reducing emissions by 30% in 2030 and net zero emissions in 2050, the City set four goals and 18 strategies based on the four major transformations of energy, industry, life, and society. At the same time, the City also set short-, medium-, and long-term quantitative and qualitative goals of various policies. In addition, with reference to various departments of the central government's promotion of the greenhouse gas implementation plan in the City, we formulated the City's six departmental control implementation plans of energy, manufacturing, residential/commercial, agriculture, waste, and environment to conduct regular follow-up and reviews to ensure that the carbon reduction target is achieved every five years. This will be adjusted on a rolling basis based on the City's policies so as to move towards a net zero port city step by step.

Kaohsiung's Pathways to Net Zero



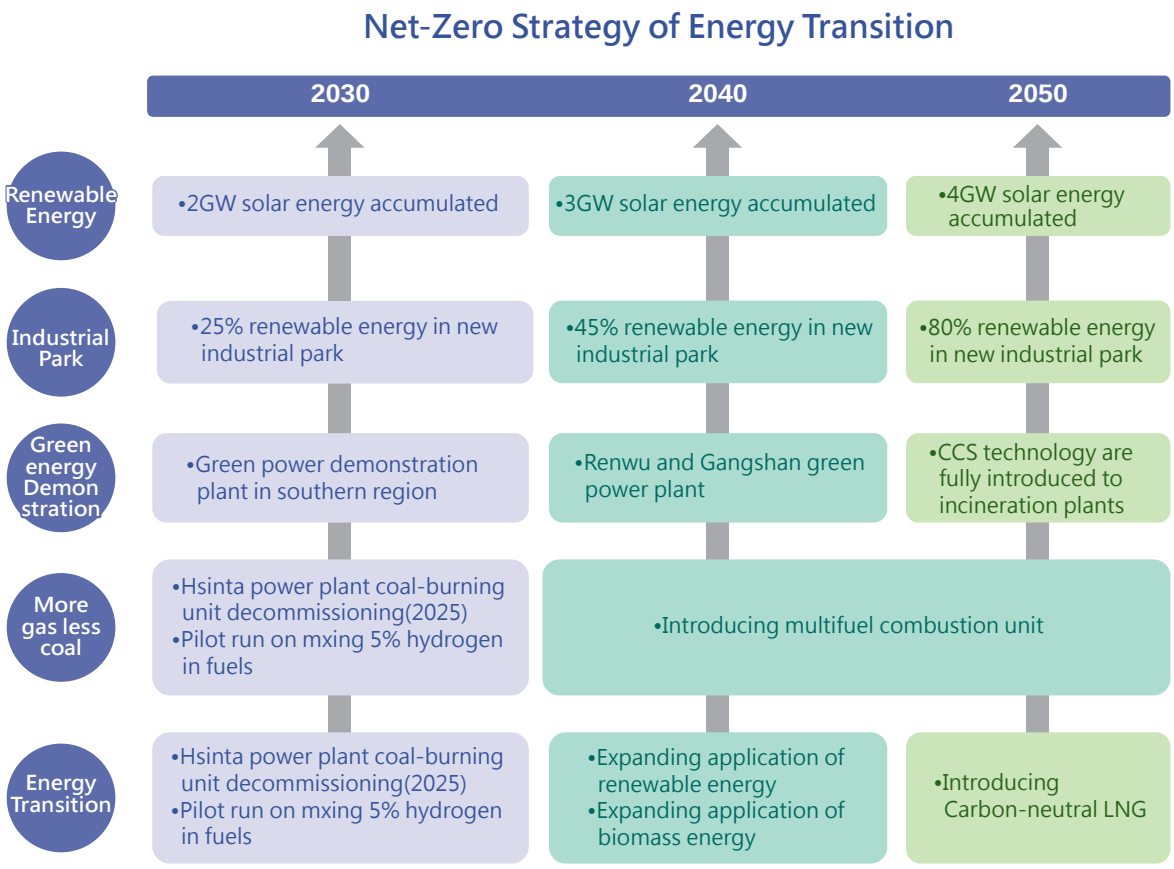
1 Energy Transformation – Reducing Carbon Emission Factor of Electricity

(1) Renewable Energy Construction

A cross-bureau of "Green Power Promotion Task Force" will be established with an aim of 6-year 1.25GW photovoltaic target, and the roofs of public buildings will be monitored; we will promote 210MW of fishery and electricity symbiosis, and implement fishery-based green electricity to be value-added; as for the photovoltaic part on campus, it will be built in 333 schools, accounting for 96% of the number of schools; we will counsel the private residence on building the photovoltaic system; for the long term, the cumulative photovoltaic capacity will be 2GW in 2030, 3GW in 2040, and 4GW in 2050.

(2) Increase Natural Gas and Decrease Coal

In 2025, the coal-fired units of Hsinta Power Plant will be decommissioned, with 3.85 million tons of coal and 4.38 million tons of carbon being reduced, and 5% hydrogen mixed power generation will be on the trial run.



2 Industrial Transformation - Building Low-carbon Industrial Chains:

We will promote the industrial net zero alliance and divide this into five major sectors: iron and steel, petrochemical, electronics, energy, and recycling. The industrial leaders of each sector will be invited to share reduction results and innovative technology research and development in a way to lead businesses to build a low-carbon industrial chain. As for strategy, process improvement, energy conversion and circular economy will be used to reduce the volume. In the short term, energy efficiency improvement, coal-to-natural gas (de-coaling of 3.4 million tons of cogeneration) and integration of energy and resources in industrial areas will be the focus. In the medium and long term, it is hoped to develop hydrogen smelting in iron and steel industry based on the technology, carbon capture and reuse in the petrochemical industry, and introduce the zero-carbon energy.

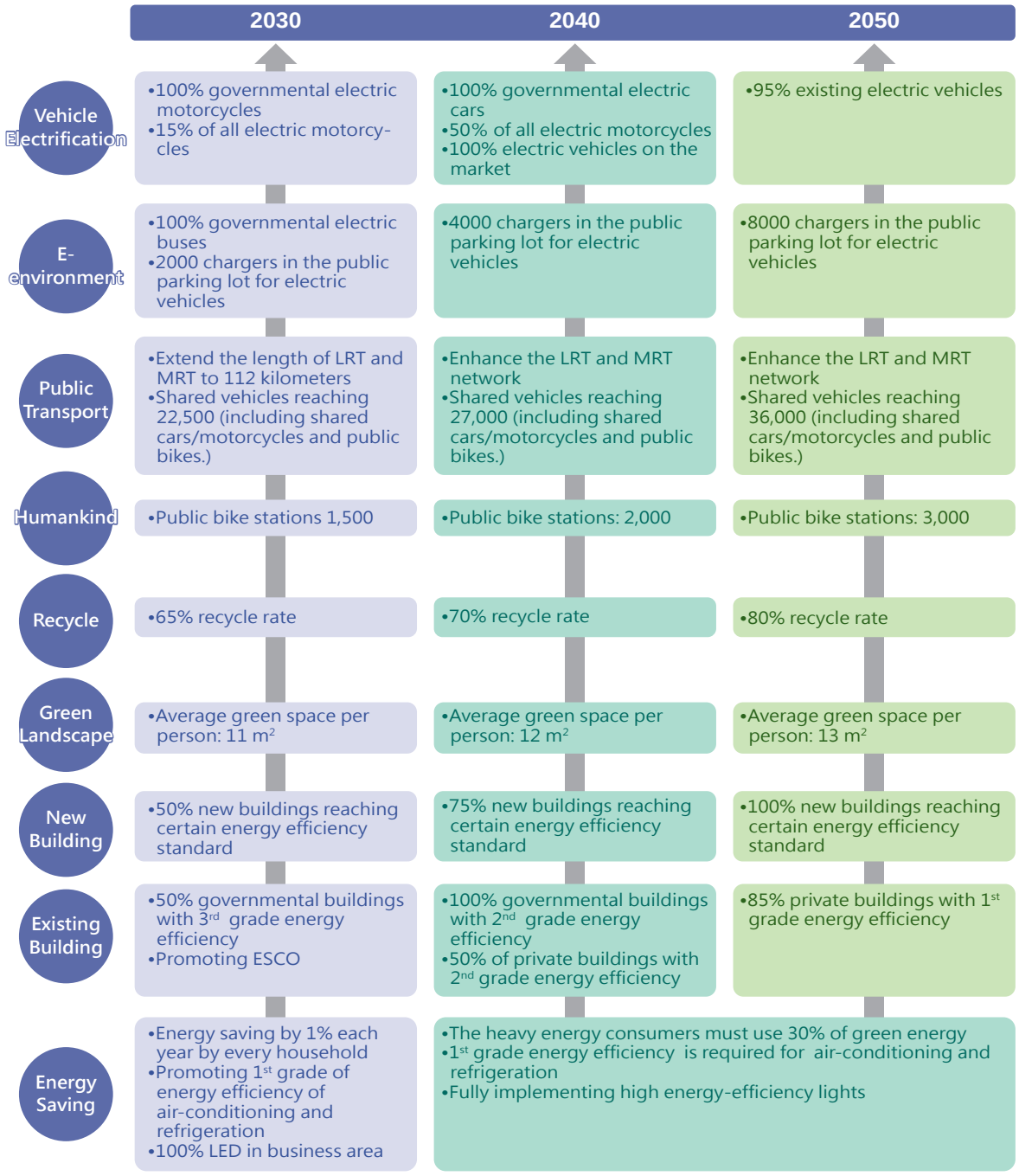
Roadmap of Net-Zero Industry Transition

	2030	2040	2050
Goal	•Emission reduction by 30% in industrial sectors	•Emission reduction by 60% in industrial sectors	•Emission reduction by 90% in industrial sectors
Circular Economy	•Integration of energy and resource in industrial areas •Enlarge the coproduction between steel and petrochemical plants	•CCUS in petrochemical industry •Coproduction between steel and petrochemical plants for commercial use •Coproduction between steel and petrochemical plants for commercial use	
	•85% selling rate of incinerated bottom ash •92% reuse rate of business waste •95.5% reuse rate of business garbage •85.7% reuse rate of agricultural waste •45% ranch with livestock manure resource •210,000CMD reclaimed water	•95% selling rate of incinerated bottom ash •93% reuse rate of business waste •97% reuse rate of business garbage •88% reuse rate of agricultural waste •80% ranch with livestock manure resource	•100% selling rate of incinerated bottom ash •95% reuse rate of business waste •98% reuse rate of business garbage •90% reuse rate of agricultural waste •100% ranch with livestock manure resource
Process Improvement	•Enhancing energy efficiency by introducing energy management system •Steel industry applying scrap steel and HAHL	•Hydrogen smelting process in steel industry •Low-carbon blast furnace transition into Zero-Carbon blast furnace	
Waste to Resource	•90% sewage processing rate	•95% sewage processing rate	•100% sewage processing rate

3 Life Transformation - Towards a Net Zero Lifestyle:

We will construct the infrastructure required for the citizens' life transformation. In terms of transportation, the two major goals of "electrification of vehicles" and "popularization of mass transportation" will be used to reduce mobile pollution and carbon emissions from transportation by changing the way people commute. As for residential/ commercial sector, the focus is on energy efficiency improvements and electricity conservation, while promoting low-carbon communities and rooting the concept of net zero. Finally, the policies will be promoted to every aspect of life to advocate the public of a future net zero lifestyle and to make the transformation together.

Roadmap of Net-Zero Lifestyle Transition



Performance of emission reduction
No.1 in the country

In 2020 comparing to baseline year(2005)

Reduced by 19.4%

Exceeding in advance by 10% of the 2025 National Goal

Emission reduced by 1,283 Mts

Further reduction by 700 Mts will be met by 2030

Targets and Current Situation of Reduction in this City and Other Five Special Municipalities

	Kaohsiung	Taipei	New Taipei	Taoyuan	Taichung	Tainan
Current emissions (10,000 tons)	5,331	1,139	1,887	2,929	3,354	2,245
Current percentage of reduction from base year	-19.4%	-12.9%	-6.6%	+4.3%	+8.9%	+15.1%
Current reduction compared with the base year (10,000 tons)	-1283.7	-168.2	-126.5	-132.8	+274.4	+294.4
Reduction target by 2030	-30%	-40%	-30%	-40%	-30%	-30%
Further reductions should be made (10,000 tons) to achieve 30% goal.	-700.7	-354.6	-446.6	-1091.9	-1198.3	-879.7

Notes:
1. It is the total emissions in 2020 in Taipei City, New Taipei City, Taichung City, and Tainan City, while it is the net emissions in 2020 in Taoyuan City and Kaohsiung City.
2. The base year of Taipei City, New Taipei City, Taichung City, Tainan City, and Kaohsiung City is 2005. Taoyuan City has not published the base year emission, so the data from 2011 will be used.

1 Roadmap of Net-Zero

Six sectors with short, middle and long term goals

2 Establishment of Net-Zero Industry Alliance

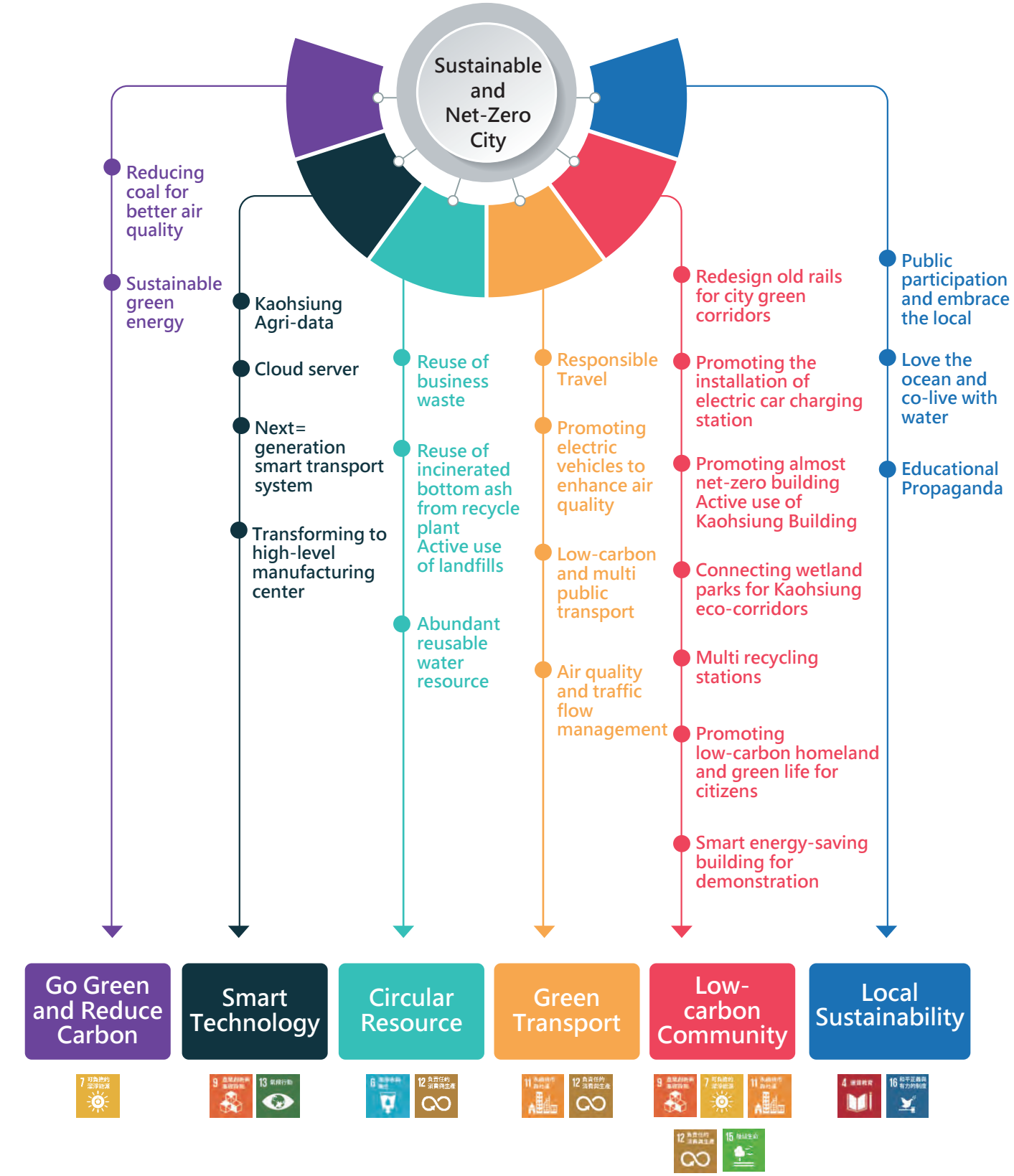
The top industry leads the rest to build a low-carbon industrial chain

3 Kaohsiung Net Zero Regulations and Management

Implementation of various carbon reduction targets and goals with regulations

Actions and Results

To achieve the goal of net zero carbon emissions, the City has formulated four major transformation strategies and law foundations, supplemented by specific policies, such as going green and reducing carbon, smart technology, resource recycling, green transportation, and low-carbon community, rooting the ideas downward through sustainable net zero education. We will work with citizens, industries, non-governmental organizations, and academia to implement the SDGs and move towards the goal of achieving a 2050 net zero harbor city.



Going Green, Reducing Carbon

2021	2030	2040	2050
0.4GW solar energy	2GW solar energy	3GW solar energy	4GW solar energ
Cogeneration power plants reduces coal by 30.1 Mts	Zero coal of cogeneration power plant (2025)	Expanding application of renewable energy Expanding application of biomass energy	Introducing Carbon-neutral LNG
37% ranch with livestock manure resource	45% ranch with livestock manure resource	80% ranch with livestock manure resource	100% ranch with livestock manure resource

Conforming to the international trend on carbon reduction, the City aims to gradually reduce the growth rate of energy demand through various departments' improvement on energy efficiency and structural transformation. Also, in line with the central policy goal of promoting renewable energy to account for 20% by 2025, we actively promote the deepening development of green energy industries in Kaohsiung. This will assist in reducing the carbon emission factor of electricity and ensuring the stable supply of energy in the future, as well as considering industrial upgrading and air quality.

Shutdown and reduce coal to improve air quality

Core goal

Secondary related goal(s)

Relevant indicators: 11.6 AQI value, annual average concentration of PM 2.5 (suspension of fine particles), eight-hour ozone

1 Shutdown and reduce coal for the Hsinta Power Plant in autumn and winter

Since 2017, Kaohsiung City has gradually suspended the issuance of operating permits for the coal-fired units of Hsinta Power Plant, and has reviewed and requested reducing the amount of raw coal used year by year used to implement the coal-fired units of Hsinta Power Plant in autumn and winter when the air quality is poor and to expand the number of coal reduction days. We gradually guide and require the coal-fired co-generation units within the jurisdiction to be decommissioned in advance in 2025; the coal-fired units of Taipower Hsinta Power Plant will be decommissioned and hydrogen-mixed combustion will be introduced. As of 2021, a total of 1.79 million tons of coal have been reduced.

2 Cogeneration coal-reduction policy

To improve air pollution and reduce carbon emissions, Kaohsiung City joined the "Powering Past Coal Alliance" in September 2020 and amended the "Kaohsiung City Air Pollutant Emission Standards for Power Facilities" in December 2021. After implementation, it will promote Taipower and cogeneration plants to adopt low-pollution processes and high-efficiency control technology. The Environmental Protection Bureau will coach the businesses to convert the use of raw coal to natural gas or SRF and apply for a gas boiler installation permit as soon as possible.

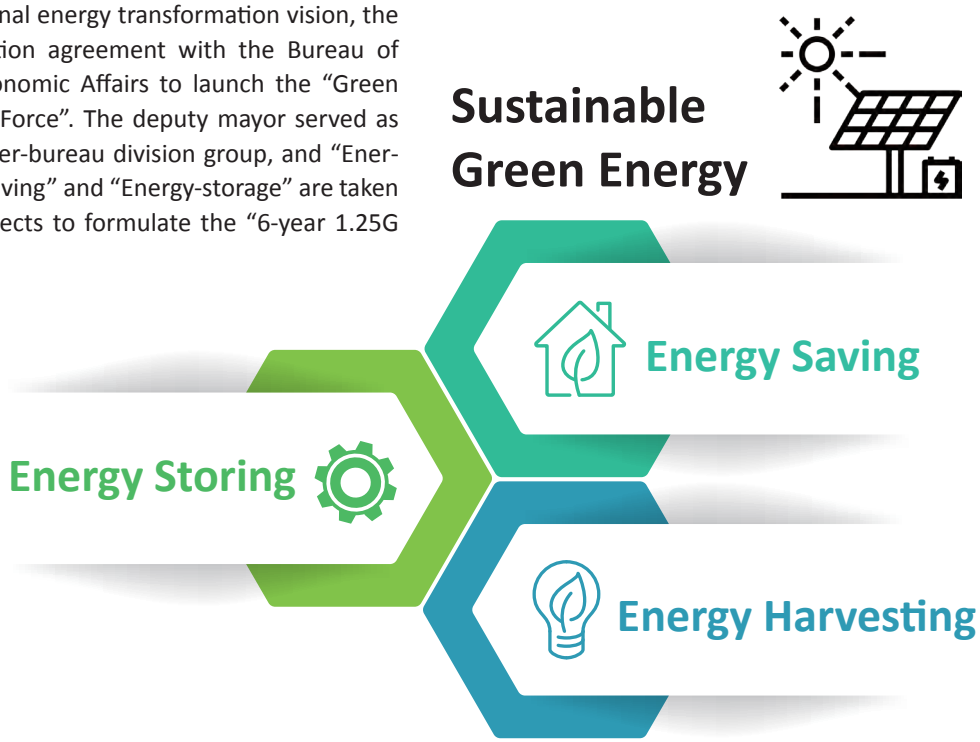
Through holding the "Kaohsiung City Raw Coal Usage Management and Control Conference", the City Government invited coal-fired cogeneration boiler manufacturers (18 in total) within the City to encourage them to arrange annual maintenance in the autumn and winter of 2021. The actual coal reduction was about 180,000 tons, a decrease of 16% compared with the same period last year in autumn and winter. It is estimated that in 2022, the consumption of raw coal will be reduced by another 367,000 tons.

Sustainable green energy

Core goal	Secondary related goal(s)
7 AFFORDABLE AND CLEAN ENERGY	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE; 13 CLIMATE ACTION; 17 PARTNERSHIPS FOR THE GOALS

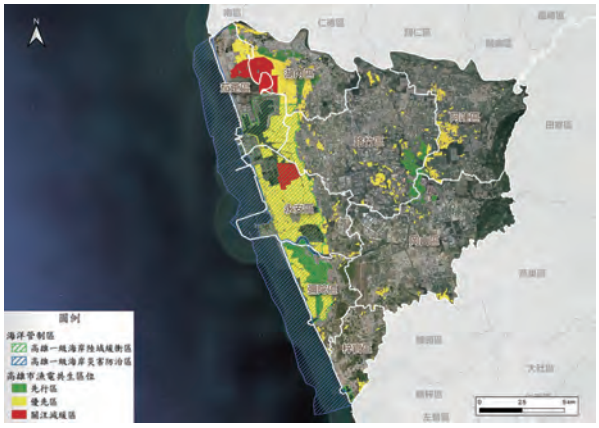
Relevant indicator: 7.2 Promote solar photovoltaic facilities

To implement the national energy transformation vision, the City signed a cooperation agreement with the Bureau of Energy, Ministry of Economic Affairs to launch the "Green Power Promotion Task Force". The deputy mayor served as the convener of the inter-bureau division group, and "Energy-creation", "Energy-saving" and "Energy-storage" are taken as the three major aspects to formulate the "6-year 1.25G Photovoltaic Plan".



1 Energy-harvesting Measures

We promote various tasks, such as solar photovoltaic “fishery and electricity symbiosis”, “promotion of photovoltaic roofs in public and private buildings”, and “green energy planning of school buildings and development of smart electricity use”. We have also been entrusted by the Bureau of Energy, Ministry of Economic Affairs to handle the solar photovoltaic power generation equipment certification business since 2014. We thereby established solar photovoltaic one-stop service to provide private investment in solar photovoltaic industry consulting services, green financing loans, and other assistance. The accumulated photovoltaic alternative capacity in 2021 was 295.04MW, 2.27 times more than the original target of 130MW. The number of alternative cases is 1,542, ranking first in the country.

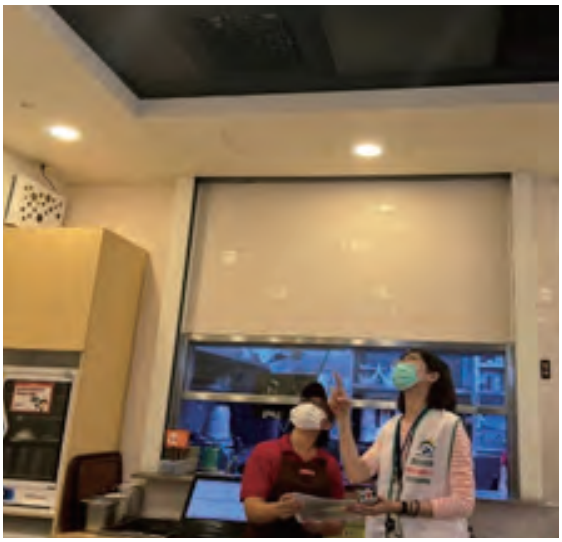


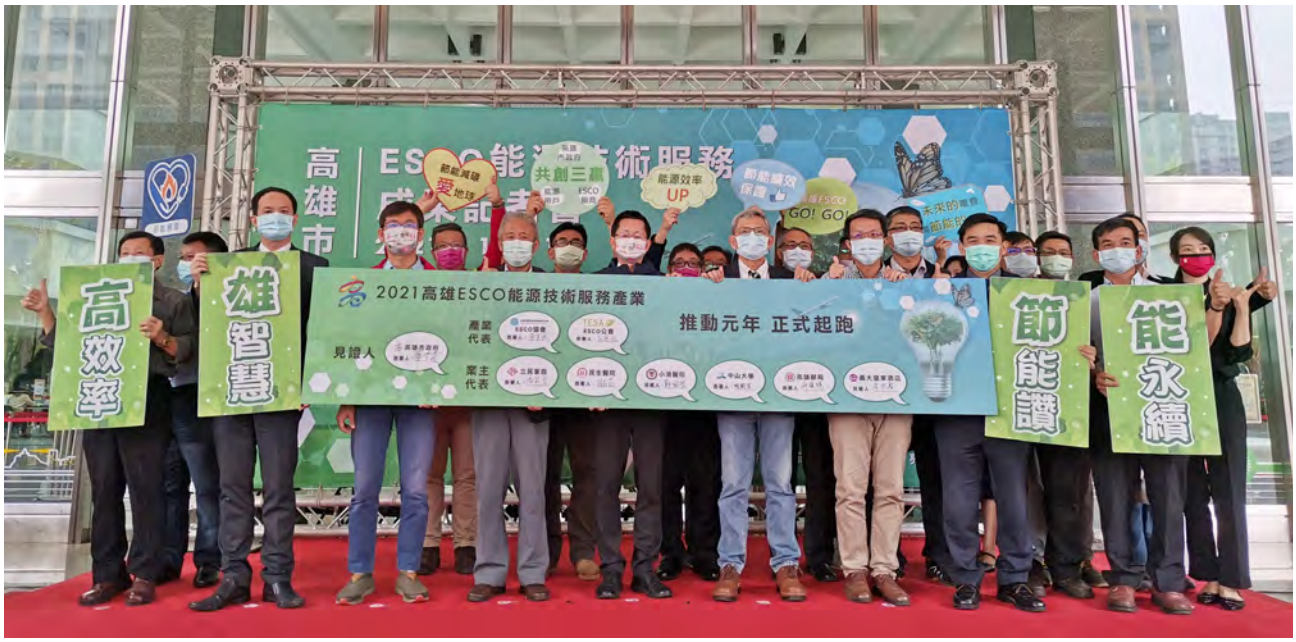
2 Energy-saving Measures

"Accelerate energy-saving and low-carbon actions with energy-saving service models": Energy Service Company (ESCO)

The spirit of implementing ESCO aims to save energy costs in the future and use it in energy-saving measures so as to reduce the burden on owners to replace or purchase energy-saving equipment and increase their willingness to save energy.

According to Articles 8 and 14 of the Energy Administration Act, we handle 20 types of service industry energy user audits, energy-saving labels, and energy efficiency grading labels. In recent years, more than 99% of the inspection results has met the requirements. The correct rate of energy efficiency grading labeling (mandatory) and energy-saving labeling (non-mandatory) is over 98%. In 2021, the electricity saving rate of Kaohsiung City's residential and commercial departments ranked first among the six special municipalities.





3 Energy-storing and Other Measures

The City has completed the installation of energy storage demonstration sites in Siaolin Villagei, Shanlin Junior High School, and Yong-an, and further successfully introduced "Taiwan's first super battery factory" - Molie Quantum Energy (1.8GWh) to set up a factory in Xiaogang, Kaohsiung. To make the power grid safe and stable, Taipower Company introduced Automatic Frequency Control (AFC) technology for energy storage. With the fast charging and discharging characteristics of the energy storage system, it can adjust the frequency of the power system to achieve the goal of stabilizing the power supply output of the power grid.

We established "Kaohsiung Green Energy Management Information Integration System Platform" to plan and integrate related information, such as energy-creation, energy-saving, energy-storage, smart grid, demand bidding, and green energy certificates. It is hoped that the diversified data presentation can introduce people's reflections on the concept of electricity consumption, and then change the daily electricity consumption pattern.

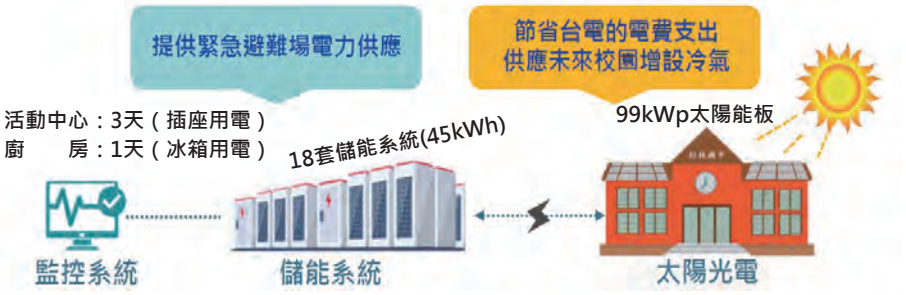
引進「台灣首座超級電池廠」-三元能源科技於高雄設廠(1.8GWh)

小林村家戶型儲電系統(太陽能光電3KW 儲能設備6~10kWh)

杉林國中智慧微電網(太陽光電99KW 儲能設備45kWh)

高雄永安1.0MW/1.2MWh電池系統

市長參訪校園智慧微電網 – 杉林國中(2021年10月29日)

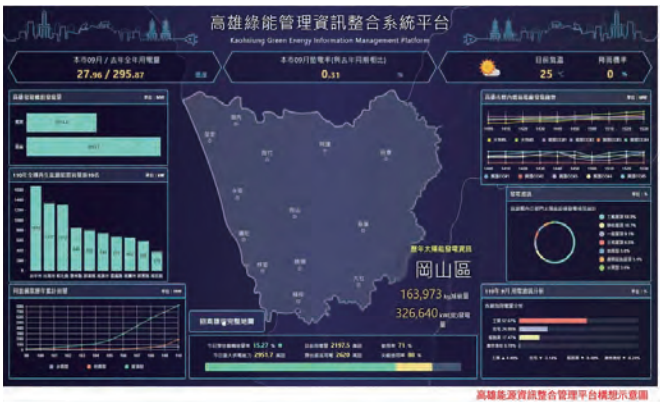


KAOHSIUNG 高雄市綠能管理資訊整合系統平台

Green Energy Information Management Platform

在地綠能資訊整合

喚醒節能意識　打造低碳宜居城市



高雄能源資訊整合管理平台模型示意圖

Smart Technology

Effective control of energy use and cost control through smart technology can also achieve energy saving and carbon reduction. The City actively improves various investment environments, environmental protection, and basic measures to transform Kaohsiung City into a high-end manufacturing center that connects smart biomedicine, semiconductors, and smart aerospace, innovative technology, smart machinery and other fields, and upgrades and transforms traditional industries to form a complete ecosystem. Also, according to urban development, the virtual and real integration concepts will be applied to the transportation, agriculture, and industry fields.

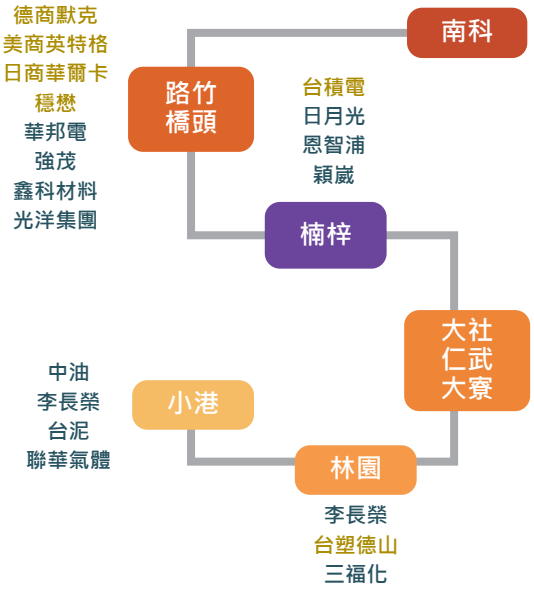
Promote park development and transform into a high-end manufacturing center

Core goal

Secondary related goal(s)

Relevant indicators: 9.1 KO-IN (Financial Data Innovation Lab); 9.2 Promote park development and transform it into a high-end manufacturing center

The restructuring of the global supply chain in recent years has created new opportunities for Kaohsiung's industrial transformation. To address the surge in demand for industrial land and the needs of enterprises to expand factories, the City Government put forward the policy vision of "industrial transformation and employment increase first", and actively cooperated with the central government to accelerate the development of Nanzi Industrial Park, Ciaotou Science Park, Renwu Industrial Park, and Asia New Bay Area 5G AIoT Innovation Park to build the Asia New Bay Area into becoming the largest 5G R&D testing base and application display platform in Taiwan. Also, it will extend to Tainan and Pingtung, driving the transformation of the local industry as a whole, and moving towards the direction of building the "S" corridor of semiconductor materials in the south. It is estimated that the three major industrial parks and the Asia New Bay Area will create an annual output value of more than NT$480 billion and provide more than 30,000 job opportunities.



全國最大5G AIoT創新試驗場域

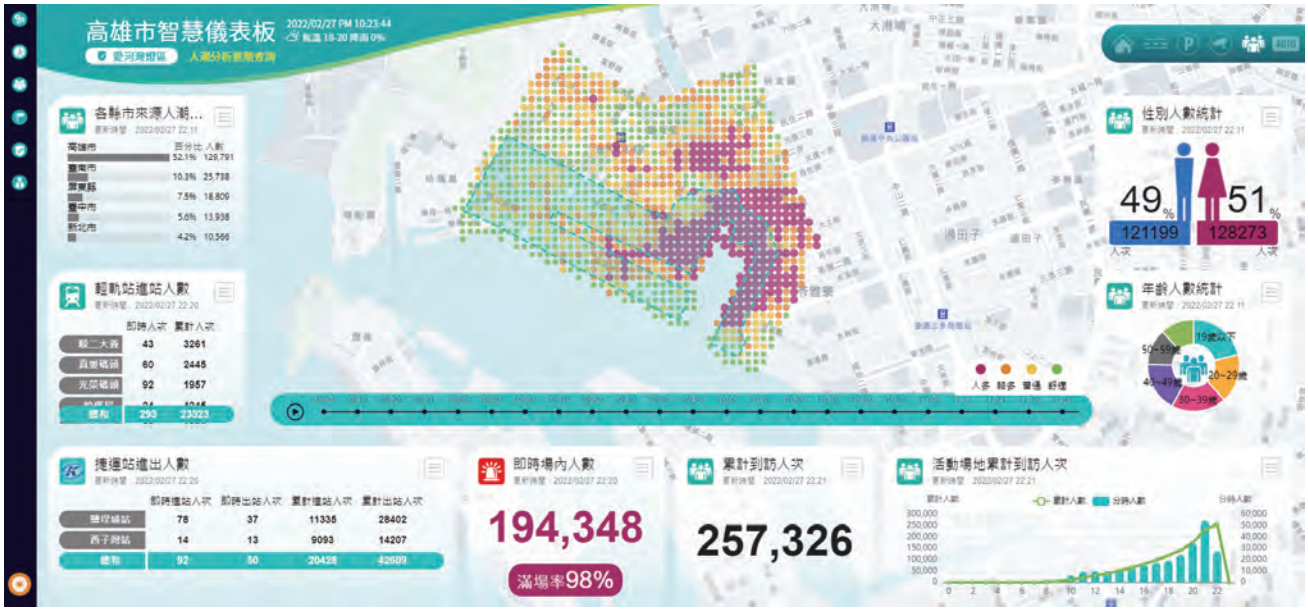
A new generation of intelligent transportation system

Core goal	Secondary related goal(s)
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	3 GOOD HEALTH AND WELL-BEING; 5 GENDER EQUALITY; 7 AFFORDABLE AND CLEAN ENERGY; 16 PEACE, JUSTICE AND STRONG INSTITUTIONS; 17 PARTNERSHIPS FOR THE GOALS

Relevant indicator: N/A

In the past, Kaohsiung City lacked a cross-regional and cross-vehicle integrated traffic management system, which consumed a lot of time and labor costs, sometimes delayed information transmission. The "New Generation Smart Transportation System" integrates the City's existing traffic control system to establish sustainable application functions of single-interface comprehensive query and a collection of multiple traffic information. The stored data are presented on the smart dashboard in a visual and graphical way, and are applied to the traffic monitoring of various large-scale events. Through the intelligent signal control system, the efficiency of traffic mitigation of events has been successfully improved, saving up to 60% of the efficiency of traffic mitigation time. Road users saved driving costs, including fuel, maintenance, and depreciation expenses, due to the reduction of travel time. It is expected to save fuel consumption costs, reduce carbon dioxide emissions, and improve air quality.

In the future, we will extend to the establishment of decision-making support, incident response and other systems, and continue to strengthen the traffic maintenance and operation of Kaohsiung City to promote the sustainable development of urban traffic, and public transportation-oriented transportation policy. This will establish improvement indicators that the public could feel so as to move towards the new stage of greening and sustainable transportation.



Cloud computer room

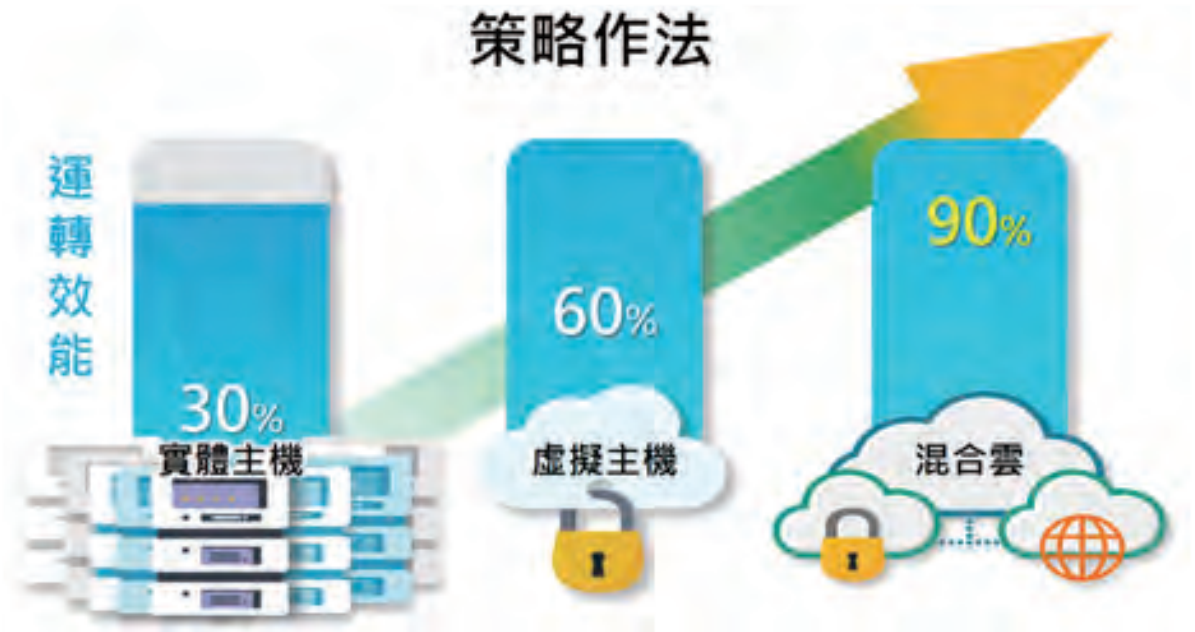
Core goal	Secondary related goal(s)
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	3 GOOD HEALTH AND WELL-BEING; 5 GENDER EQUALITY; 7 AFFORDABLE AND CLEAN ENERGY; 16 PEACE, JUSTICE AND STRONG INSTITUTIONS; 17 PARTNERSHIPS FOR THE GOALS

Relevant indicator: N/A

The Information Center of Research, Development and Evaluation Committee uses host virtualization technology to build a cloud computer room, requiring all agencies to replace physical hosts with virtual ones year by year. The Information Center will coordinate the allocation of host hardware resources, maintenance, and management so as to facilitate the large number of scattered hosts to gradually concentrate them in the cloud computer room. It is expected to efficiently reduce the number of hosts and the use of electricity and air-conditioning in the computer room so as to improve energy saving and carbon reduction and efficiency, and save manpower for maintenance and operation.

From 2020 to 2021, the Information Center provided a total of 243 virtual hosts for each bureau, saving about NT$ 8.45 million in server purchase costs. This also saved about NT$ 978,000 in electricity costs for the computer room every year, which was equivalent to reducing 99.56 tons of carbon emissions.

From 2022 to 2024, 13 small computer rooms from various agencies and the physical hosts of the Fongshan computer room will be consolidated into the cloud computer room. The public cloud will be combined to create a hybrid cloud so as to achieve the best operating efficiency. The power consumption of the computer room and air-conditioning will be reduced, achieving the carbon reduction goal.



[1] Calculated based on the 2021 electricity emission factor of 0.509 kg CO_2e/degree

Kaohsiung agricultural news

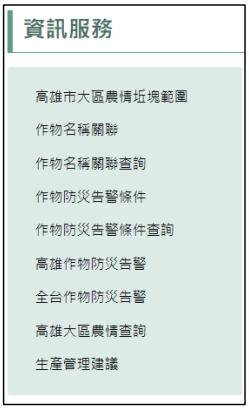
Core goal	Secondary related goal(s)
13 CLIMATE ACTION	8 DECENT WORK AND ECONOMIC GROWTH; 11 SUSTAINABLE CITIES AND COMMUNITIES; 12 RESPONSIBLE CONSUMPTION AND PRODUCTION; 14 LIFE BELOW WATER

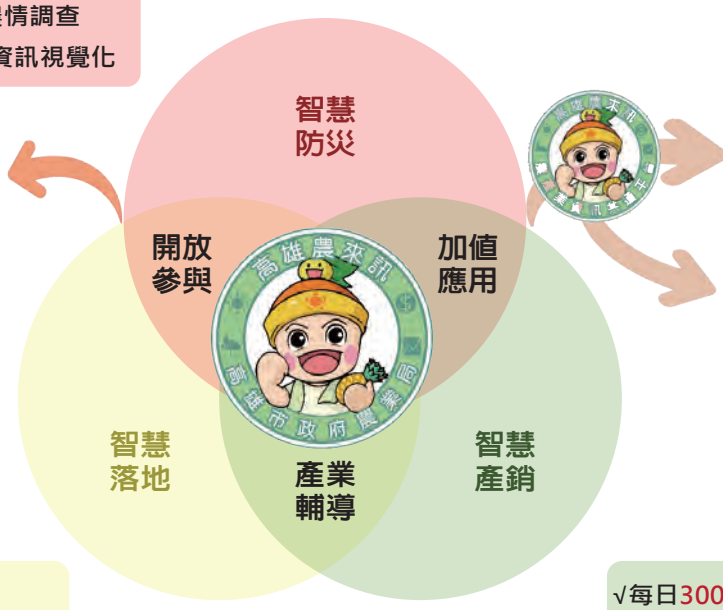
Relevant indicator: 13.1 Promote farmers to set up disaster prevention greenhouse facility areas

Huge and scattered agricultural information makes it difficult for farmers to access. To avoid the potential agricultural risks caused by extreme climate change causing industrial shocks, the Agriculture Bureau has integrated the production and marketing information commonly used among farmers to develop “Kaohsiung Agricultural News” and introduced smart technology equipment to accelerate the implementation of smart agriculture in Kaohsiung. The LINE official account has been launched since October 2021, and has been used by more than 1,700 people so far. There are also customized subscriptions and broadcasts on Telegram. In addition, the Kaohsiung Agricultural News System won the 2022 “Smart City Innovation Application Award”, and began to provide agricultural meteorological broadcasts in the same year to attract more farmers to use.

We promoted the “Kaohsiung City Government Agricultural Industry Smart Agriculture Subsidy Program”, which subsidized 16 cases and NT$ 3.4 million in 2021, reducing the cost of farmers. In addition, the Agricultural Bureau actively assists farmers in obtaining subsidies for agricultural facilities and equipment. Since 2017, it has obtained subsidies for various facilities covering more than 269 hectares, worth more than NT$ 332 million. Through the introduction of facilities, farmers’ ability to adapt to climate change will be strengthened. They will be able to produce precisely and thereby stabilize their income.

√每時61種+作物防災告警分析
◇每年4,700項次+農情調查
◇高雄211區位農情資訊視覺化





√高雄智農服務平台
√作物防災告警OPEN API
√智慧農業補助計畫-
公私協力推動智慧落地
2021-2022年40案場

√每日300項+蔬果市場價量查詢分析
◇每年4,700項次+農情調查
◇高雄211區位農情資訊視覺化

Resource Recycling

2021	2030	2040	2050
59,263 CMD reclaimed water	210,000 CMD reclaimed water		
91.75% reuse rate of business waste	92% reuse rate of business waste	93% reuse rate of business waste	95% reuse rate of business waste
80.2% selling rate of incinerated bottom ash	85% selling rate of incinerated bottom ash	95% selling rate of incinerated bottom ash	95% selling rate of incinerated bottom ash

According to the latest research report of Ellen MacArthur Foundation (EMF), 55% of global greenhouse gas emissions are emissions from energy use, and 45% are emissions related to product manufacturing. Kaohsiung City is a major industrial city in the country, and the waste produced is also considerable. It should be transformed from a linear economic production and consumption model in which waste is the terminal to a sustainable one, reducing excessive damage to the environment in a circular manner as well as creating economic business opportunities.

Recycle water resources for safe water supply in Kaohsiung

Core goal: 6 CLEAN WATER AND SANITATION

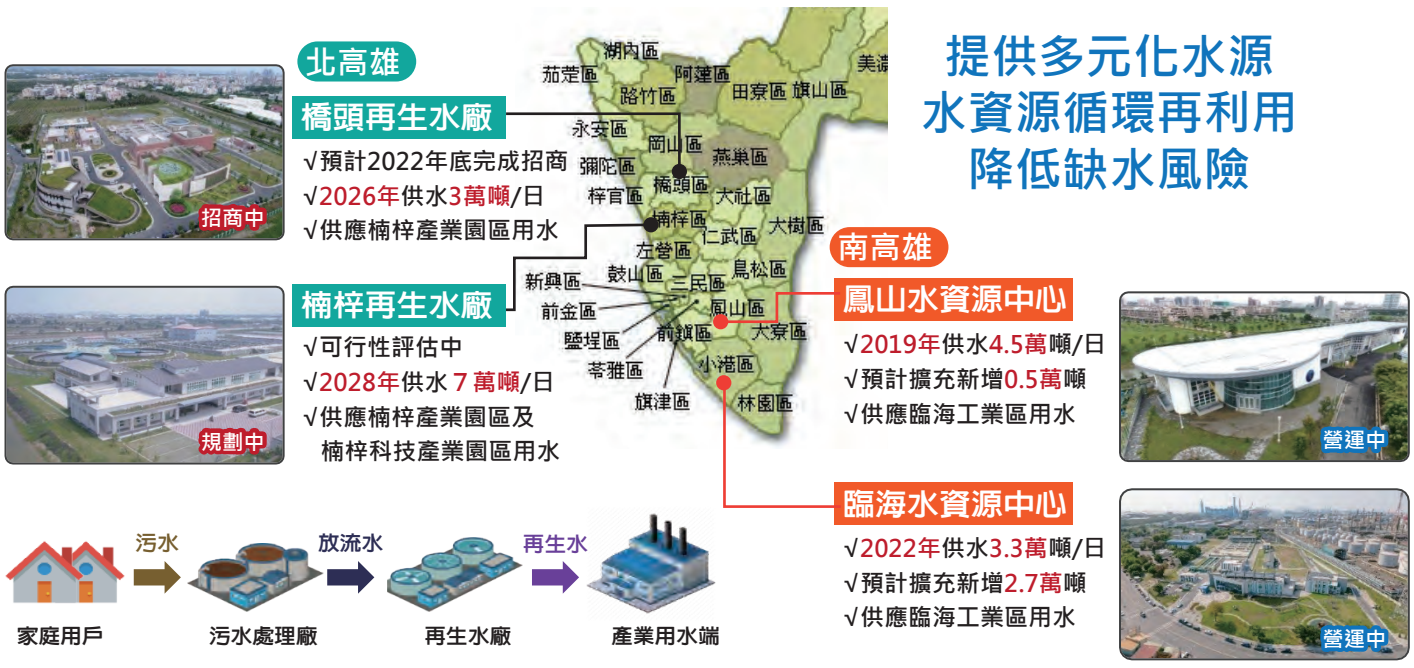
Secondary related goal(s): 1 NO POVERTY; 2 ZERO HUNGER; 3 GOOD HEALTH AND WELL-BEING; 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Relevant indicator: 6.3 Situation of water recycling

Because of climate change, the problem of industrial water shortage has gradually come to the fore. The central government and the local government work together to recycle and reuse the effluent from sewage treatment plants as industrial water to support Kaohsiung's industrial development and ensure the safety of water for people's livelihood.

The City has promoted two water reclamation plants. In 2019, Fengshan Water Resources Center produced 45,000 tons of reclaimed water per day. By the end of 2021, Linhai Water Resources Center produced 33,000 tons of reclaimed water per day. A total of 78,000 tons of recycled water is produced per day for industrial water use in Linhai Industrial Zone. Moreover, the effluent discharge from the sewage treatment plants can be used for street washing, watering flowers and other landscape water, so we can make the best use of water. In addition, in response to the industrial development of northern Kaohsiung, we have planned for the Qiaotou and Nanzi water reclamation plants. It is estimated that the Qiaotou water reclamation plant will produce 30,000 tons of reclaimed water per day in 2026, and the Nanzi water reclamation plant will produce 70,000 tons of reclaimed water per day in 2028.

The City Government will continue to promote the reclamation plant project, and will also accelerate the takeover rate of sewage users. In addition to satisfying the industrial water demand and implementing water recycling economy, it will lay the foundation for Kaohsiung's future industrial development and improve the overall quality of life of the citizens.



Reuse the incinerator bottom ash and activate the landfill space

Core goal	Secondary related goal(s)
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	11 SUSTAINABLE CITIES AND COMMUNITIES; 13 CLIMATE ACTION; 15 LIFE ON LAND

Relevant indicator: 12.4 Business waste recycling rate

Nearly 200,000 to 220,000 metric tons of incinerator bottom ash are produced in Kaohsiung City each year, and fly ash stabilized production averages up to 80,000 metric tons. Based on the current remaining landfilling capacity, it is estimated that by 2023 to 2024, the City's public landfills that can bury ash will be saturated. Therefore, we continue to evaluate and plan new landfill projects, and accelerate the activation and replacement projects of existing landfills so as to effectively recycle the wastes to increase the landfill space. It is planned to increase the landfilling capacity by about 234,000 cubic meters in 2025, and increase the service life by about 4 years. If the new landfill is successfully promoted in 2027, it is expected to increase the landfilling capacity by about 1,112,000 cubic meters, which can be used for about 14 years.

In addition, to implementing the circular economy, the City actively promotes the incinerator bottom ash reuse plan, which turns the incinerator bottom ash into recycled aggregates and promotes them to the governmental public projects. The amount of incineration bottom ash that can be processed each year is 185,000 metric tons. Using incinerated recycled aggregates to replace natural ones can reduce 0.07 kg of CO_2e per ton. It is expected that the removal rate will reach 100% this year (2022). The City did an excellent job in promoting incineration recycled aggregates, and has become the only city among the six special municipalities to be awarded special excellence on national incineration bottom ash business evaluation for three consecutive years.

Business waste recycling

Core goal	Secondary related goal(s)
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	11 SUSTAINABLE CITIES AND COMMUNITIES; 13 CLIMATE ACTION; 15 LIFE ON LAND

Relevant indicator: 12.4 Business waste recycling rate

To create a win-win situation for both the economy and the environmental protection and gear to the international standards, we put forth the "Business Waste Resource Management" project to promote the business waste recycling institution, as well as animal husbandry inspection and control. Also, we guide supermarkets and wholesalers in the recycling of food waste to ensure that waste can be recycled properly and waste generation reduced. In addition to creating a circular economy to achieve the goal of resource recycling and zero waste, it can also reduce the cost and burden of waste disposal by enterprises and the government, and reduce the occurrence of illegal waste disposal cases.

The average monthly output of business waste in the City in 2021 was about 535,157 metric tons, and the reuse amount was 488,116 tons per month; the inspection rates of recycling institutions and animal husbandry were 83.1% and 100%, respectively; the articulation rate of supermarkets and wholesale stores was 100%, and the guidance rate was 6.9%. In the future, we will guide the production source to set up self-recycling factory facilities and guide the recycling institutions to expand the recycling capacity and continue to strengthen the waste recycling work at the production source. It is estimated that the recycling rate of business waste will reach 91.5% in 2025 and 92% in 2030.

Green Transportation

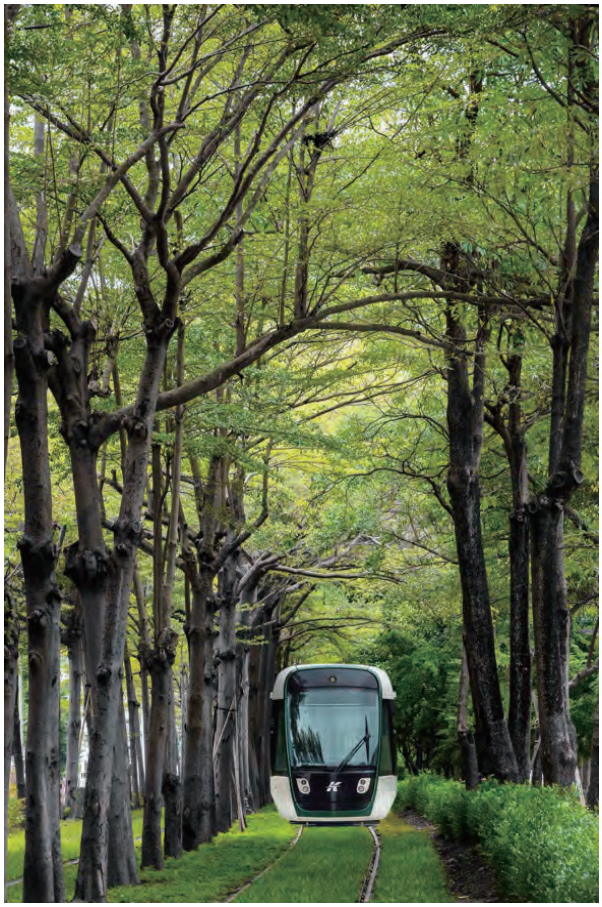
2021	2030	2040	2050
12,625 shared vehicles	22,500 shared vehicles	27,000 shared vehicles	36,000 shared vehicles
Rail length of LRT and MRT: 55.5 kilometers	Expand the rail to 112 kilometers	Enhance the network of LRT and MRT	Enhance the network of LRT and MRT
•Electric bus: 21.8% •Electric governmental cars: 0%; electric governmental motorcycles: 11.6%	•Electric buses only •Electric governmental motorcycles only	•Electric governmental cars only	•Electric governmental cars only
Electric motorcycles: 3.59%	Electric motorcycles: 15%	•Electric motorcycles: 50% •Electric cars/motorcycles on the market: 100%	Existing electric cars/motorcycles: 95%
1,035 public bike stands	1,500 public bike stands	2,000 public bike stands	3,000 public bike stands

The number of motorcycles and cars in Kaohsiung City ranks among the top two and three in the country, respectively, and the exhaust gas generates a large amount of carbon emissions. The City sets vehicle electrification as the main direction of efforts. Through the pilot demonstration of official vehicles electrification in the public sector and then promoting it to the private sector simultaneously brings sharing, low-carbon, and other sustainable spirits into urban construction, and creates a complete convenient transportation system. Through the combination of electric vehicles and responsible tourism marketing, Kaohsiung's local tourism industry will move towards sustainable development, which reduces the environmental impact caused by traffic, and achieves the purpose of curbing greenhouse gas emissions.

Diversified low-carbon mass transportation

Core goal	Secondary related goal(s)
11 SUSTAINABLE CITIES AND COMMUNITIES	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE; 12 RESPONSIBLE CONSUMPTION AND PRODUCTION; 13 CLIMATE ACTION

Relevant indicators: 11.2 Increase the length of the MRT, 11.2 Increase the length of light rail, 11.2 Number of people using public bicycles, 11.2 the length of bike lane



路線全長約22.1公里，
預定設置38處候車站，
1處機廠，1處駐車廠

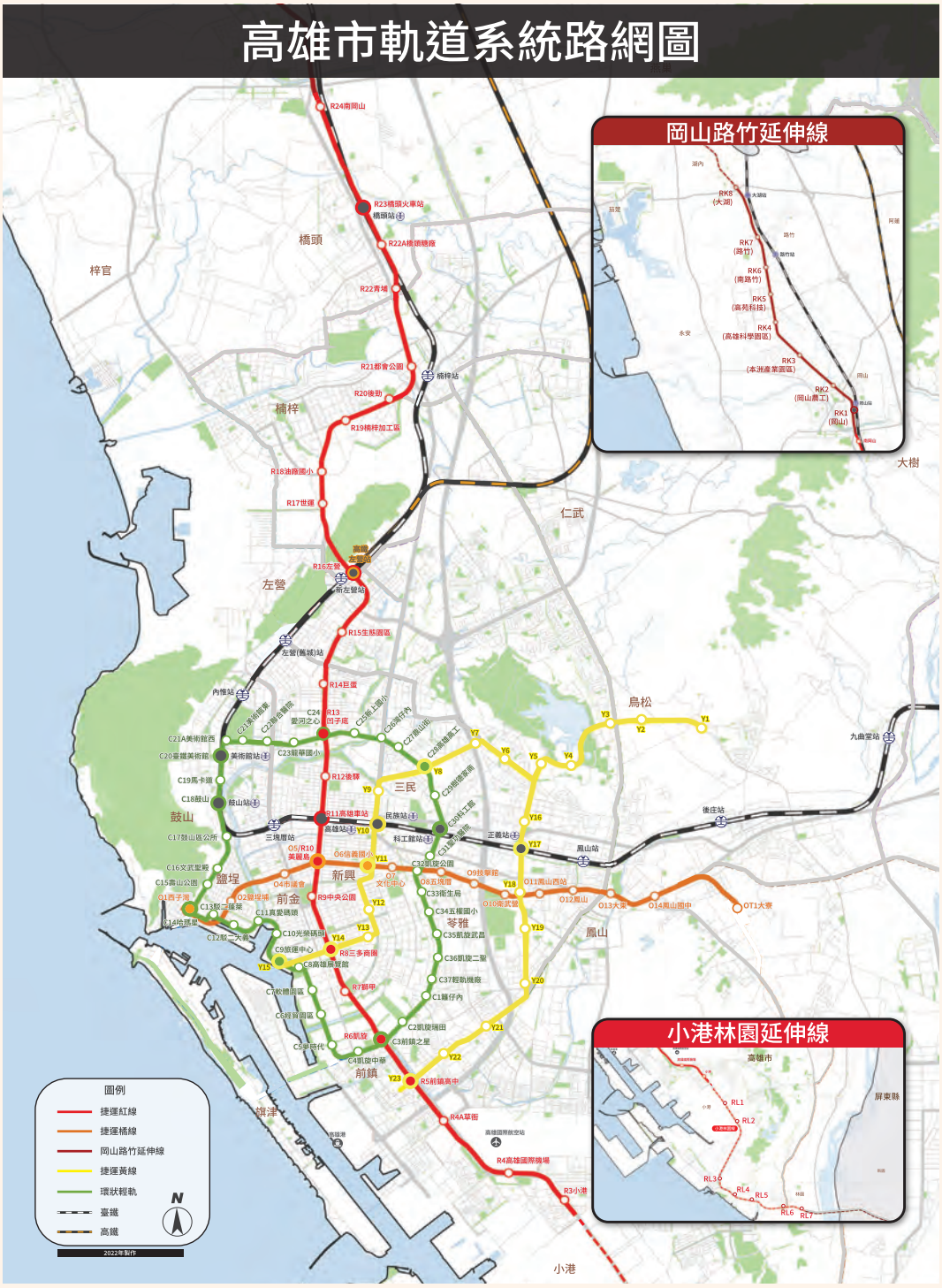
一階工程	C1～C14路段 (含機廠)	約8.7公里
二階工程	C14(不含) ～C37	約13.4公里

1 Circular light rail, stepping forward

The Kaohsiung Light Rail Transit construction is divided into two phases. The first phase was opened to traffic on September 26, 2017. The second phase is currently under construction, and is expected to be opened to traffic in 2023, which will enable the light rail to form a circle, stringing the various construction of the circle line and creating a convenient, friendly and livable city. Meanwhile, to encourage the citizens to take public transportation and respond to environmental protection policies, we have designed offering a discounted fare of NT$10 if you use electronic tickets to take the light rail so as to increase the passenger volume. In 2021, the average light rail traffic volume was about 8,923 passengers per day.

2 The Kaohsiung MRT connects North-South industrial chain

To drive balanced development of all districts in Kaohsiung City and connect the travel needs of industrial clusters in northern Kaohsiung, we plan to construct the MRT Gangshan-Luzhu Extension Line and the MRT Xiaogang-Linyuan Line. Furthermore, to intensify the urban core MRT network services, we plan to construct the MRT metropolitan line (yellow line). This could make up for the gap in the railway network in the core area of the metropolis, greatly strengthening public transportation services, expanding the service scope of the metropolitan area railway network, and improving the convenience and benefits of public transportation. This provides the most direct service to major travel with convenient transfer, enabling Kaohsiung City to enter a new stage of seamless transportation which is public transportation-oriented.

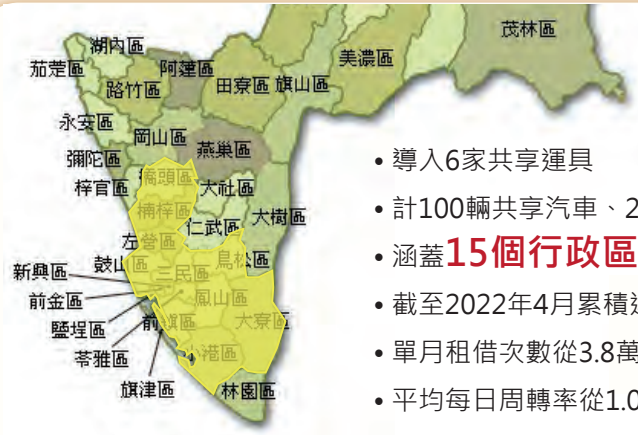


共享運具及公共腳踏車

3 Diversified development of shared vehicles

In response to the advent of the sharing economy, the City has formulated relevant regulations on shared vehicles since 2019, including electric motorcycles and other shared vehicles into management. The City has introduced six shared vehicle operators, making it the city with the most diverse shared vehicle in the country.

Currently, there are 100 shared cars, 2,665 shared electric motorcycles, and 1,200 shared electric bicycles, covering 15 administrative districts, including Zuoying District, Gushan District, and Sanmin District. In the future, we will actively guide the businesses to expand the scope of operating services and increase the number of vehicles on the market, expecting to combine the existing public transportation networks such as the Red/Orange Line of MRT, light rail, and buses. Also, cooperating with the existing Kaohsiung public bicycle rental system with 1,035 rental stations and 8,960 public bicycles, we hope to gradually reduce the ownership and utilization of private vehicles, reduce parking demand, and gradually release limited urban space.



- 導入6家共享運具
- 計100輛共享汽車、2,665輛共享電動機車、1,200輛共享電動自行車
- 涵蓋**15個行政區**
- 截至2022年4月累積達423萬使用人次
- 單月租借次數從3.8萬次提升至21萬次
- 平均每日周轉率從1.03人次/車提升至2.57人次/車

Responsible tourism

Core goal	Secondary related goal(s)
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	11 SUSTAINABLE CITIES AND COMMUNITIES; 13 CLIMATE ACTION; 15 LIFE ON LAND

Relevant indicator: 12.b Low-carbon tourism

1 Bike-riding in Kaohsiung

To reduce the waste of resources in round-trip transportation, we plan bicycle activities suitable for all age groups in the form of bicycle tourism, combining history, humanities, food, and cultural customs. Moreover, we also release 15 complete “bicycle tours” on Kaohsiung Travel website to provide comprehensive information on cycling routes and introductions to scenic spots. We provide one-day and two-day tours according to the travel time, so that the public can easily obtain tour information and increase their interest in cycling tour.

Bike-riding in Kaohsiung

2 Integrated ticket makes it convenient and environmental friendly

"Kaohsiung Travel Pass" travel package is integrated with more than 300 high-quality merchants. Since its issuance in 2015, the sales of Kaohsiung Travel Pass have exceeded 140,000 sets, for most of which reimbursement can be claimed by electronic vehicles. Also, electronic payment is introduced to add convenience and environmental protection concepts to travel, so as to enhance the practicality of "Kaohsiung Travel Pass" and expand to the application of Taiwan Travel Pass.

The City's MeNGo traffic service has its exclusive app. Whether it is regular commuting or sightseeing, you can use the MeNGo APP to scan the QRcode to take the five major transportations, such as MRT, light rail, bus, ferry and YouBike. Kaohsiung City is the first one in the country to complete the digitization of public transportation. To encourage people to take public transportation, the City launches various special schemes from time to time to attract people to take. At present, we have more than 45,000 members, have sold 221,000 sets of package tickets, and have achieved more than 13.11 million times of use, which is remarkable.

Integrated immersive experience services

Travel package products using QRcode for the whole journey

Promote electric vehicles to maintain air quality

Core goal	Secondary related goal(s)
11 SUSTAINABLE CITIES AND COMMUNITIES	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE; 12 RESPONSIBLE CONSUMPTION AND PRODUCTION; 13 CLIMATE ACTION

Relevant indicator: N/A

1 Official vehicles fully electrification

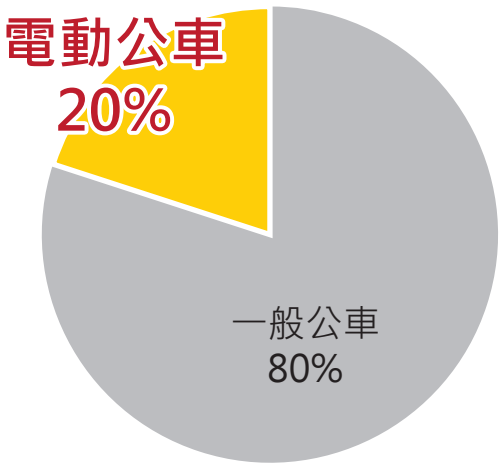
We take precedence in the official vehicle electrification, install electric vehicle charging systems (chargers) in public sectors, and set up designated parking spaces for electric or hydrogen energy vehicles. Except for police motorcycles, special vehicles or those approved by the local government, we expect to achieve the goal of full electrification of official motorcycles and cars in 2030 and 2040, respectively, and move towards the goal of net zero emissions in 2050.

2 Subsidize citizens to purchase electric vehicles

To maintain air quality, from 2016 onwards, the subsidy will be expanded for citizens to replace or purchase electric two-wheeled vehicles. After 9 years of implementing replacement subsidy, the number of two-stroke motorcycles in the City has decreased by 210,000, reducing air pollutants of total hydrocarbons (THC) by about 3,871.3 tons, nitrogen oxides (NOX) by 550.0 tons, suspension of fine particles (PM2 .5) by 181.0 tons, non-methane hydrocarbons (NMHC) by 3,692.3 tons, and carbon monoxide (CO) by 7,507.6 tons. Our target is to have electric motorcycles account for 10% of the total motorcycles in Kaohsiung City in 2026. Only by continuing to increase the share of electric motorcycles can the serious air pollution caused by highly polluting motorcycles be reduced.

3 Transport facility electrification

To promote bus electrification, we actively assist bus companies in applying for electric bus purchase subsidies in accordance with the "Guidelines on Subsidizing Electric Buses for Highway and Public Transport" of the Ministry of Transportation and Communication to reduce air pollution from buses and require long-distance bus companies to use all-electric buses when opening new routes. As of April 2022, there are 201 electric buses in Kaohsiung City, accounting for 20% of the total number of buses in the City, with the highest proportion in six special municipalities. We will continue to strive to use electric buses in 2030.



- 電動低地板公車201輛
- 電動公車比例為**六都第一名**
- 全線皆以電動公車營運共有16條

Air quality maintenance and vehicle control

Core goal	Secondary related goal(s)
11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION; 13 CLIMATE ACTION

Relevant indicator: N/A

1 Strengthen vehicle management

The City regularly executes exhaust inspection on a yearly basis as logistics vehicle control measures, and those who fail need to improve within a time limit. This is to establish the concept of vehicle repair and maintenance for bus companies. It is estimated that the regular exhaust inspection will make it effective to replace 2,045 phase 1-3 diesel vehicles. Estimated according to the Air Pollution Reduction Calculation Manual published by the Environmental Protection Bureau, the annual reduction of NMHC will be 164.1 tons and CO will be 629.6 tons.

Roadside inspection of logistics vehicles for the exhaust

Logistics vehicles take the initiative to go to the Diesel Vehicle Exhaust Testing Station of the Bureau for exhaust testing

2 Vehicle control for the air quality maintenance area

The control targets of the first phase of air quality maintenance area are mainly diesel buses and motorcycles. Diesel buses must have a record of passing the inspection within one year after the previous inspection date, while motorcycles must complete the latest regular inspection before entering the control area. This was officially implemented on February 5, 2022. We plan to set up the second phase of air quality maintenance areas, which will control large diesel trucks and tractor vehicles. By demarcating the City's air quality maintenance zone, it is estimated that the replacement of all high-polluting vehicles could reduce NMHC by 1,014.5 tons and CO by 3,892.3 tons every year.

Dissemination at the first phase of air quality maintenance area

Using technology to enforce the law and ban vehicles violating traffic regulation

Low-carbon Community

2021	2030	2040	2050
–	•50% new buildings reaching certain energy efficiency standard •50% governmental buildings with 3rd grade energy efficiency	•75% new buildings reaching certain energy efficiency standard •100% governmental buildings with 2nd grade energy efficiency	•100% new buildings reaching certain energy efficiency standard •85% private buildings with 1st grade energy efficiency
62.6% recycle rate	65% recycle rate	70% recycle rate	80% recycle rate

The International Energy Agency (IEA) mentioned at COP26 that as much as 37% of carbon emissions in 2020 would come from housing and buildings; coupled with many other environmental issues such as high temperature, high carbon emissions, alternating floods and droughts, urban heat island effect, air pollution, and PM2.5 being difficult to spread, these originate from the services or products used by the public in daily life. The choice of lifestyle will greatly affect carbon emissions. Therefore, through the implementation of policies, such as near-zero carbon buildings and the creation of urban green corridors, both energy efficiency and city appearance can be improved, and make the City move towards a sustainable recycling city with net zero emissions.

Promote the construction of electric vehicle charging stations

Core goal

Secondary related goal(s)

Relevant indicator: N/A

To build an environment for the use of electric vehicles, we encourage buildings to set up electric vehicle charging stations in the form of incentives. Also, it is stipulated that starting from July 2022, the new buildings in the future must reserve charger locations to increase residents' willingness to use electric vehicles and reduce the utilization rate of fuel vehicles. It is also hoped to reduce carbon dioxide emissions, health hazards caused by air pollution such as carbon monoxide, and noise pollution.

In addition, there are currently 234 public parking lots in Kaohsiung City, of which 170 chargers have been set up in 32 parking lots, and each parking lot will increase by at least 5%. It is expected to achieve the goal of 2,000 chargers in public parking lots in the City by 2030, providing a more friendly environment for electric vehicle users.

Promote near-zero carbon buildings and revitalize the KAOHAUS

Core goal	Secondary related goal(s)
11 SUSTAINABLE CITIES AND COMMUNITIES	6 CLEAN WATER AND SANITATION; 10 REDUCED INEQUALITIES; 12 RESPONSIBLE CONSUMPTION AND PRODUCTION; 13 CLIMATE ACTION

Relevant indicator: 6.4 Green building selected for rainwater storage and rainwater recovery amount

Since its launch in 2012, KAOHAUS project has promoted the construction and green energy tourism industry, created branding of land and buildings, and promoted social participation, landscaping, carbon reduction and disaster prevention, with universal design responses to establish a new paradigm of sustainable environment and architecture in tropical climate regions across the country.

Since the implementation of KAOHAUS project, a total of 3,837 applications have been filed and the number continues to increase. In the future, there will be about 130,000 KAOHAUS residences, with a total green area of 620,046 square meters, which is equivalent to the area of 103 international standard football stadiums, and can reduce carbon emissions by 12,400 metric tons per year. The carbon reduction amount of total energy creation will be 1.33 million metric tons per year, which is equivalent to the carbon sequestration amount of 13.3 million trees.

Flipping old railways to build urban green corridors

Core goal

Secondary related goal(s)

Relevant indicator: 15.1 Increase the average area of parks enjoyed by each person

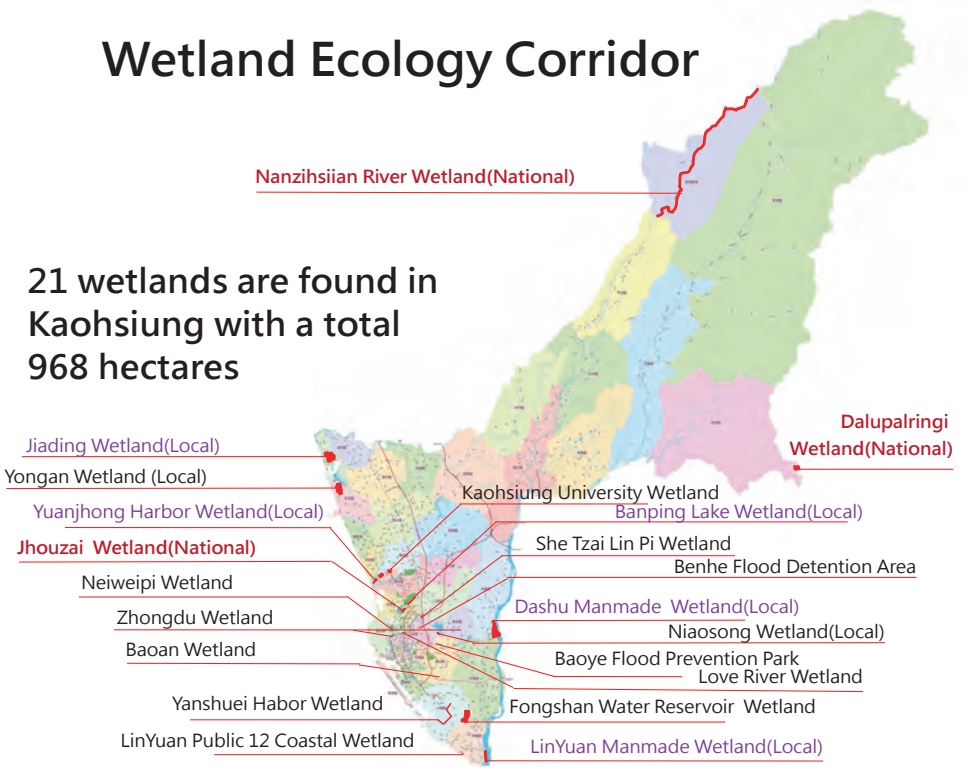
After the completion of the underground railway, a 15.37-kilometer railway corridor along the Western Trunk line will be vacated. To re-stitch the urban texture, the city government removes the obstacles to the development of the areas on both sides of the original railway. The transformation of urban space integrates urban aesthetics and promotes the integrated utilization of surrounding land along the railway. The city government also uses the multiple relationships among natural green land, water environment, human-oriented space, and users to create a sustainable greenway. The total area of the parkway is about 71.3 hectares, connecting 24 green systems in series. It can reduce urban noise, improve urban greening through planting about 8,200 trees, reduce carbon by about 2,000 tons per year, and reduce air pollution.

Create ecological corridor and connect wetland park network

Core goal	Secondary related goal(s)
15 LIFE ON LAND	13 CLIMATE ACTION

Relevant indicator: 15.1 Important wetland area

Wetlands are one of the important measures for urban development. The connection among wetland corridors provides sheltered and safe habitat and breeding space for wild animals and plants. It can also conserve water sources, enrich the original monotonous biota of the metropolitan area, provide substantial benefits for the conservation of the urban ecological environment, and use the existing carbon sequestration capacity to increase the City's ability to reduce carbon. At present, Kaohsiung City has nearly 1,000 hectares of wetlands, which can reduce carbon dioxide emissions by 21,500 metric tons per year. It is the city with the most wetlands in the country, and its evaluation performance ranks first in the country. Moreover, we apply for wetland labels in accordance with national policy. In the future, it is hoped to expand social participation through the market mechanism. The wetland resources can then be marketed and become potentially profitable so as to achieve the goal of self-sufficiency in the cycle of wetland conservation.



Diversified recycling channels

Core goal	Secondary related goal(s)
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	11 SUSTAINABLE CITIES AND COMMUNITIES; 13 CLIMATE ACTION; 15 LIFE ON LAND

Relevant indicator: 12.5 Garbage recycling rate

Through diversified recycling channels (such as ARM, recycling redeems activities, etc.), it is hoped to improve the resource recycling rate. We also promote plastic reduction and ban disposable plastic products to reduce the load on waste treatment and reduce carbon emissions. The daily garbage amount of the City has dropped from 1,372 metric tons to 1,279 metric tons, and the daily garbage amount has decreased by about 93 metric tons. The resource recycling rate has also increased from 41.03% in 2011 when the Kaohsiung County and City merged to 62.6% in 2021. It is estimated that the resource recycling rate can reach 64% in 2025 and 65% in 2030, making the City a sustainable recycling city with net zero emissions.

Shopping with your own bags brings you free goodies

Enterprise adoption of automatic resource recycling machine

Promote low-carbon sustainable homes and create a green life for all

Core goal	Secondary related goal(s)
11 SUSTAINABLE CITIES AND COMMUNITIES	13 CLIMATE ACTION, 17 PARTNERSHIPS FOR THE GOALS

Relevant indicator: N/A

Through community construction, we aim to garner consensus from the community residents and mobilize volunteers to work together to renovate the community environment, turning idle spaces into community landscape highlights, and increasing the green shared space for community residents' activities.

Resource recycling and regional beautification – Ganghou Village, Alian District (Lungang Community)

From 2011 to 2021, a total of 550 dirty and messy environments have been improved, 435 existing social construction sites have been maintained, and 1 community gardening shop and the community construction material stock of Hengshan Co-creation Base have been continuously operated. The overall performance was recognized by the Ministry of Health and Welfare's "Taiwan Healthy and Age-Friendly City Award – Clean Homeland and Community Construction" in 2013 and "Taiwan Healthy and Age-Friendly City Award – University Rooting in Community Construction" in 2018. Moreover, a total of 25 communities have won honors in the community landscape category of the Yuan-Ye Award in recent years, and Lungang Community in Alian District has even won the 2021 Urban Engineering Quality Gold Award.

As of 2021, a total of 525 villages and communities in the City have joined the ranks of low-carbon sustainable homes, and the annual carbon reduction reached 250,000 kgCO2e. The practical actions and carbon reduction ideas allow more villages and communities to join together.

Demonstration of smart energy-saving building renovation

Core goal	Secondary related goal(s)
7 AFFORDABLE AND CLEAN ENERGY	11 SUSTAINABLE CITIES AND COMMUNITIES; 13 CLIMATE ACTION

Relevant indicator: N/A

Sunshade installation art at Alian District Office

In 2021, Kaohsiung City sought competitive funds from the central government to carry out smart energy-saving renovation demonstration projects for government organizations, schools, and villages (districts) in the City. Among them, four landmark demonstration sites in the City were selected: Wenfu Elementary School in Zuoying District, Jianshan Branch of Yanchao Elementary School in Yanchao District, Alian District Office, and Cuiping Village Activity Center in Nanzi District. Through various energy-saving measures and energy management systems, users can better understand the power consumption status of buildings, thereby achieving the goal of energy saving and carbon reduction.

Roof farm and heat insulation net to reduce room temperature at Cuiping Village Activity Center in Nanzi District

The items to be replaced at the 4 demonstration sites include energy-saving luminaires, heat insulation and energy-saving measures, and smart energy management systems. These save a total of 66,000 kilowatt-hours of electricity, reducing carbon by 33 tons. The photovoltaic system installed generates 3,402 kilowatt-hours of electricity, reducing carbon by 1.7 tons.

Sustainable Rooting

In its report "Net Zero by 2050: A Roadmap for the Global Energy Sector", IEA indicates that behavioral changes play an important role in reducing energy demand for reaching net-zero emissions. The City will root the implementation of sustainable development through diversified education programs and awaken the public's awareness of global net zero carbon emissions. Meanwhile, we will implement the governance philosophy of open government and citizen participation in public affairs, construct the City's overall mechanism for promoting citizen participation, and incorporate the opinions of citizens from different generations to participate in the city government's policy promotion. We also cooperate with epidemic prevention measures and management, and combine virtual (digital) and real integration training to enable citizens to participate in empowering courses to play a multiplier effect. In addition to creating a good environment for lifelong learning for citizens, it will also lead the public to acquire a macroscopic vision and global thinking.

Civic participation and local engagement

Core goal	Secondary related goal(s)
16 PEACE, JUSTICE AND STRONG INSTITUTIONS	11 SUSTAINABLE CITIES AND COMMUNITIES; 17 PARTNERSHIPS FOR THE GOALS

Relevant indicator: N/A

The City has actively promoted civic participation since 2016, including issue-based and community-based participatory budgets, such as fishing village participation, district construction, youth dialogue, inclusive parks, and visionary citizen meetings. To stimulate the public's willingness to participate, it should be promoted as much as possible by the businesses that are closely related to the people's life. To allow more people to participate, we will continue to cultivate civic participation talents, enhance local participation capacity and knowledge, and gradually establish a talent database so that citizens are willing to participate in public affairs to implement direct democracy.

Discussion process of "Future Smart Manor Citizens Meeting"

Last year, we set up a "I want to propose" area, which served more people who cared about Kaohsiung municipal administration. More people seconding the case will prompt the competent authorities to make a formal response, reflecting the significance of direct civic participation in municipal administration.

Civic participation Gangshan Riverside Park inclusive playground

Educational promotion courses

Core goal	Secondary related goal(s)
4 QUALITY EDUCATION	3 GOOD HEALTH AND WELL-BEING, 11 SUSTAINABLE CITIES AND COMMUNITIES, 13 CLIMATE ACTION, 17 PARTNERSHIPS FOR THE GOALS

Relevant indicators: 13.3 Handle sustainable environment and disseminate high/low temperature adjustment course participation, 13.3 Awareness promotion of high temperature adjustment, prevention and treatment, 4.7 Lifelong Learning Engagement, Marine Education and Environmental Education, 3.4 The screening coverage rate of three cancers (cervical, breast, and colorectal), 3.8 Ratio of Citizens Utilizing Public Health Examination Resources, 3.d Utilization rate of long-term care services, 13.3 Number of implementations of sustainable campuses

1 Lifelong learning education

To promote lifelong learning, environmental education and promote civic participation, Kaohsiung City has set up 7 community colleges, 39 senior learning centers and Evergreen Academy. People have at least one learning base in each administrative district. It is hoped that through the courses, citizens can implement environmental protection, energy saving and carbon reduction behaviors in their daily lives, so as to achieve the role of concept communication and behavior change.

(1) Virtual and real integration to multiply empowerment

In 2021, the civic participation project was implemented; in line with the epidemic prevention measures and management and combining virtual (digital) and real integration training, we provided civil servants and citizens to participate in physical and digital learning courses. 6 sessions were handled in the former with a total of 143 person-times, empowering the City Government colleagues with the knowledge of energy and carbon reduction management, and leading the construction industry towards energy transformation. The latter used the digital learning platform "Kaohsiung E-learning" to self-produce digital teaching materials on issues related to citizen deliberation and regional revitalization. A total of 11,561 people participated in the study, and the total number of hours of study completed reached 19,378 hours. It has become the best promoter of the theoretical concept and practice of civic participation.

Kaohsiung E-learning series courses

(2) Handle sustainable environment and disseminate high/low temperature adjustment courses participation

We provide preventive information such as cold snap, low temperature, heat injury, and rainstorm warnings in various courses or through electronic bulletin boards, Facebook, and other publicity channels to reduce the impact of climate and maintain personal safety. In 2021, a total of 24,941 person-times was promoted, and it is expected to reach 27,450 person-times in 2025.

Evergreen academy publicizes rainstorm prevention information


Volunteer training to promote sustainable environment

(3) Lifelong learning engagement

We develop a variety of courses with the intention to satisfy the self-development, adapt to social life, and learn about public affairs, intergenerational learning, language learning, cultural inheritance, life art learning, etc., to break through the gap between ethnic groups and generations. This provides citizens of different ages, races, genders, occupations, and backgrounds with diverse learning opportunities. Also, based on the unique historical development and operational texture of each community, we designed a flexible learning mechanism that responds to residents' schedules and established a flexible course opening system to satisfy the learning needs of the public and activate a lifelong learning atmosphere. In 2021, a total of 240,448 people participated.

Traditional craftsmanship enters the campus - cutting and sticking craft (Fengshan community college)


Yoga classes at senior learning center in Linyuan District

(4) Senior-friendly literacy education and environment creation

The City promotes health literacy of the elderly for three major issues: exercise, nutrition, and dementia prevention. In 2021, we launched the 26th elderly health promotion station, 194 sessions of nutrition publicity activities and nutrition education for elderly groups, 201 sessions of dementia-friendly angel training, and 380 pieces of health literacy information on various channels. The total number of various literacy promotion activity reached 3,272,757 people.

In addition, the Department of Health established the "Kaohsiung City Community Health Resource Map" in 2021 for health centers and medical institutions to use in connecting health services for the elderly in communities. A total of 209 improvements have been made in the creation of a community-friendly environment, providing a safe and friendly space for the elderly, increasing the willingness of the elderly to use, and improving their autonomy. We have completed 9,355 cases of functional assessment for the elderly and promoted the screening rate of three cancers reaching 30% and above as well as the utilization rate of health checkup services for the elderly reaching 31%.

(5) Picture book creation

"Knowledge producing, lifelong learning" is one of the important development goals of Kaohsiung City Library. Three major lecture halls: City Lecture Hall, Dadong Lecture Hall, and Gangshan Lecture Hall, have been launched since 2010. Lecture themes cover various topics such as literature, science popularization, life health care, art, architecture, etc., providing citizens with weekend afternoons to participate in lectures to acquire new knowledge, recharge knowledge, and relax their bodies and minds.

"Picture Book Sprouting" original picture book creation talent nurturing plan: 3 works were successfully published in 2021

Furthermore, we have been handling the talent nurturing plan for the original picture book creation of "Picture Book Sprouting" since 2019. Through the two themed series of "Picture Book Creation Class" and "Original Picture Book Creation Award", we handle teaching, call for submissions, subsidy purchase, and matching publishing, makes this plan more perfect. It is also expected to enhance the core position of the International Picture Book Center as a communication platform for southern picture book practitioners.

Moreover, in 2020, the Kaohsiung Municipal Library, Xiaogang Hospital, and Yuh-Ing Junior College of Health Care & Management jointly built the Caoya Branch Library as the first "elderly long-term care theme library" in Kaohsiung City through cross-regional cooperation. Besides the introduction of various elderly resources (such as: health measuring instruments, health care lectures, board game supplementary therapy courses, etc.), we purchased additional "sewing machines" based on the core concept of "preserving local skills" and "maker" to promote the inheritance of skills and the cross-generational exchange.

City Lecture Hall invites Tokyo Olympic weightlifting gold medalist Kuo Hsing-chun for a sharing

2 Downward rooting education

As a member of the international community, we should implement the goal of net zero transformation simultaneously with the world. Therefore, it is necessary for us to actively promote the teaching demonstrations of international or global issues, starting from local people and affairs to global and cross-environmental, cultural, social issues, etc., and construct teachers' professional global literacy to cultivate students' international outlook and global mobility and competence of multilingual ability in response to the future changes to the world, so as to deepen the concept of sustainable development of high-quality education talent cultivation and localization of industry-research-academia cooperation.

(1) Global professional competence and digital learning

Cooperating with the "Digital Learning Promotion Plan" and "Digital Learning Cultivation Plan for Primary and Secondary Schools" of the Ministry of Education, the City promotes digital learning materials and uses them with mobile vehicles. We also handle the "Digital Learning Cross-disciplinary Promotion Plan" to encourage teachers to develop SDGs cross-disciplinary courses and integrate digital learning resources with new technologies and high-quality educational content.

(2) LOHAS learning rooted in net zero foundation

We educate the students on "2050 Net Zero Emissions" in an easy-to-understand way. Through promoting environmental education and its philosophy, we hope to enhance students' awareness and consensus on climate change and net-zero transformation so as to trigger their behavioral changes and implement a low-carbon life. Integrating net zero path, sustainable development, and circular economy education into teaching, we guide students to think about future education and employment-related development from the perspective of climate change and net zero transformation, and then cultivate talents in various fields to respond to climate change and jointly act in education.

(3)Disseminate the types and prevention of heat injury

Schools at all levels shall disseminate the types and prevention of heat injuries, and establish students' concept of self-examination of temperature adjustment. The Education Bureau conducts workshops for full-time sports coaches, incorporates heat injury courses, and reminds them to pay attention to the status of students as well as simple first aid methods. We continue to expand the industry's sponsorship of relevant equipment to inspect the training situation of athletes. Through the support and cooperation of partners, we establish the concept for students and athletes and self-adjustment methods to reduce the occurrence of subsequent physical discomfort or even regret caused by heat injuries.

(4) Promote sustainable campus

The common problems of schools in the City are high temperature and stifling heat. To improve the existing environment, guided by the Sustainable Development Goals (SDGs), the City encourages schools to promote "Campus Sustainable Micro-Revolution" starting with the school-based local customs and culture, and considering the geographical and current environmental conditions. This focuses on the basic concepts of environmental sustainability and resource recycling, making overall planning with a macro perspective, and accumulating hardware achievements year by year. From 2016 to 2021, a total of 147 schools actively participated in the sustainable recycling campus plan, with a total of 234 cases.

Recycled water to irrigate plants and purify the air at the same time (JiaSing Junior High School)

It is expected to continue to implement the combination of hardware transformation and software (campus construction, environmental education, energy saving and carbon reduction, or related course teaching) in the sustainable recycling campus, so as to create substantial educational effects, integrate community common awareness, rebuild community style, and transform the campus into a public activity space with community characteristics. In this way, the positive significance of sustainable management and environmental education can be brought into play, and the purpose of educational reform promoted.

The air-conditioning water and Ro drainage are reconnected to the ecological pool through the old underground water pipes to achieve the purpose of sustainable use.

Love the ocean and live with water

Core goal	Secondary related goal(s)
4 QUALITY EDUCATION	6 CLEAN WATER AND SANITATION; 14 LIFE BELOW WATER

Relevant indicator: Marine education and environmental education

1 Ocean and water resources education

We aim at maintaining the marine ecological environment and effectively purifying the ocean. Only by starting from the education of marine resources conservation and marine environmental education promotion course can the public understand more about different marine species. It can therefore raise public awareness of marine conservation to understand, protect, and even cherish the ocean. Therefore, the consistent promotion of marine resource conservation education and regarding it as the most important direction can keep ocean sustainability vibrant.

Cetaceans, sea turtles and other marine wildlife conservation education

Marine environmental education activity

2 Water resources and environmental education venues

To convey the knowledge of water resources to the public and children, we have set up a number of environmental education and teaching venues with functions of water resources management, environmental conservation, recreation and education, integrating water knowledge, water safety, water ecology and water culture. We also prepare relevant teaching materials. Through the combination of teaching and field visits, visitors can understand the importance of water resources.

高雄園區污水處理廠

再生水示範園區

澄清湖高質水環境教育園區

大樹污水處理廠

鳳山水資源中心

臨海水資源中心

Future Outlook

To achieve the goal of reducing emissions by 30% in 2030 and net zero emissions in 2050, Kaohsiung City proposed a net zero transformation path in 2022. This VLR focuses on sustainable net zero, demonstrating Kaohsiung City's net zero transformation policy. The transformation will be comprehensibly implemented from the aspects of renewable energy construction, industrial low-carbon transformation, vehicle electrification, popularization of public transportation, resource recycling and zero waste, low-carbon community, and sustainable rooting. This is to construct the "Kaohsiung City Autonomous Act of Net Zero City" as the basis of the local climate law.

Kaohsiung is our home, and we are ready for the future. Not all economic development will be accompanied by damage to the environment. We use complete land planning to guide the transformation of industrial structure. Also, we give priority to improving various environmental protection and basic measures when developing parks, and connect them to smart biomedicine, semiconductors, smart aerospace, innovative technology, and smart machinery to attract manufacturers to expand investment and transform Kaohsiung into a high-end manufacturing center. At the same time, job opportunities are created, so that the younger generation can stay in their hometown, work hard, and have industrial development that is in line with environmental sustainability and social justice.

At the critical moment of global net zero emissions, Kaohsiung will turn the green industries using net zero and digital dual-axis, promote the low carbonization of traditional industries, and apply smart technology to urban governance. Sustainable development is not just a slogan. It needs everyone to make a change in his/her lifestyle. We will work with people to promote the transformation of net zero life, and start the change from the bottom up. Moreover, through the civic participation mechanism, we will listen to the voices of the citizens, broadly accept their opinions, and have them participate together in the promotion of city government's policy. Meanwhile, in the process of transformation, we will give priority to protecting disadvantaged groups, consider the rights and interests of industry, ensure that no one is left behind, and implement social justice transformation.

Kaohsiung City Government will share responsibility for carbon reduction with the world, and at the same time align governance with SDGs to pursue balanced development of the environment, economy, and society. In the future, Kaohsiung will undergo steady and rapid transformation in terms of energy, industry, life, and society. We will join hands with citizens and industries, and unite public and private partners and citizen power, to create opportunities, reverse the climate crisis, and work together with citizens to build Kaohsiung into a smart and sustainable harbor city.

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Appendix »

SDG 1

End poverty in all its forms everywhere

Indicator	2020	2021	2030
Opening rate of children and Youth Future Education and Development Accounts	51.4	53.7	Observational indicator
Applicants/eligible persons			
Continuing deposit rate of Children and Youth Future Education and Development Accounts	80	84.8	
(Number of Children and Youth Future Education and Development Accounts deposited this year) ÷ (Number of Children and Youth Future Education and Development Accounts opened this year)			
Mobile healthcare coverage	85.7	100	90
(Mobile healthcare area) ÷ (areas with insufficient healthcare resources announced by the Ministry of Health and Welfare)			
Number of culture and health stations within sensitive indigenous communities	27	27	37
1.Indigenous areas: (1)Tribal villages within the jurisdiction of indigenous areas (towns, cities, districts) that have not yet established culture and health stations. (2)Tribal villages where the number of populations over 55 years old reaches 150 or more without a culture and health station. 2.City area: Area with a high proportion of indigenous population or gathering area without a culture and health station.			
Number of disadvantaged households under the Housing Act renting social housing or receiving rental subsidies (%) Social housing	63	58	Observational indicator
Rental subsidies	56	53	
Number of disadvantaged households under the Housing Act renting social housing or receiving rental subsidies			
Public property loss caused by fire per year (unit: TWD $1M)	7.5	20.5	Observational indicator
Fire Department Statistical Report			
Rate of applicable workers being supported to work in low-income households or low-middle-income households	61.1	66.7	64
(Number of successfully employed individuals in low-income, low-middle-income households) ÷ (number of registered employment-seeking individuals in low-income, low-middle-income households) this year			

Note: Considering the target value is optimized or unable to rise, the "Percentage of care visits completed within the time limit for vulnerable family service cases" indicator was deleted consequently.

SDG 2
End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Indicator	2020	2021	2030
Production and sales history verification area(hectares)	1,948	2,427	2,948
Accumulated verified area over the years (hectares)			
In-kind contribution service stations (offices)	62	72	67
In-kind contribution service stations			
Food manufacturing industry inspections rate (%)	11	35	100
(Number of inspected food manufacturing companies) ÷ (Total number of companies)			
Young people's agricultural entrepreneurship loan amount (unit: TWD $10,000)	7,044	1,108	Observational indicator
Accumulations of the amount of young people's agricultural entrepreneurship loans			
Proportion of organic crops area (%)	1.8	2	Observational indicator
(Organic crops area) ÷ (Total cultivation area)			
Agricultural expenditure in the composition of government's annual budget (%)	0.5	0.4	0.5
(Agricultural expenditure) ÷ (City government' s annual budget)			
Public funds in the agricultural sector (unit: TWD 100 million)	6.7	12.9	73.37
Accumulation of the economic development expenditure			
Approvals of agricultural rezoning cases in rural communities (piece)	58	61	64
A community can become a rural regeneration plan community after submitting its rural regeneration plan and upon review and approval.			

Note:
(1) Considering the target value is optimized or unable to rise, the "Annual Excellent certification rate of food companies" indicator was deleted consequently.
(2) The 2020 statistics of organic crops area and the "Agricultural expenditure in the composition of government's annual budget" of 2020 and 2030 has been mistakenly implied. The data was thus corrected in this report.
(3) Based on the city's policy and the national holistic plan, the target value of "Approvals of agricultural rezoning cases in rural communities" was adjusted to meet the value of 2030.

SDG 3
Ensure healthy lives and promote well-being for all at all ages

Indicator		2020	2021	2030
Number of childcare resource stations		117	127	167
Total number of public kindergartens, home childcare, private kindergartens, parenting resource centers, parenting resource stations, parenting resource buses, location-fixed and pay-by-time daycare stations				
Social welfare coverage (%)		27.7	28	43.4
(Number of social welfare facilities) ÷ (Number of administrative regions)				
Quantities of affordable education and childcare services (unit: ten thousand)		3.8	5.5	5.5
Total number of affordable education and childcare services offered				
Homeless care project (person)		7,192	5,967	7,400
Number of people served				
Screening coverage of three cancers (cervical, breast, and colorectal) (%)	Cervical cancer	53	51.8	54
	Breast cancer	37.4	32.4	38.5
	Colorectal cancer	37.8	33	39.5
Cervical cancer screening rate = (Number of people taking pap smear in 3 years) ÷ (Middle-aged population) Breast cancer screening rate = (Mammography screenings in 2 years) ÷ (Middle-aged population) Colorectal cancer screening rate = (Fecal blood screening in 2 years) ÷ (Middle-aged population)				
Traffic safety indicators (person)		350	333	258
Number of deaths within 30 days of traffic accidents				

SDG 3
Ensure healthy lives and promote well-being for all at all ages

Indicator		2020	2021	2030
Ratio of citizens using public-funded health check resources (%)	40-64 years old	31.6	32.2	31.6
	65 years old or above	30.9	29.3	31
(Total number of people aged between 40–64 screened in the past 3 years) ÷ (Number of people aged between 40–64 screened in January of the year) (Total number of people aged between 65 or above screened in the past 3 years) ÷ (Number of people aged between 65 above screened in January of the year)				
Utilization of long-term care services (%)		55.9	50.4	65
(Number of annual service users) ÷ (Estimated number of disabled persons)				

Note:
(1) Considering the target value is optimized or unable to rise, the "Coverage rate of healthcare institutions participating in the Diabetes Common Care Network" indicator was deleted consequently.
(2) Based on the city' s policy and the national holistic plans, the target value of "Quantities of affordable education and childcare service" was adjusted to meet the value of 2030.
(3) The indicator calculation method of "screening coverage of three cancers" was adjusted.

SDG 4
Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Indicator		2020	2021	2030
Supply of public, quasi-public education, and childcare services (%)		63.1	89.6	90
(Public + quasi-public approved enrollments) ÷ (Children aged 2–5 and enrolled in the kindergarten based in school year of 2018, which is 60,799)				
Disadvantaged groups (including special education students, indigenous, and new residents) eligible for learning care and guidance (%)		95.3	95.3	99
(Students receiving special education) ÷ (Students with disabilities in the city)				
Personal counseling and placement for students with disabilities (%)		97.4	96.1	99
Placements ÷ Applicants				
Pre-employment training and support for the unemployed among disadvantaged groups (Person)		1,185	1,263	1,199
Participants from disadvantaged groups in the given year				
Teachers learning global professional knowledge (Sessions)(Person)	Attended Sessions	64	76	60
	Participants	2,339	2,124	2,000
Number of people attending sessions of different fields/topics				
Lifelong learning (unit: 10,000 people)	Civil Servants	12.3	24.3	10
	Promotion	217.7	200	225
	Student Participation	0.9	0.9	0.95
	Community College for Senior Citizens	6	10	13
	Senior Citizens Learning Center	25.6	24.9	28.8
Civil servants of life-long learning in Kaohsiung City People reached by promotion activities Students participating in lifelong learning courses Summation of attendants of Senior Citizens Academy's education course, participants in special lectures at community's women colleges, and participants in volunteer's training) Students at community's college and senior citizens learning center				

SDG 4
Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Indicator	2020	2021	2030
Volunteers of environmental protection (unit: 10,000 people)	2.8	2.9	3.1
Volunteers of environmental protection			
People using digital learning materials (unit: 10,000 people)	17,002	11.4	13.4
Students participating in projects			

Note:
(1) Based on the city's policy and the national holistic plans, the target values of "Supply of public, quasi-public education, and childcare services" , "Disadvantaged groups (including special education students, indigenous, and new residents) eligible for learning care and guidance", "Teachers learning global professional knowledge" , and "People using digital learning materials" was adjusted to meet the target value of 2030.
(2) The 2020 statistics of "Teachers learning global professional knowledge" and the "People using digital learning materials" has been mistakenly implied, thus was corrected in this report.

SDG 5
Achieve gender equality and empower all women and girls

Indicator		2020	2021	2030
The sex ratio at birth (%)		107.1	107	Observational indicator
(Born male) ÷ (Born female)				
Cases in multi-agency program of domestic violence prevention (Applicants)(People)	Applicants	166	140	180
	People	5,804	5,709	6,200
Annual number of service recipients and persons				
Domestic violence and sexual assault prevention activities of the year (unit: 10,000 people)		1	0.68	3.2
Annual number of persons reached by events				
Same-sex marriages (couples)		306	249	Observational indicator
Calculation of same-sex marriages				
Proportion of deputy chiefs, chiefs of staff and first-level female supervisors in Kaohsiung City Government (%)		28	29	30
(Women among the current deputy chiefs, chiefs of staff, first-level unit supervisors, and the chiefs, deputy chiefs, and chiefs of staff of the municipal government) ÷ (Total number of the current deputy chiefs, chiefs of staff, first-level unit supervisors, and the chiefs, deputy chiefs, and chiefs of staff of the municipal government)				
Proportion of female non-supervisors in the municipal government and its first-level agencies (%)		28	42	30
(Female non-supervisors in the municipal government and its first-level agencies) ÷ (Total number of non-supervisors in the municipal government and its first-level agencies)				
Gender ratio of chairpersons of non-governmental organizations (%)	Male	71.7	71.1	70.8
	Female	28.3	28.9	29.2
(Calculation of male/female chairpersons of non-governmental organizations in Kaohsiung City at the end of the year) ÷ (Total number of chairpersons of non-governmental organizations)				

Note: Considering the target value is optimized or unable to rise, the "Male-to-female ratio of kindergarten staff in home kindergarten service centers" indicator was deleted consequently.

SDG 6
Ensure availability and sustainable management of water and sanitation for all

Indicator	2020	2021	2030
Daily water consumption per person (Liter)	281	272	Observational indicator
(Tap water for domestic consumption ÷ water supply population) ÷ 365 days			
Premium public toilets in Kaohsiung City (%)	79.2	79.8	85
(Premium public toilets) ÷ (Registered public toilets)			
Households connecting to public sewer system and sewer (%)	46	47.4	55.5
(Connected households × Number of households per county/city) ÷ total population per county and city			
Recycle of used water (Mts / Days)	5.4	5.9	21
Summation of the amount of recycled water discharged from the public sewage treatment plant and the total amount of recycled water produced by the Water Resources Center			
Mildly and slightly/not polluted length of the main rivers (%)	34.9	30.3	≧50
(Mildly polluted length + not/slightly polluted length) ÷ (Total polluted length)			
Stations' examining result with DO≧2.0mg/L in each water basin within the jurisdiction	≧95	97.3	≧100
(Stations with results of DO≧2 mg/L) ÷ (Effective stations)			
The length of tap water pipeline replacement (cases)	4,738	5,082	Observational indicator
Repair leak density			
Tap water penetration rate (%)	96.6	96.6	Observational indicator
(People with water supply) ÷ (Number of people in Kaohsiung City)			
Green building rainwater storage and rainwater recovery (unit: million liter)	3.5	3.7	4.5
Designed capacity of rainwater storage and rainwater recycling facilities for green buildings			
Kaohsiung city's soil and groundwater pollution public sites(numbers) released from listing	9	16	Observational indicator
Numbers of Kaohsiung city's soil and groundwater pollution public sites released from listing			

SDG 6
Ensure availability and sustainable management of water and sanitation for all

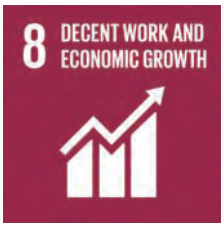
Indicator	2020	2021	2030
Subsidence area or amount of stratum in Kaohsiung City (square meter)	0	No monitoring results	Observational indicator
Area with the annual subsidence rate greater than 3 cm			
Water Environment Patrol Teams (teams)	30	31	30
Number of Water Environment Patrol Teams in Kaohsiung City			
River volunteers with the volunteer service records (%)	74.8	77.1	80
(Number of river volunteers with volunteer records) ÷ (River volunteers)			

Note:
(1) Considering the target value is optimized or unable to rise, the "Qualified rate of industry waste water audits" indicator was deleted consequently.
(2) Based on the city's policy and the national holistic plans, "Recycle of used water" was adjusted to meet the value of 2030.
(3) Updated the 2020 statistics of "The length of tap water pipeline replacement".

SDG 7
Ensure access to affordable, reliable, sustainable and modern energy for all

Indicator	2020	2021	2030
Energy consumption per capita (kWh/people)	2,745	2,779	Observational indicator
(Annual sales of electric lightings announced by Taipower) ÷ (Population in Kaohsiung)			
Solar photovoltaic facilities promoted (GW)	0.71	1	2
Cumulative capacity of solar photovoltaic facilities installed on buildings			

Note: Based on the city's policy and the national holistic plans, the "Solar photovoltaic facilities promoted" indicator was adjusted and updated to meet the value of 2030 and the statistics of 2020 respectively.



SDG 8
Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Indicator	2020	2021	2030
Entrepreneurship training courses held (sessions)	29	32	38
Sessions of entrepreneurship training courses			
Service of support and advice (people)	249	275	315
Number of applicants of support-and-advice service			

Note: Based on the city's policy and the national holistic plans, the "Entrepreneurship training courses held" and "Service of support and advice" indicator was adjusted to meet the value of 2030.

SDG 9
Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Indicator	2020	2021	2030
Promoting of park development and transforming into high-end manufacturing center (unit:100 million TWD)	400	815.7	2,442
Promoting the increase of annual value of manufacturers in the park			
KO-IN Zhigao Point (Financial Data Innovation Lab) (cases)	2	2	10
Number of applications for the financial data innovation laboratory			

SDG 10
Reduce inequality within and among countries

Indicator	2020	2021	2030
Multiples of household income quintiles gap	6.56	6.46	Observational indicator
(Average highest quintiles) ÷ (Average lowest quintiles)			
Promoting employment for people with physical and mental disabilities (people)	3,151	2,433	3,160
Number of people with promoted employment			
Employment-by-referral rate of disadvantaged job seekers	54	58.2	58
(Number of job seekers with special needs) ÷ (Number of newly registered job seekers with special needs)			
Gini coefficient of income per household	0.36	0.35	Observational indicator
Area contained between the Lorenz curve and the perfect equal line to the area of the entire triangle below the perfect equal line			

SDG 11
Make cities and human settlements inclusive, safe, resilient and sustainable

Indicator	2020	2021	2030
Disadvantaged households (household)	16,381	17,958	Observational indicator
Summation of households signing the social housing contract and households receiving rent subsidies			
Urban renewal (cases)	1	2	2
Number of approved urban renewal cases			
Barrier-free buses increased (%)	54	61	100
(Number of barrier-free buses) ÷ (Total Buses in Kaohsiung city)			
Public bike promoted (unit: 10,000 people)	669.8	917.3	1,200
Number of people riding public bicycles			
Bike lanes (kilometers)	1,035.3	1,047.9	1,100
Bike lanes length			
Extended length of the MRT (kilometer)	42.7	42.7	90.3
Extended rail length of the MRT			
Extended length of the LRT (kilometer)	8.7	12.8	22.1
Extended rail length of the LRT			
Senior Fun Caravan (unit: trips)	122	50	123
Senior Fun Caravan trips			
Developed land size of urban planning public facilities areas (unit: 10,000 hectares)	1.2	1.2	1.2
Statistics of developed of urban planning public facilities areas			
The suburban area planning in Kaohsiung city’ s spatial planning (cases)	1	1	1
The suburban area planning in Kaohsiung city's spatial planning			
National land plan and non-urban land development permission (cases)	2	3	2
Permitted cases of National Spatial Planning and non-urban land development			

SDG 11
Make cities and human settlements inclusive, safe, resilient and sustainable

Indicator	2020	2021	2030
Completion of barrier-free facilities in public buildings (%)	90.9	91	91.3
(Barrier-free public facilities) ÷ (All public facilities)			
Pavement environment and access area around schools (unit: 10,000 square meters)	12.3	14	24.2
Walkable area of pavement			
Continuous selection of public/private facilities in each jurisdiction suitable for emergency shelter for during disasters (%)	10	10	>10
(Evacuation capacity) ÷ (Number of citizens)			
Length of pavements with motorcycles' parking space removed (kilometers)	4.5	11.5	22.5
Total length of the motorbike parking spots removed on the pavement			
The number of people died, missing, injured during major disasters (earthquakes, typhoons, and floods) (person)	0	0	Observational indicator
Fire Department Official Statistics Report			
Annual average concentration of fine suspended particles (μg/m^3)	18.4	18.4	13
(Annual average sum of fine suspended particles found through manual monitoring stations) ÷ (Number of fine suspended particles manual monitoring stations)			
Ozone for eight hours	75.3	72.9	73
Average of annual ozone's concentration for 8 hours in 12 air quality automatic monitoring stations in Kaohsiung City			
AQI value	82.8	80.7	88
Improving the air quality by increasing AQI to ≦100			
Available air quality automatic monitoring data (%)	98.8	96.8	>94
(Hourly data included in the scheduled number of effective data) ÷ (Month included in the total scheduled number of transactions) × 100%			

SDG 11
Make cities and human settlements inclusive, safe, resilient and sustainable

Indicator	2020	2021	2030
Environmental noise monitoring (%)	100	97	96
1-(Number of periods of anomalous environmental noise monitoring) ÷ (Total number of periods of monitoring)			
Increase of the average park/green area per capita (square meters)	10.3	10.4	12.3
Average park and green area per capita			

Note:
(1) Considering the target value is optimized or unable to rise, the "The city's 20 main bus schedules" indicator is deleted consequently.
(2) The 2020 statistics of "Number of disadvantaged households", "Continuous selection of public/private facilities in each jurisdiction suitable for emergency shelter for during disasters", and "Available air quality automatic monitoring data" have been mistakenly implied, thus w corrected in this report.
(3) Based on the city's policy and the national holistic plans, the "Public bike promoted", "Bike lanes", and "Rail extended length of the MRT" indicators were adjusted to meet the value of 2030.
(4) Updated the 2020 statistics of "The suburban area planning in Kaohsiung city's spatial planning" and "Permitted cases of National Spatial Planning and non-urban land development".
(5) The 2030 value of "Permitted cases of National Spatial Planning and non-urban land development" was mistakenly implied.

SDG 12
Ensure sustainable consumption and production patterns

Indicator	2020	2021	2030
Increase of the issued green factory certificates (factories)	18	19	Observational indicator
Number of green factory acquired certificates			
Reuse of industrial food waste (%)	94.4	91.7	95.5
(Amount of reused industrial food waste) ÷ (Amount of total industrial food waste)			
Reuse of industrial waste (%)	90.6	91.8	92
(Amount of reused industrial waste) ÷ (Amount of total industrial waste)			
Tracing cases of the flow of toxic chemicals (%)	82.9	100	88
(Inspections of the regulated factories with toxic chemicals) ÷ (Numbers of the regulated factories with toxic chemicals)			
Selling rate of particles recycled from incinerated bottom slags (%)	80.2	90.4	85
(Selling number of particles recycled from incinerated bottom slags) ÷ (Total amount of particles recycled from incinerated bottom slags)			
Recycle rate of agricultural waste (%)	84.7	84.7	85.7
(Amount of recycled agricultural waste in registered companies) ÷ (Total amount of agricultural waste in registered companies)			
Recycled food waste (%)	2.4	2.2	5.5
(Amount of recycled food waste) ÷ (Waste volume, in despite of the business employees' household waste)			
Livestock wastewater turned into resource (%)	-	9.4	≥10
The percentage of resource utilization of livestock ranchs			
Recycled waste (%)	61.5	64.8	62
(Amount of recycled food waste, recycled waste and recycled huge waste) ÷ (Waste volume, in despite of the business employees' household waste)			

SDG 12
Ensure sustainable consumption and production patterns

Indicator	2020	2021	2030
Companies are encouraged to fulfill and integrate their social responsibilities into their operations and core strategies, becoming the cornerstone of their sustainable operations. (companies)	521	586	Observational indicator
Number of registered companies that have submitted a corporate social responsibility report during the previous year to the Market Observation Post System of the Taiwan Stock Exchange			
Green procurement by public organizations (%)	99.7	99	99
The annual purchases of environment-friendly products that meet the first category (with environmental protection labels), the second and third categories of "low pollution, resource conservation, and recyclability" in total, which should reach a set target ratio of the agency's total purchase budget for the year			
Green procurement by private enterprises and organizations (unit: 100 million TWD)	28.4	45.1	40
The annual purchases with Taiwan's environmental protection labels, second-grade environmental protection labels, energy conservation labels, water conservation labels, green building material labels, carbon footprint labels, carbon reduction labels and foreign green products in total			
Occupancies of tourist hotels (%)	41.4	45.7	50
(Number of guest rooms occupied) ÷ (Number of guest rooms)			
Low-carbon sightseeing (trips)	3	3	4
Trips of low-carbon sightseeing			

Note: Based on the city's policy and the national holistic plans, the "Increase of the issued green factory certificates", "Reuse of industrial waste", and "Green procurement by private enterprises and organizations" indicators were adjusted to meet the values of 2030.

SDG 13
Take urgent action to combat climate change and its impacts

Indicator	2020	2021	2030
Areas of farmers encouraged to set up a disaster preventional net-plastilhouse (hectare)	67.2	73.3	467
Cumulation of areas of farmers encouraged to set up a disaster preventional net-plastilhouse			
Volume of detention basins (Mts)	326.6	326.6	490
Volume of detention basins in Kaohsiung city			
Volume of detention basins (%)	40	40	Observational indicator
(Pedestrian areas with permeable pavement in square meters) ÷ (Pedestrian areas suitable for permeable pavements)			
GHG emissions reduction (%)	15.5	19.4	30
(Annual GHG Emissions - 2005 GHG Emissions) ÷ 2005 GHG Emissions			
Smart flood prevention and monitoring stations (stations)	172	208	208
Numbers of flood sensors, water level stations and mobile pump sensors			
Sewer monitoring stations	0	0	7
Each monitoring station is equipped with flow meters, water level meters, pH meters, conductivity meters, and total organic carbon analyzing devices			
Number of sustainable campuses (campuses)	213	234	290
Cumulative value of approved campuses			
Landslide prevention education and training (sessions)	24	50	150
Training sessions for landslide prevention education and training (including landslide prevention drills, actual military drills, etc.) in total per year			
Awareness raising sessions of high temperature adaptation, prevention and treatment (sessions)	347	861	7,000
Cumulation of awareness raising sessions of high temperature adaptation, prevention and treatment			
Sustainable environment and high/low temperature adaptation courses (unit: 10,000 people)	10.1	24.6	100
Cumulation of participants			

SDG 13
Take urgent action to combat climate change and its impacts

Indicator	2020	2021	2030
Communities with autonomous landslide disaster prevention (communities)	3	7	22
Number of communities awarded with the 2.0 Bronze Community Certification Award for Quality Independent Disaster Prevention Communities by the Water and Soil Conservation Bureau of the Council of Agriculture			
Communities with autonomous flood prevention (communities)	31	32	43
Number of communities continuously operating the autonomous flood prevention			

Note: Based on the city's policy and the national holistic plans, the "Volume of detention basins", "Communities with autonomous landslide disaster prevention", and "Communities with autonomous flood prevention" indicators were adjusted to meet the value of 2030.

SDG 14
Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Indicator	2020	2021	2030
Qualified rate of costal and ocean water quality	100	100	100
Σ (Total numbers of water quality meeting the marine environmental quality standards) ÷ (Effective monitors with 7 water quality indicators)			
Marine education and environmental education (sessions)	40	40	40
Annual sessions of marine conservation and marine environmental education			
Preservation of species	4	7	6
Clean-ups of the nets in the artificial reefs every year			
Cancelation of fuel subsidies of the illegal fishing vessels (units)	0	11	Observational indicator
Cancelation of fuel subsidies of the illegal fishing vessels			
Subsidies for off-fishing	98	98	100
(Number of approvals) ÷ (Number of applications)			

Note:
(1) Based on the city's policy and the national holistic plans, the "Preservation of species" indicator was adjusted to meet the value of 2030.
(2) The previous indicator "Conduct marine water quality monitoring along the coast and offshore, and calculate the pass rate target values based on 7 items related to marine environmental quality standards: pH, dissolved oxygen, lead, copper, mercury, zinc, and cadmium" was renamed to "Qualified rate of costal and ocean water quality". The previous "The Ocean Conservation Administration, Ocean Affairs Council awards subsidies for the removal of marine debris and marine environmental education and publicity program funds" was renamed to "Preservation of species".

SDG 15
Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Indicator	2020	2021	2030
Forest coverage (%)	57.9	57.9	58
(Forest area) ÷ (Total land area)			
Research and investigation report of the natural reserve area managed by Kaohsiung (reports)	5	4	2
Number of investigations per year in Wushanding Mud Volcano Nature Reserve and Nanzihsiian River Wildlife Reserve in Namaxia District			
Important wetland area (hectare)	583.5	583.5	583.5
According to the Wetland Conservation Act, the total area of international, national, and local grades of important wetlands approved by the central government			
Reservation areas for indigenous people (hectare)	12.7	8.8	25
Applications by the public			
Memorial trees registered and in conservation (trees)	558	564	750
Number of memorial trees in Kaohsiung			
Proportion of reserved area in mountainous areas (%)	23.3	23.3	23.3
(Total area of the city's natural reserves) ÷ (Total area of the city's mountainous areas)			
Number of afforestation seedlings given out (unit: 10,000 seedlings)	4.2	4	4.5
The public was encouraged to apply for the afforestation seedlings			
Increase of entries in Kaohsiung Biodiversity Database (numbers)	81	92	140
Number of entries in Kaohsiung Biodiversity Database			

SDG 15
Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Indicator		2020	2021	2030
Removal of alien species	Kaloula pulchra (unit)	202	987	Observational indicator
	Polypedates megacephalus (unit)	36	30	
	Egg foams of Polypedates megacephalus (unit)	2		
	Geopelia striata (unit)	28	134	
	Copsychus malabaricus (unit)	42	66	
	Iguana iguana (unit)	3,047	5,217	
	Leucaena leucocephala (hectare)	2	-	
	Mikania micrantha and Fragrant Eupatorium (hectare)	20.81	23.3102	
	Mimosa pigra (hectare)	3.5	1.5	
	Parthenium hysterophorus (hectare)	1	0.5	

Number of removed alien species

Note:
(1) Based on the city's policy and the national holistic plans, the "Important wetland area", "Memorial trees registered and in conservation", and "Number of afforestation seedlings given out" indicators were adjusted to meet the value of 2030.
(2) Updated the 2020 statistics of "Research and investigation report of the natural reserve area managed by Kaohsiung" and "Number of afforestation seedlings given out".
(3) The 2020 statistics of "Increase of entries in Kaohsiung Biodiversity Database" has been mistakenly implied, thus was corrected in this report.

SDG 16
Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Indicator	2020	2021	2030
Violence crimes committed (cases)	76	51	100
Cumulation of violence crimes			
Investigation of children under 12 years old in the household of wanted criminals and current criminals in violation of the Narcotic Hazards Prevention Act (%)	100	100	100
(Children interviewed by telephone + Children interviewed in-person) ÷ (Children that should be interviewed)			
Investigation rate of children in the household of suspected criminals in violation of the Narcotic Hazards Prevention Act (%)	100	100	100
(Number of visits to suspects that violated the Narcotic Hazards Prevention Act under a child protection or with vulnerable family for less than one year) ÷ (Number of suspects that violated the Narcotic Hazards Prevention Act under a child protection or with vulnerable family for less than one year)			
Crime reporting and requiring for assistance by the general public (%)	29	30.8	32
(General public reports through the 110, police phone number, and the 113, women's and children's protection phone number) ÷ (Annual crime reports)			
Restorative Justice Seed Teachers (people)	76	72	120
Restorative Justice Seed Teachers			
Open data downloads of Kaohsiung City Government (unit: 10,000 people)	40	43	80
Cumulation of downloads via Kaohsiung City Open Data Platform			
Kaohsiung City Government information platform queries provided (queries)	452	516	1,200
Total amount of query services provided by the Kaohsiung City Government information platform			

Note: Based on the city's policy and the national holistic plans, the "Violence crimes committed" indicator was adjusted to meet the value of 2030.

SDG 17
Strengthen the means of implementation and revitalize the global partnership for sustainable development

Indicator	2020	2021	2030
Dissemination of sustainable development information (unit: 10,000 people)	54.6	78.8	94
Cumulated number of viewers			
Conference of sustainability (sessions)	4	9	40
Cumulated numbers of conference and educational training of sustainability			
Participating in Fulbright Project (school)	20	22	20
Cumulation of school participating in Fulbright Project			
Collaborating projects with international sustainable organizations/government units (projects)	29	29	Observational indicator
Number of sustainability-related technical or strategic partnerships with international organizations and government units			
International Mental Health Training Center Taiwan (IMHTCT) under the New Southbound Policy (People) — Visiting Taiwan	428	158	Observational indicator
International Mental Health Training Center Taiwan (IMHTCT) under the New Southbound Policy (People) — Teaching Abroad	336	168	
Number of participants from overseas visiting Taiwan and teaching from abroad			

Note: Updated the 2020 statistics of "Dissemination of sustainable development information".

高雄市政府

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