

CHAPTER
06

Agent of Environmental Friendliness



⚡ Development Vision

As an energy enterprise, Taipower must face the challenge of maximizing its benefits while minimizing its negative impacts. As the economy develops, Taipower must continue increase the energy supply while pursuing cleaner energy and a low-carbon transformation. The Company will continue to work with society and enterprises to seek more energy and eco-efficient solutions as it pursues carbon value and environmental sustainability. In doing so, Taipower hopes to increase its environmental sustainability at a pace that is in step with economic development.

Taipower has responded to issues of air quality and climate change by adjusting its energy structure, increasing the energy use ratio of gas and renewables, and improving pollution prevention equipment, while increasing the efficiency of various energy resources. To achieve the goals outlined in its Environmental White Paper for 2025, Taipower will continuously work to mitigate the environmental impacts of various power facilities and work earnestly to live up to its commitment to environmental friendliness.

⚡ Performance Highlights

- 🏆 In 2022, the capital expenditure on environmental protection was approximately NT\$5.305 billion. Recurring expenses associated with environmental protection were about NT\$3.346 billion.
- 🏆 In 2022, the reuse rate for coal ash production and desulfurized gypsum were 94.1% and 100% respectively.
- 🏆 In 2022, Taiwan's power plant loads were voluntarily and autonomously reduced 1,301 times.
- 🏆 Approximately 1.09 million fish fry were released into the sea near power plants and offshore wind facilities in 2022.
- 🏆 In 2022, the emission intensity of air pollution decreased 66% compared to 2016.

6.1 Strengthening Environmental Management

6.1.1 Environmental Policy and Goals

3-3

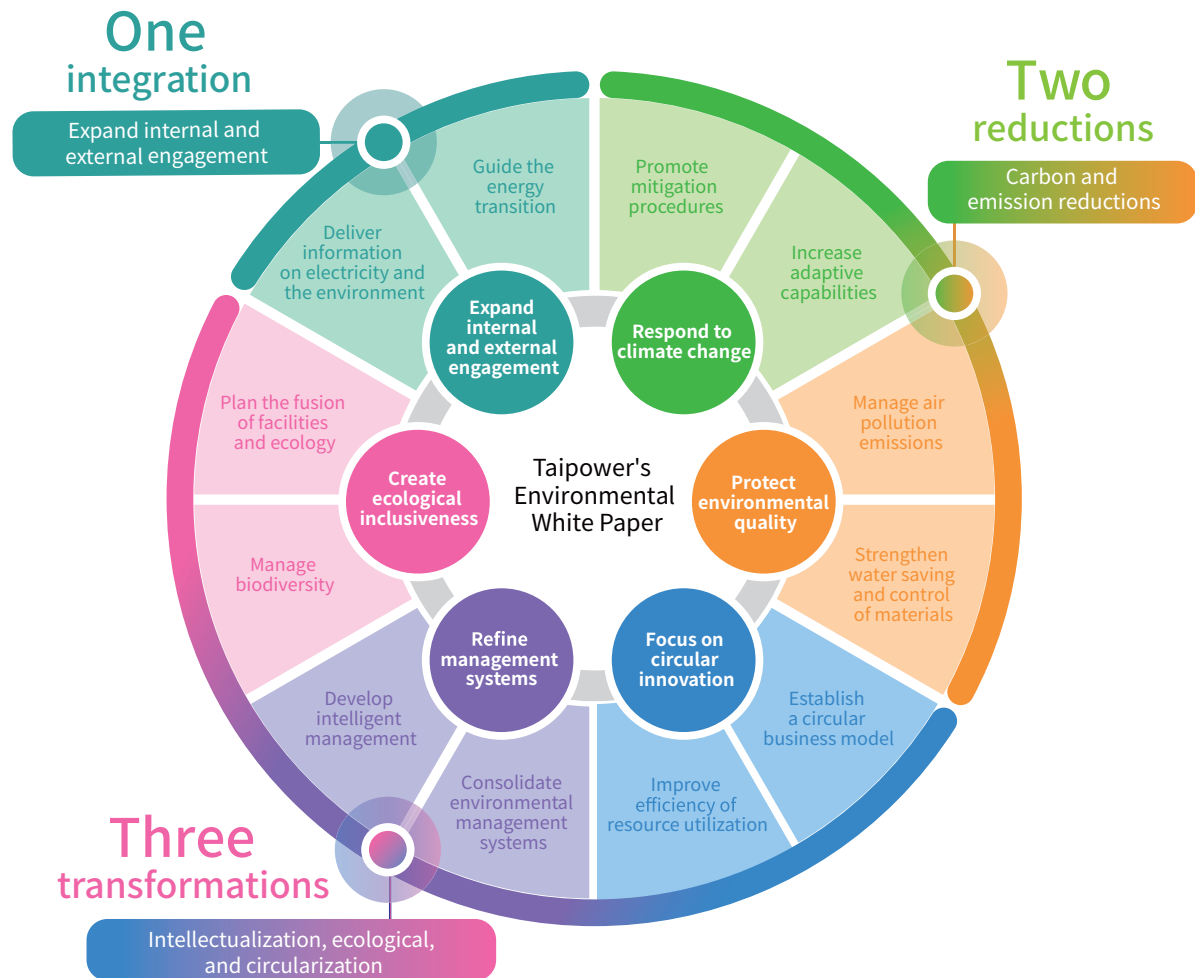


As the electric power industry pursues operations, it must consider energy quality, safety, and environmental sustainability. Taipower's corporate mission is to ensure a stable supply of electricity for the diversified development of society in a cost-effective and environmentally-friendly manner. The Company also aspires to transform itself into a prestigious, trustworthy world-class power utility group. As such, the Company is actively responding to the major environmental issues and development trends faced by the energy industry.

In alignment with the United Nations Sustainable Development Goals (SDGs) and the international vision for achieving carbon-neutrality by 2050, Taipower has formulated a White Paper with a forward-looking mindset. The White Paper fully elaborates on Taipower's strategic objectives and outlook and seeks to maintain a consensus on sustainability and a commitment to environmental policy.







Through six major strategic aspects and 12 corresponding strategic development dimensions, Taipower's Environmental White Paper presents a basis for the follow-up promotion of sustainable environmental management. Through development goals and action plans, Taipower integrates its business divisions to achieve the benefits of "one integration" (internal and external), "two reductions" (carbon and emission reductions), and "three transformations" (intellectualization, ecological, and circularization). Through this multi-pronged approach, Taipower will create environmentally friendly power facilities, a comprehensive model of green environmental protection, and a sustainable and inclusive power generation, transmission, distribution, and sales enterprise system.

Unfolding the Specific Contents of Taipower's Six Major Strategic Aspects and Twelve Strategic Dimensions



Environmental Sustainability Strategy Refinement >>

Taipower conducts a range of activities that are both environmentally friendly and neighborly. These include beach cleanups, fish fry releases, green space adoptions, and artificial reef developments. Additionally, in implementing its environmental policies, Taipower conducts environmental education, carefully evaluates environmental factors before power plant expansions and unit additions, and undertakes in-depth communication with local stakeholders to ensure legality and compliance. Through these measures, the Company achieves win-win situations for society, the environment, and Taipower.

Taipower Environmental Policy - Short, Medium, and Long-Term Goals						
Strategy	Key strategic dimension	2022 goal (Short-term goal)	Achievements in 2022	2023 goal	Medium-term goal (by 2025)	Long-term goal (by 2030)
 Respond to climate change	Promote mitigation procedures	Net greenhouse gas emission intensity of thermal power units will be reduced by 7% as compared to 2016 levels	Net emission intensity of thermal power units has been reduced by 7.1% as compared to 2016 levels	Net emission intensity of thermal power units will be reduced by 7.1% as compared to 2016 levels	Net greenhouse gas emission intensity of thermal power units will be reduced by 15% as compared to 2016 levels	Net greenhouse gas emission intensity of thermal power units will be reduced by 20% as compared to 2016 levels
 Protect environmental quality	Manage air pollution emissions	Air pollution emission intensity will be reduced by 55% compared to 2016 (2016: 0.769g/kwh)	Air pollution emission intensity has been reduced by 66% compared to 2016 levels (0.259g/kwh)	Air pollution emission intensity will be reduced by 55% compared to 2016	Air pollution emission intensity will be reduced by 70% compared to 2016 levels	Air pollution emission intensity will be reduced by 75% compared to 2016 levels
 Focus on circular innovation	Establish a circular business model	Completed circular business model pilot	Completed the renovation of the underground cafeteria at the headquarters building and handled 1 expert consultation meeting	The General Management Office conducted a feasibility analysis on promoting the use of recyclable containers and held 2 meetings on recycling and sustainability issues	Implement a circular resource supply model	Complete the establishment of a circular economy system
 Refine management systems	Develop intelligent management	Intelligent management and service coverage will reach 55%(Including the cumulative deployment of smart meters in 2 million households, representing 75% of total national power consumption)	Intelligent management and service coverage reached 56.32%(Including the cumulative deployment of smart meters in 2.1 million households, representing 75.64% of total national power consumption)	Intelligent management and service coverage will reach 58%(Including the cumulative deployment of smart meters in 2.5 million households, representing 78% of total national power consumption)	Intelligent management and service coverage will reach 65%(Including the cumulative deployment of smart meters in three million households, representing 81% of total national power consumption)	Intelligent management and service coverage will reach 82%(Including the cumulative deployment of smart meters in six million households, representing 85% of total national power consumption)
 Create ecological inclusiveness	Plan the fusion of ecology and facilities	Completed the interim report on the second power facility's ecological coexistence plan	Completed the interim report on the Yongan Wetland ecological integration project at the Hsinta Power Plant	Complete the release of the Hsinta Power Plant Ecological Coexistence Achievement Video and a presentation of the project results report	Establish at least three ecologically inclusive plans for power facilities	Establish at least five ecologically inclusive plans for power facilities
 Expand internal and external engagement	Deliver information on electricity and the environment	Annual communication of environmental protection information will reach 560,000 people	Annual communication of environmental protection information reached 626,096 people	Annual communication of environmental protection information will reach 560,000 people	Annual communication of environmental protection information will reach 700,000 people	Annual communication of environmental protection information will reach 750,000 people

To align with the Company's formulated environmental policy and fulfill its commitments to the public, Taipower has taken into consideration international sustainability trends, social sentiments, legal circumstances, as well as operational status and plans. Through a collaborative approach across departments and units, each unit has developed feasible, forward-looking, and representative short, medium, and long-term strategic goals and action plans based on their respective business attributes. By constructing and implementing these strategic plans, we aim to ensure that each business unit follows the directions outlined in the Environmental White Paper. This will effectively realize the Company's vision of becoming a green enterprise and translate its goals into tangible actions.

Implementing Environmental Impact Assessments ▶▶

To ensure a stable power supply, Taipower continues to develop and renovate various electrical facilities throughout Taiwan so that its hardware is well appointed and sound. The development of power facilities is highly related to local environments and communities. Improper management may result in water, air and soil pollution, noise or vibrations, waste, damage to natural resources and social, cultural or economic landscapes.

Consequently, Taipower has always been cautious about the impact of its operations on the surrounding environment and society. It has also adhered to a principle of minimizing its negative influence on the environment and sought to actively carry out effective environmental impact management. Through pre-development assessments and communication, public reviews, post-assessment improvements to plans, and a framework for continuous monitoring during construction, the impact of development activities on the environment and the surrounding community is minimized.



Adaptation Strategy and Climate Change Action ▶▶

Taipower's power plants and transmission and supply systems are distributed throughout mountainous, coastal, and riverine basins around the country. As power infrastructure is spread over complex terrain, setting adaptation strategies and actions is critical. Taipower has actively conducted risk assessments for strong winds and flooding at 44 power generation (hydro and thermal power) units (excluding those on offshore islands) and for its transmission, and distribution systems. Furthermore, the Company has voluntarily established and promoted demonstration sites showcasing adaptation strategies for power generation, transmission, and distribution systems since 2013. These demonstration sites were completed in 2021. Additionally, power equipment with a higher climate risk will be screened. Accordingly, Taipower has reinforced the protection capabilities of various hydro and thermal power plants as well as transmission and distribution systems to reduce environmental impact and strive for sustainable operations.

Taipower plans to expand the above-mentioned demonstration projects to each unit. For example, a parallel expansion plan for the climate change adaptation of the generation system was launched in 2020. In 2022, a risk assessment of the power generation system was completed, and the parallel implementation plan for climate change adaptation in the transmission system was initiated. In the future, apart from working in conjunction with plans implemented by the Bureau of Energy, Taipower will launch relevant projects simultaneously and independently to enhance its climate adaptation capabilities.

Environmental Accounting ▶▶

To accurately evaluate Taipower's investment in environmental protection, the Company implemented an environmental accounting system (EAS) in 2008. Environmental accounting is divided into capital expenditures (depreciation and amortization of fixed assets related to environmental protection) and recurring expenses (reimbursement of environmental protection-related expenses) for the collection of environmental protection-related expenses. The system requires employees to input environmental accounting codes for specific tasks or activities such as purchase requisitions, purchasing, reimbursements, and so forth through their business or accounting systems.

All operations are managed and compiled by Taipower's EAS to compute the costs of environmental protection, occupational safety, and health for each unit. Information is also compiled in the environmental accounting management system to make reimbursements more convenient and to accurately evaluate Taipower's investments in environmental protection expenditures. This system indicates that, in 2022, Taipower's environmental protection capital expenditure was approximately \$5.305 billion and its recurring environmental protection expenses were about \$3.346 billion. Taipower's EAS continues to be refined and optimized each year. In 2022, Taipower also made some major improvements to its environmental accounting process. These improvements are as follows:



Continuous Optimization of the Environmental Accounting System

In order to improve the environmental accounting mechanisms and management system, Taipower analyzed the environmental accounting data from each business unit and compared it with the actual operation patterns. The Company selected various business units for interviews, and optimized the system based on those interview results to ensure the accuracy of Taipower's environmental expenditure statistics.



Conducting Environmental Accounting Advocacy Meetings

Taipower conducted six educational advocacy meetings in 2022, and distributed new environmental accounting code promotion items. Through multiple education and training sessions, the Company enhanced the accuracy of the information gathered from the submission of environmental accounting codes by employees.

6.1.2 Developing High-efficiency Thermal Power Generation

305-5

Along with many in the global energy industry, Taipower is committed to developing high-efficiency power generation technology. The Company has been actively engaged in the energy transition in recent years. Through the development of low-carbon power, Taipower continues to reduce its electricity carbon emission factors. The Company is also reducing greenhouse gas (GHG) by using cleaner energy and providing cleaner power for industries and individuals in Taiwan. For thermal power generation, Taipower currently focuses on three main directions:

Transformation from coal to gas	The proportion of gas was increased again in 2022, and the pattern of primarily using gas with coal as support was continued. The proportion of gas used is higher than that of coal.
Coal-fired unit upgrades	Coal-fired units are gradually being replaced with ultra-supercritical units that have better generation efficiency.
Gas-fired unit upgrades	Old gas-fired combined-cycle units are gradually being phased out and replaced with new-type combined-cycle gas-fired units that have better generation efficiency.

Engagement of External Initiatives Organizations ▶▶

- 1 The Parallel Monitoring Organization for the Taichung Thermal Power Plant (The Central Counties / Cities Environmental Air Quality Parallel Monitoring Management Committee) has been jointly monitoring the air quality at the Taichung Thermal Power Plant for over 30 years. The committee involves organizations such as the Taichung City Environmental Promotion Association, the Changhua County Pollution Control Association, the Taichung City Pollution Control Association, and the Nantou County Ecological Conservation Association.
- 2 Participation in the Taiwan Association for Aerosol Research to discuss and share information on the rheology and impact of airborne particulate matter.
- 3 Participation in the Chinese Institute of Environmental Engineering to exchange and present papers on various pollution prevention strategies and technologies. Participation has gradually evolved from observing, listening, and communicating to collaborating and proactive participation.

Sulfur Hexafluoride (SF₆) Reduction ▶▶

Sulfur hexafluoride (SF₆) is a greenhouse gas with an extremely high global warming potential. After long-term use, the gas gradually escapes into the atmosphere. Nevertheless, as it is an essential insulating material for power equipment it is widely used in Taipower's substation equipment for power generation, transmission, and distribution. In response to this issue, Taipower has continuously promoted reduction methods. Taipower units that manage substation equipment have SF₆ maintenance management procedures. Relevant units carry out SF₆ reclamation and purification work as part of procedures for overhauling substation equipment. After the equipment is overhauled, the purified SF₆ is backfilled into equipment to reduce greenhouse gas emissions. This allows for the recycling of SF₆, mitigates climate change problems and achieves the goals of establishing a circular economy and resource regeneration.

6.2 Reducing Use of Energy and Resources

6.2.1 Fuel Usage Management

302-4

In order to be environmentally friendly, Taipower has chosen to use fuels with low-ash, low-sulfur, and low-nitrogen content. The Company's policy seeks to stabilize the use of coal, and gradually shift from coal to gas. Taipower will also continue to build and upgrade gas-fired units and related facilities to minimize pollutant emissions from thermal power generation.

Taipower's Use of Fuels from 2020 to 2022

	2020	2021	2022
Gas (millions of cubic meters)	15,075	15,846	16,395
Coal (millions of tons)	26.937	28.295	28.115
Fuel oil (thousands of kiloliters)	758	961	861
Nuclear fuel (tens of thousands of pounds)	155.5	128.66	115.83

To reduce emissions in line with regulatory requirements, power plants need to add environmental protection equipment and facilities. The coal used must be high in calorific value, low in ash, and low in sulfur content. Since the properties of coal vary from mine to mine and country to country, power plants use blending methods to meet a power plant's requirements for coal ash, calorific value, and sulfur. Taipower has added additional quality requirements for its coal procurement. For example, the Company has decided to reduce the ash content of its Indonesian coal from 11% to 8% and sulfur from 1.1% to 0.9%. It has also decided to reduce the ash content of its Australian coal from 14-15% to 10%. Further restrictions on mercury content have been imposed, too. While Taipower exercises strict control of emissions from downstream power plants in its supply chain, the Company works even harder to deliver on its environmental commitments in upstream areas of its supply chain.

6.2.2 Enhancing the Energy Efficiency of Taipower's Operations

302-1 302-3
302-4

In 2022, Taipower continued to give impetus to power-saving in conjunction with the Executive Yuan's Electricity Efficiency Management Plan for Government Agencies and Schools by setting a goal of zero growth in annual power consumption compared to the previous year. Moreover, in accordance with the Ministry of Economic Affairs' Water Saving Normalization Action Plan, Taipower promoted water conservation. The General Management Office will coordinate these efforts while other branches and power plants will be driven through promotions to implement various measures that constitute a comprehensive energy-saving and carbon-reduction scheme. Taipower will also track its energy consumption (water, power, fuel, paper) on a monthly basis and conduct annual assessments to select units with excellent performance.



Taipower's Non-Productive Power Consumption from 2020 to 2022

	2020	2021	2022
Consumption (GWh)	118.1	112.9	118.3
Calculation Scope (The percentage of total Taipower employees that fall within the scope of efforts)	100%	100%	100%



Taipower's Non-Productive Water Consumption from 2020 to 2022

	2020	2021	2022
Consumption (Tons)	1,328,077	1,236,818	1,287,862
Calculation Scope (The number, by percentage, of Taipower employees that fall within the scope of efforts)	100%	100%	100%



Taipower's Total Resource Recycled for Non-productive Business Activities from 2020 to 2022

	2020	2021	2022
Consumption (Tons)	39,159.93	54,156.12	33,591.68
Calculation Scope (The number, by percentage, of Taipower employees that fall within the scope of efforts)	100%	100%	100%

Note: 1. The statistical result for resources recycled from the Taipower headquarters building
2. Recycled resource include: Paper, iron and aluminum cans, other metal products, plastic containers, glass containers, etc.

Results of Non-Productive Resource Management



Water-savings

- Prioritizing the use of equipment with water efficiency labels was the first priority along with the effective use of rainwater resources (for toilet flushing, watering plants) to reduce tap water consumption.
- In line with the Water Saving Normalization Action Plan, Taipower actively promoted the installation of water-saving equipment and the replacement of old, water-consuming equipment in offices, at construction sites, and in employee dormitories.
- Promote water-saving measures at each unit through water-saving advocacy, water management, pipeline facility leak inspection, and rainwater reclamation and reuse.



Power-savings

- Prioritizing the purchase of appliances with an energy-saving labels or in the first or second class of energy efficiency.
- Establish an energy management system to monitor and analyze electricity consumption data. Identify improvement items and plan solutions to improve energy efficiency.
- In cooperation with the Electricity Efficiency Management Plan for Government Agencies and Schools, Taipower actively promoted the replacement of old energy-consuming equipment (air conditioners, lamps, etc.) in each unit to enhance electricity efficiency.
- Indoor temperatures were kept between 26-28°C in each office and circulating fans were used to increase comfort levels while reducing the use of air conditioning
- The elevators in each building adopt an energy-saving operation and control mode, and some of the elevators are deactivated during off-peak hours, after work and on holidays.
- Energy-consuming equipment and business machines were operated in all offices in an energy-saving manner; for example, the power supply for water dispensers was turned off automatically during off-hours and on regular holidays to save standby power.



Fuel-savings

- Promoted ride-sharing measures in vehicle dispatching and reinforced vehicle maintenance and inspection to reduce fuel consumption.
- Drew up a budget to accelerate the replacement of old fuel-consuming vehicles and made good use of electric vehicles.
- Fuel consumption in the past three years: In 2021, due to the impact of the epidemic, the usage rate of public vehicles was reduced, so the fuel consumption in 2022 was slightly higher than in 2021 by 340 liters. Despite this, fuel consumption in 2022 was 5,196 liters lower than in 2020.



Paper-savings

- Continued to implement paper-reduction measures such as the electronic exchange of official documents and online approvals, with performance reaching 70% and 85%, respectively.
- Advocated for employee use of double-sided printing to save 2.82 million sheets of paper.

Taipower in collaboration with IKEA, has adopted the "rental instead of purchase" circular furniture model to transform employee restaurants. This effort was officially launched in 2022. By implementing the rental model, Taipower aims to reduce the costs associated with purchasing, maintaining, and disposing of furniture. It is estimated that this initiative will reduce approximately 6 tons of furniture waste, which is equivalent to a reduction of about 20 tons of carbon emissions. This reduction is equivalent to the carbon absorption of 2,000 trees in one year. Over the 6-year project period, the furniture will be recycled and refurbished by IKEA, allowing used furniture to have an extended lifespan and creating value in the circular economy. This collaboration marks the first instance of a state-owned enterprise adopting such an approach.

6.3 Minimizing Environmental Impacts

3-3 305-6 305-7

6.3.1 Response Measures to Air Pollution



Taipower has formulated air pollution management strategies for thermal power plants. These include load reductions during periods of poor air quality and sufficient power supply. The Company has also conducted a comprehensive inventory of existing control equipment, planned to set up high-efficiency air pollution control equipment, and continuously improved its air pollution improvement measures at thermal power plants over three stages: short, medium, and long-term. These measures ensure a balance is achieved between power supply and environmental protection.

In recent years, the issue of "haze hazard" has been of great concern to the public. As such, Taipower has continued to manage air pollution actively through various plans and management methods. Taipower coordinated its implementation of environmental protection dispatching during periods of poor air quality to voluntarily reduce loads. For sulfur oxides (SO_x), nitrogen oxides (NO_x), and particulate pollutants (PM), the best available control technologies have been applied.

To control the air pollutant emissions generated by the operation of each power plant, Taipower chooses to use low-ash and low-sulfur fuels and is switching to clean energy in its fuel selection. In addition, continuous flue gas emission monitoring instruments have been installed in the smoke fontanel of various thermal power plants to accurately assess the concentration of pollutants in the flue gas, enabling equipment efficiency to be maintained in the best state, and minimizing the emission of pollutants in flue gas. Consequently, Taipower's flue gas pollutants are far lower than regulatory standard values.

The Actual and Regulatory Values of Major Air Pollutants from 2020 to 2022

Year	PM (kg/GWh)		SO _x (kg/GWh)		NO _x (kg/GWh)	
	Actual value	Regulatory value	Actual value	Regulatory value	Actual value	Regulatory value
2020	8	61	102	307	203	407
2021	6	61	98	312	188	393
2022	5	60	84	277	169	359

Note: The EPA published pollutant emission standards (Unit: PPM), multiplied by the exhaust air volume of each emission pipe (Unit: NCMM), then converted from volumetric emissions to mass emissions, and finally divided by the amount of electricity generated (Unit: GWh).

Management of Stationary Emissions ▶▶

Short-term responses

Coal-fired unit loads are reduced during periods of poor air quality and the dispatching of gas-fired units is prioritized

One example of Taipower's environmental commitment can be found in its reduction of coal use. Since 2015, coal-fired thermal power plants have undertaken environmental load reductions, when system supply is secure. Reductions include both voluntary and autonomous actions. In 2022, load reductions occurred 1,301 times, and the cumulative frequency of load reductions reached 5,682 times by the end of December 2022, with a total load reduction of 55,138.96 GWh.

Principles of Load Reduction in Response to Air Pollution Grading

Load Reduction Action	Criteria	Action Plan
Voluntary Load Reduction	Where next day air quality indicator pollutants are predicted by the EPA's air quality forecast to reach targeted levels for "particulate matter (PM _{2.5})" or "ozone hour value (O ₃)," and the air quality indicator reaches the orange level (AQI> 100) or above.	After evaluating power supply sufficiency, the thermal power plants in the upwind area will undertake load shedding in accordance with the measures recommended by the EPA.
Autonomous Load Reduction	Following EPA notifications, where more than one-third of the stations in the air quality area on that day have detected air quality index pollutants at target levels for "particulate matter (PM _{2.5})" or "ozone hour value (O ₃)," and the air quality indicator reaches the orange level (AQI> 100) or above.	After evaluating the sufficiency of power supply, thermal power plants in the upwind area will undertake load shedding in accordance with the orders of the EPA.
Mandatory Load Reduction	Following the issuance of air quality warnings or severe deterioration warnings by local authorities.	When alerts of air quality deterioration are issued, designated power plants will implement a certain percentage of production cuts or load reductions provided the available national generating capacity is at 2.8 GWh and the reserve capacity ratio is more than 10%.

Load Reductions in 2022

All power plants in Taiwan	Frequency of load reductions (times)	Amount of load reductions (10 MWh)		
		Annual overhauls (maintenance)	Non-annual overhauls (maintenance)	Total
Voluntary load reduction	1,223	657,177.1	748,459.5	1,405,636.6
Autonomous load reduction	75	23,230.6	19,973.2	43,203.8
Forced load shedding	3	2,834.0	4,193.0	7,027
Total	1,301	683,241.7	772,625.7	1,455,867.4




Medium-Term Actions

Adopting End-of-Pipe Reductions and Adhering to Emission Standards for Gas-Fired Generating Units

Taipower has conducted a comprehensive inventory of its existing control equipment and plans to install high-efficiency air pollution control equipment, use overhaul periods to improve the functions of control equipment, and enhance the removal efficiency of control equipment as much as possible through operational practices.

Taipower will introduce more advanced and efficient air pollution prevention and control equipment, install equipment in new power plants and renew equipment in existing plants to effectively reduce emissions. It will also set up automatic continuous monitoring equipment for flue gas emissions. Taipower's air pollution control improvement plans for particulate pollutants (PM), nitrogen oxides (NOx), and sulfur oxides (SOx) are shown in the table below. Taipower will invest a total of \$69.229 billion between 2017 and 2025 in these initiatives. Together, the measures are expected to reduce particulate matter by 398 tons/year, sulfur oxides by 7,118 tons/year, and nitrogen oxides by 15,460 tons/year. For more information, please refer to the annual report of the Department of Environmental Protection.

Air Pollution Control and Improvement Plan

Air Pollutant	Preventive Measure
 Particulate Matter	<ul style="list-style-type: none"> Install highly efficient electrostatic precipitators (EP) with a dust removal efficiency of 99.8% Build dust-proof grids around coal yards and configure regular sprinkler systems Use closed facilities for the transportation and unloading of coal, and frequently compact coal piles and clean roads Utilize chemical agents to stabilize the surface of coal piles in long-term storage, and implement the planting of windbreaks.
 Nitrogen Oxides	<ul style="list-style-type: none"> Install low NOx burners (LNB) and selective catalytic reduction (SCR) equipment
 Sulfur Oxides	<ul style="list-style-type: none"> Install flue-gas desulfurization (FGD) equipment to remove more than 95% of sulfur oxide

Long-Term Action

A Power Source Shift from "Primarily Coal with Gas as support" to "Primarily Gas with Coal as support"

The proportion of renewable energy has been increased in line with the national energy policy. In addition, the thermal generation structure has been adjusted from primarily coal with gas as support to primarily gas with coal as support. As a result, the future power generation fuel structure will be dominated by natural gas. According to the power development plan, all thermal plants, with the exception of the ultra-supercritical coal fired units at Linkou and Talin, will operate gas-fired units. Additional gas-fired units are being added at the Hsieh-ho, Datan, Taichung, and Hsinta plants. This measure will ensure both air quality and a stable power supply. After the new gas-fired units at the Taichung and Hsinta plants are completed and commercialized, some of the existing coal-fired units will be decommissioned or converted to standby.

Taipower is committed to reducing air pollution. In addition to measures such as the renewal and reconstruction of generating units, improvements to generation efficiency, and strengthening the efficiency of air pollution control equipment, the move towards reducing coal and increasing gas is a vital emissions reduction strategy. Under Article 14 of the Air Pollution Control Act, Taipower submits Implementation Plans for Gas Adjustment during Periods of Air Quality Deterioration and the Adoption of Emergency Control Measures. The plans explain the results of Taipower's environmental protection dispatching and evaluate the overall air pollution reduction benefits accordingly. Plans will be submitted annually to the EPA for approval so that when Taipower reduces loads for coal-fired units in response to poor air quality or is required by the competent authority to reduce coal-fired generation, gas-fired power generation can be used instead to ensure a stable power supply is maintained while achieving air pollution reduction.

Air Pollutant Emissions by Power Plants from 2020 to 2022

Unit: kg/GWh

Air Pollutant Type	2020	2021	2022
Nitrogen Oxides (NOx)	203	188	169
Sulfur Oxides (SOx)	102	98	84
Particulate Matter (PM)	8	6	5

Management of Mobile Emission Sources ▶▶

According to Environmental Protection Administration (EPA) analysis, diesel trucks account for the largest proportion of emissions from among the various kinds of mobile pollution sources. This has led Taipower to make an inventory of its large diesel vehicles that meet phase one and phase two environmental protection standards. The Company is also cooperating with the EPA to replace older vehicles. It is estimated that 67 kg of PM_{2.5} emissions will be eliminated for each old large diesel vehicle removed from service. Additionally, large diesel vehicles that meet phase three standards are equipped with smoke filters to reduce pollution. It is expected that this will reduce PM_{2.5} emissions by about 10 kg per year for each phase three diesel vehicle.

Management of Fugitive Emission Sources ▶▶

Taipower's fugitive emission sources include construction sites and coal yards. For construction projects, Taipower announced Promotion and Management Guidelines on Environmentally Friendly Measures for Green Construction Sites in 2018. The Company's projects now incorporate these guidelines. An appendix to the guidelines called Environmental Protection Construction Regulations of Taiwan Power Company, requires contractors to formulate Environmental Protection Management Plans and position environmental protection management personnel, who should be full-time and have the qualification of Class B air pollution control or above (one qualified employee is required for project contracts of NT\$50 million, two are required for contracts above NT\$200 million), to reduce air pollution from construction projects.

To reduce emissions from coal yards, Taipower set up dust-proof netting around older, open yard perimeters and uses sprinklers to inhibit the escape of coal dust. With technological progress and increasingly robust environmental quality requirements, Taipower's coal storage yards have gradually been converted from open to indoor storage. The Linkou, Hsinta, and Talin Power Plants have all built indoor coal bunkers, and the Taichung Power Plant is planning to construct indoor coal bunkers. Work on these projects is currently underway and will further restrain the escape of coal dust when completed.

6.3.2 Effluent Recycling

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Water Resources Management ▶▶

Taipower tracks its wastewater discharge in accordance with Environmental Protection Agency rules, follows the progress of legal and regulatory revisions, and develops corresponding solutions for possible risks. For example, 24 new control items were added to the effluent standards for power plants at the end of 2017. New ammonia nitrogen control items were added in 2021, and control limits were tightened for the effluent of the flue gas desulfurization of coal-fired units on mercury, arsenic, and selenium. In 2019, the Water Pollution Control Measures and Test Reporting Management Regulations were also amended, requiring periodic test reporting on wastewater according to the announced items and frequency. If power plants violate the effluent standards, they will be punished according to law.

All of Taipower's power plants follow the ISO 14001 management system and conduct regular compliance inspections. In view of the risks that may arise from ordinance revisions, relevant plans are developed for measures such as increasing the frequency of testing, decreasing pollution emissions at source by process control, and evaluating the need for additional treatment equipment to improve wastewater treatment efficiency over the long term.

Water Consumption for Generation at Taipower's Thermal Power Plants in 2022

Power Plant	Water Consumption for Generation(m ³)		
	Volume of Tap Water	Volume of Desalinated Water	Total
Hsieh-ho	310,243	4,633	314,876
Linkou	601,612	0	601,612
Datan	408,617	0	408,617
Tunghsiao	590,682	0	590,682
Taichung	4,613,335	0	4,613,335
Hsinta	2,202,606	0	2,202,606
Dalin	377,824	208,419	586,243
Nanbu	104,580	0	104,580
Jinshan	0	48,027	48,027
Tashan	0	33,307	33,307
Total	9,209,499	294,386	9,503,885

Wastewater Reuse ▶▶

Taipower actively pursues a goal of zero wastewater discharge. Rainwater collection (at power plants and dormitories) and wastewater reuse projects have been employed to reduce the use of tap water inside power plants through comprehensive planning. For many years, Taipower's thermal power plants have implemented measures for rainwater reclamation and wastewater reuse. The main uses of the recycled water are green irrigation, furnace bottom sealing, bottom ash water, and dust suppression for coal piles in coal yards. These measures have become normal water use principles for thermal power plants.

Rainwater storage and utilization essentially provides an alternative water source. It is an economical and practical water source development model because it does not consume energy or cause pollution. Taipower records the daily usage of demineralized water in unit operations. If there is any abnormality, Taipower investigates immediately, and implements water conservation. The Company encourages employees to sincerely cherish water resources and develop habits for water conservation.

Reclaimed and Reused Wastewater in Thermal Power Plants			
	Unit: Tons		
	2020	2021	2022
Reuse of Rainwater	108,959.0	115,476	61,292.7
Reuse of Effluent and Wastewater from Processes and Boiler Blowdowns	2,421,670	2,436,777	2,385,843

Note: Flue gas desulfurization (FGD) wastewater is not reused as it contains a high salt content which is likely to cause equipment corrosion and soil salinization. As such it is not included in the calculation of wastewater volumes

6.3.3 Waste Management

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Taipower has taken mitigation and improvement measures to minimize the impact of waste generated at the various stages of power generation, transmission, distribution, and sale. The following outlines the measures exercised for each type of power generation.

Type	Main Waste	Environmental Impact of Waste	Materiality Narrative	Mitigation and Improvement Measures
Thermal Power	Wastes and by-products are generated after fuel use, and include coal ash (fly and bottom ash) and desulfurized gypsum.	Coal ash (fly and bottom ash) is the industrial waste generated after fuel combustion. Improper storage may affect air quality and human health and can also have an impact on nearby ecosystems.	Thermal power (including gas and coal) accounts for approximately 78.5% of Taipower's total generated and purchased power. As such, industrial waste and by-products produced after fuel use must be disposed of properly.	<ol style="list-style-type: none"> 1. Taipower has formulated an air pollution management strategy for thermal power plants. For example, coal-fired thermal power plants are equipped with dust collection equipment to remove particulate pollutants in their smokers, and flue gas desulfurization equipment is installed to remove sulfur oxides from flue gas and to improve air quality. 2. Sulfur oxides combined with a limestone slurry produce desulfurized gypsum ($\text{CaSO}_4 + 2\text{H}_2\text{O}$) through chemical reactions such as absorption, neutralization, oxidation, and crystallization. This can be reused in the cement and fireproof board industries.
Nuclear Power	Main wastes can be divided by high and low-level radioactivity. Low-level radioactive wastes include radioactive waste resins, waste liquids, residues, radiation protection clothing, and parts that are generated during regular operations, equipment maintenance, or improvement projects at the nuclear power plant. High-level radioactive waste refers to the used nuclear fuel withdrawn after the operation of the nuclear power plant.	Radioactive material has a long half-life. If it is released carelessly, it may affect human health and pollute the surrounding environmental, soil and water resources.	If radioactive waste is improperly disposed of, the degree of harm and the scope of its impact could be enormous. Moreover, because radioactive materials have a long half-life, the impact time may last for tens or hundreds of years.	Taipower actively handles, disposes, and manages radioactive waste appropriately to effectively isolate it from the environment. Please refer to the Waste Management Mechanism section for Taipower's plans for high and low-level radioactive waste.
Hydropower Wind Power Solar Power	Decommissioned units and equipment.	There is no waste produced during the power generation process, and the product life cycle of units and equipment is enduring, resulting in low environmental impact.	The power generation processes of hydro, wind, and solar power units rely on natural resources, and unit life cycles are lengthy, so there is no materiality at present.	Regarding renewable energy equipment that may be decommissioned, Taipower will entrust a compliant disposal company to carry out waste cleaning and transportation and will evaluate the reuse of resources to minimize environmental impact.

Waste Management System ▶▶

The accumulation of coal ash also has potential hazards. Taipower takes steps to control ash levels effectively. Fly ash is measured at the angle of repose of the full silo, and the load combination is carried out by considering wind force, seismic force, soil transverse force, silo wall ring stress, temperature stress, and other factors. The Company also considers extreme situations, such as an empty silo with a full silo adjacent to it, by analyzing and confirming that the bearing force, deflection, displacement, subsidence, angular variables, and other items are sufficient to minimize potential hazards. Coal ash accumulation is classified according to the degree of potential hazard as follows:

Diameter, Height, and Level of Fly Ash at Coal-fired Power Plants				
Power Plant	Linkou	Taichung	Talin	Hsinta
Number of Silos	2	10	2	4
Diameter(m)	16.5	15	16	17
Height(m)	36	20	26.6	24
Control Ash Level (m)	28	10	22	20

Nuclear Energy-Related Waste Disposal Methods

Short-term	Storage and disposal processes for low-level radioactive waste	Before 1996, waste was sent to the Lanyu low-level radioactive storage yard for temporary storage. Since 1996, it has been temporarily stored in low-level radioactive storage depots at power plants.
	Storage and disposal processes for used nuclear fuel	In keeping with international norms, used nuclear fuel is stored in a dry storage facility after temporary storage in a used nuclear fuel pool.
Medium-term	A temporary storage facility is planned for the medium term and material will be transported to the facility for storage.	
Long-term	Transportation from short-term facilities or mid-term temporary storage facilities to a final disposal site.	



Utilization of Industrial Waste ▶▶

Reuse of Coal Ash and Desulfurized Gypsum in 2022

Waste	Reuse Practice	Production	Reuse Volum	Reuse Ratio
Coal Ash	Taipower has encouraged its engineering units to use fly ash in civil construction projects and for filling trenches. This raises the volume and utilization rate of fly ash and reduces the environmental burden. Coal ash is also sold for use as a building material.	2.178 million tons	2.051 million tons	94.1%
Desulfurized Gypsum	Desulfurized gypsum is used by local cement and fire-retardant board makers.	0.273 million tons	0.273 million tons	100%

The company is committed to enhancing energy efficiency and reducing the environmental impact of the renewable materials used.

1. The company's coal-fired power plants generate a by-product called coal ash, which can be used as a substitute for cement and as a binding material in concrete. Currently, most of the coal ash produced is sold for external use in construction materials. This use serves as an excellent example of recycling waste resources. In 2022, the production of coal ash reached approximately 2.178 million tons. To promote resource recycling and reuse in response to the government's initiatives. It has also been actively involved in the research, development, and promotion of coal ash reuse technologies, as well as in strengthening coal ash production management. The aim is to achieve diversified reuses for coal ash, increase reuse rates and add value in alignment with the government's goals of reducing waste and promoting a green energy and carbon reduction agenda.
2. In recent years, efforts have been made to increase the reuse rate of coal ash. In addition to its use in industrial building materials and land reclamation, the Company actively promotes the use of controlled low-strength materials (CLSM) containing coal ash in pipeline projects in an effort to expand the utilization of coal ash resources.

In the process of operations, the company generates other waste materials such as cables and metal waste. These are handled through public bidding after recycling, and bidders must meet the qualifications of the "business waste disposal industry" as required by the competent authority. The recycling operations are carried out in accordance with legal procedures to reduce the environmental risks associated with waste disposal.

In the past, when public assets reached the end of their service lives, the company would conduct public auctions in accordance with the "Waste Disposal Act" after completing scrapping procedures. Qualified private waste disposal organizations would then handle the disposal. Unfortunately, this system meant that some items with remaining functionality were not fully utilized. To improve the situation, the Company signed a memorandum of cooperation with the Taipei City Collateralized Loan & Consignment Corporation in 2015. Through this collaboration, some of the still functional and usable scrapped items are auctioned through the "Taipei Used Goods Exchange" operated by the Taipei City Collateralized Loan & Consignment Corporation to promote waste reduction, resource recycling, and reuse in line with green environmental principles.

In 2006, following the Ministry of the Interior's "Joint Investigation and Coordination Meeting on Anti-theft and Contacting", the company began cooperating with police to crack down on the theft of power cables and curb the trade of stolen goods. All waste cables with high copper content, and thereby susceptible to theft, were included in centralized bidding. Police agencies nationwide were notified about the contracted waste disposal companies and the quantity of waste cables as a reference for investigation, and to help prevent dishonest businesses from using the company's authorization to cover up illegal activities.

To reduce operating costs, the company established Equipment and Spare Parts Management Guidelines for Regional Operating Offices in 2014. It also set up tracking and control systems for equipment and spare parts management, set quarterly inventory targets, and implemented quantitative management to reduce the inventory quantity of equipment and spare parts. The activation rate of equipment awaiting repair or inspection was increased while the purchase of new materials was reduced. In addition, regional centralized contract maintenance was implemented, and scrapping procedures were carried out in accordance with regulations. Active measures were taken, such as immediate announcements on the corporate network regarding repair and calibration work and transportation progress. The contracted calibration institutions were also notified and asked to expedite the calibration process, thereby facilitating a reduction in the volume of equipment awaiting repair or inspection.

Sales Volumes and Amounts for Taipower's Industrial Waste from 2020 to 2022

Item	2020	2021	2022
Coal ash output (10,000 tons)	220	234	217.8
Coal ash sales volume (10,000 tons)	198	201.8	205.1
Volume of scrap cable and other metal (1,000 tons)	8.502	10.758	10.097
Value of scrap cable and other metal (\$100 million)	9.679	18.345	16.427

6.4 An Eco-Friendly Environment

6.4.1 Promoting Circular Economies

In responding to energy transition and the government's 5+2 Innovative Industries Plan, Taipower has pledged to embrace a circular mindset to create efficient and sustainable energy resource utilization, establish circular economies, and to develop a circular economic business model and improving resource efficiency. The Company hopes to transform from its traditional linear economic mindset into a circular economic model that gives increased consideration to sustainable development.

In view of this, Taipower celebrated May of 2021 as Environment Month. The Company used the event to publicly disclose its strategic blueprint for a circular economy. For the first time, the Company held an internal Citizen Cafe with the theme of circular economies. The event gathered the heads of various units to discuss and exchange ideas. At the meeting, more than 20 action plans were produced, and a strategic framework for a circular economy was established to push forward Taipower's dedicated circular economy plan. Taipower subsequently took the following specific measures to improve resource efficiency and reduce its environmental impact in 2022:

✔ Promoting the servicification model with furniture in the underground cafeteria of the headquarters building

In 2022, Taiwan Power partnered with IKEA to successfully promote the servicification model for the furniture in the headquarters building's employee dining facilities. In 2021, the partnership with IKEA was initiated, and the two companies jointly implemented a rental-instead-of-purchase circular furniture model for the renovation of the employee restaurant, which has been in operation for nearly 40 years (since 1983). IKEA took charge of the space design, furniture, and soft furnishing planning and arrangement, as well as subsequent maintenance, refurbishment, and recycling. This approach breaks away from the traditional linear model of manufacture, purchase, use, and discarding of furniture, to embrace the concept of a circular economy. The collaboration is set for a six-year duration, during which IKEA will customize and adjust the style and arrangement seasonally, creating a cozy Nordic atmosphere for Taipower.



✔ R&D and Promotion of Coal Ash Reuse and Recycling

Taipower's coal ash output in 2022 reached approximately 2.178 million tons. In response to the government's promotion of resource recycling and reuse, the Company actively invested in R&D and promoted coal ash reuse technology over the years. It has also reinforced coal ash production management. Moreover, coal ash from coal-fired thermal power plants can be used to partially replace cement as a concrete cementing material, so most of the Company's coal ash is sold for external reuse as a building material. The process has become an excellent example of waste resource recycling.



Retired cement utility poles are transformed into artificial fish reefs

Taipower utilizes retired cement utility poles to create artificial fish reefs by placing them in suitable marine areas. In coastal waters near power facilities, high-value juvenile fish are released to enhance fishery resources, improve or create marine habitats, and promote fishery development and ecological restoration. Since 1997, a total of 18,517 artificial fish reefs have been deployed in 22 reef and protection areas around the island, providing habitats for coastal fish species, preventing fishery aging, and enhancing productivity in nearshore waters. By creating marine habitats, these artificial reefs indirectly prevent trawlers from intruding into coastal waters.



Promoting an eco-friendly environment to enable efficient waste recycling

1 The "Cherish Goods" Online Platform: In order to foster a green environmental consciousness and promote resource recycling, Taipower signed a memorandum with the Taipei City Secured Small Loans Service Office on July 8, 2015. The Company also established Guidelines for the Online Auction of Scrap Items, making Taipower the only state-owned enterprise using online auctions. To demonstrate the Company's commitment to creating an eco-friendly environment and green transformation, Taipower actively promotes online auctions and encourages participation by various units. In addition to conducting advocacy and providing training, incentive mechanisms have been implemented to recognize outstanding units. From the start of online auctions until December 31, 2022, approximately 95 units have completed 6,260 online auction transactions, with a total transaction value of approximately NT\$184 million. The auction revenue was about 2.51 times higher than the base price, indicating a significant achievement. (Note: From January 1 to December 31, 2022, a total of 81 units completed 1,006 cases with a total transaction value of approximately NT\$33 million.)

2 Establishing contracts for the sale of reusable steel reels for cross-linked PE cables and cross-linked PE weather lines was part of the Company's resource-efficient recycling initiative to reduce waste generation. Since the 1970s, the Company has been maintaining these contracts with manufacturers of cross-linked PE cables and weather lines. After the company uses the steel reels, they are sold back to the manufacturers for reuse. The purchased steel reels are refurbished and painted before being used again for cable delivery, eliminating the need for re-acceptance (for the steel reel portion). In 2022, a total of 16,429 steel reels were recycled and reused.



6.4.2 Creating Ecological Inclusiveness

Taipower is committed to minimizing its negative impact on the surrounding environment during operations while maximizing its positive influence on society and the environment. In addition to carrying out neighborhood activities at power plants, such as beach cleanups, fish fry releases, green space adoptions, and building artificial reefs, Taipower continues to conduct environmental education and carefully evaluates environmental factors before power plant expansions or the addition of units. Moreover, Taipower conducts in-depth communications with local stakeholders to ensure legality and compliance and to achieve win-win situations for society, the environment, and the Company.

In 2021, bat nest boxes were installed at wind power sites. These achieved the short-term goal of creating ecological inclusiveness as mandated in the Taipower Environmental Whit Paper. It is expected that two more power facilities will host ecological integration projects by 2025. As Taipower moves towards its vision of becoming a green corporate enterprise, it will continue to integrate "multi-featured, multi-green spots."

The Cholan Plant – Firefly Ecological Conservation

The Cholan Plant site contains rich and diverse ecological features. The plant was completed and put into operation in 2003. During the plant's construction, more than 6,000 native species of trees were planted to beautify the environment and to enhance the stability of mountain slopes. Since then, the fishway ecology at the river dam has been continuously observed and monitored. Additionally, during the nearly two decades of plant operation, Taipower has carried out various maintenance projects including slope collapse remediation, pit and ditch management, pavement restoration, and regular soil and water conservation. Adhering to the spirit of environmental protection and ecological conservation, Taipower strives to reduce environmental impacts and maintain the natural ecology. Maintenance work at the plant avoids firefly breeding season, and there is a total ban on the use of herbicides. Consequently, the site's soil and water resources are well maintained, and the ecological environment is intact. This has allowed for the gradual formation of a firefly habitat. When the firefly viewing season begins in late March every year, fireflies gradually appear in the grass on both sides of the road, making it a popular firefly viewing spot.

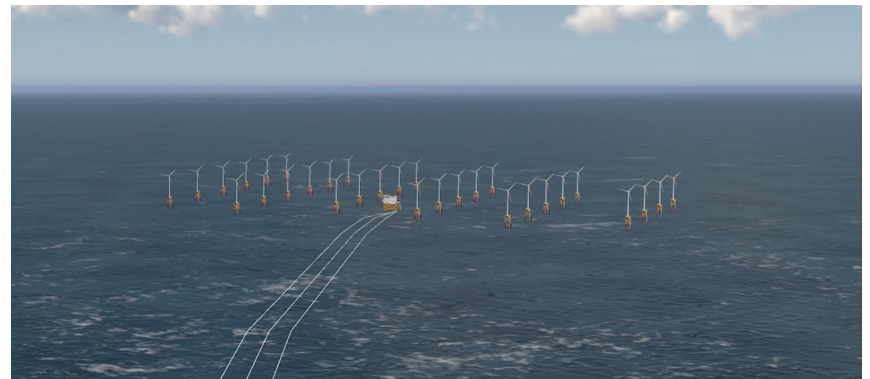


The Linkou Plant – Lily Ecology Restoration

The *Lilium formosanum* is an iconic native plant of Taiwan. In the past, it could be found throughout the Linkou, Bali, and Northeast coastal areas. Collectively, these places were known as the "hometown of the wild lily." Now, the Linkou Plant has devoted its efforts to the local ecology and put forward a Linkou ecological vision with lily restoration at its core. Since 2013, restoration work has been ongoing and expanded from the heavy oil tank area of the plant to the water outlet trail along the mountainside. By connecting with the neighboring Hongfu Palace, Xingfu Community, Xingfu Elementary School, and the Linkou District Office, the lily has been promoted through environmental education. Since the beginning of restoration work on the *Lilium formosanum* habitat, there have been traces of *Lilium formosanum* inside and outside the plant. While restoring the ecology, the project has also struck an emotional chord with local residents.

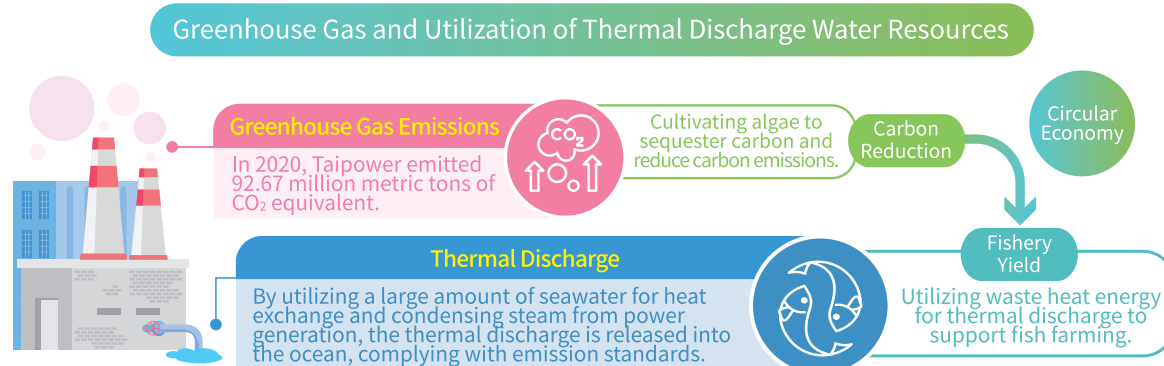
Offshore Wind Facilities and Plant – Ecological Care of the Adjacent Seas

Taipower carries out fish fry releases in the adjacent seas near thermal power plants and offshore wind farms. A total of six releases were held in 2022, including activities in the waters near the Taichung, Datan, Linkou, Hsinta, and Tunghsiao plants, as well as at offshore wind facilities. A total of about 1.09 million fry were released. Taipower has also invested funds in coral restoration, established heat-resistant coral nurseries in response to climate change, improved coral transplantation technology, and developed off-site coral cultivation.



The Linkou Power Plant - Marine Farm

Taipower utilizes "thermal discharge water" for aquaculture and has been implementing a Marine Farm project since 2016. The project provides a solution for winter cold damage and ensures that cultivated fish meat meets the hygiene standards for aquatic animals. Additionally, by cultivating algae to absorb carbon dioxide and using it as fish feed, Taipower achieves resource recycling, improves the efficiency of power plant resource utilization, and promotes the coexistence of ecology and economy.



The Hsinta Power Plant – Ecological Conservation at the Yong'an Wetland

Hsinta Power Plant boasts the only wetland within a power plant area in Taiwan. Through Taipower's proactive conservation and meticulous maintenance, the vibrant and abundant ecology of the Yong'an Wetland has been preserved. The identification of issues concerning wildlife and the environment has been enabled, and solutions can be proposed. In 2021, the Yong'an Wetland Ecological Education Center was officially unveiled, featuring an education center, a landscape platform, a wetland birdwatching wall, and the appropriately restored historical monument for the Wushulin Salt Company. This initiative aims to create a more accessible and informative environment that allows the public to get closer to and better understand the Yong'an Wetland. In 2022, Hsinta Power Plant further collaborated with Taipower's Environmental Month activities to host a Yong'an Wetland Ecological Promotion and Education Guided Tour, thereby deepening its commitment to environmental sustainability.

In 2011, Taipower initiated efforts in ecological conservation by focusing on mangrove carbon sequestration in the Yong'an Wetland. At that time, academic institutions were commissioned to conduct research on mangrove ecological restoration, to conduct basic environmental surveys and, to perform habitat creation planning. These initiatives laid the foundation for the wetland's ecological conservation and introduced the concept of habitat heterogeneity. They also guided the development of Taipower's ecological conservation activities, marking the beginning of a beautiful chapter in wetland ecology. In 2014, the Taipower Research Institute took over the ecological conservation research, covering topics such as avian species, mangrove conservation, comprehensive vegetation surveys, vegetation succession processes, aquatic organisms (fish, shrimp, and mollusks), insects, amphibians, and reptiles. Through observation, the research identified challenges faced by wetland bird populations due to poor water levels and observed changes in vegetation towards low-altitude secondary forests, leading to the loss of the ecological characteristics of salt marshes. These research findings served as a basis for proposing solutions to address the identified issues and to further enhance wetland ecological conservation.

Over the course of 8 years, the Taipower Research Institute meticulously recorded the changes in bird populations and their distribution and spatial utilization under different water levels. Through

the application of geographic information systems and advanced statistical analysis, the preferred water depths and ranges for each bird species were accurately measured. Water level regulation was then used as a basis for creating suitable habitats. By precisely controlling water levels during different migratory seasons (transit, wintering, and transit in spring), the populations of birds such as plovers, geese and ducks, herons, and egrets increased by 176.7%, 78.6%, 47.0%, and 178%, respectively. The reasons for the increases in avian diversity through effective water level improvement were analyzed, and the database of bird species and water depths helped solve challenging conservation issues, demonstrating significant scientific value. The methods for measuring water depths and water level control techniques have subsequently received patents in Taiwan. The research on vegetation distribution and succession processes effectively improved the direction of vegetation succession, allowing the appearance of salt marshes to be maintained and the wetland's ecological system to be stabilized. The most valuable aspect of the wetland ecological conservation research in Yong'an Wetland is that it was carried out independently by Taipower Research Institute staff, demonstrating Taipower's determination, confidence, and capability in ecological conservation.

According to surveys conducted over the years, the cumulative number of bird species in the Yong'an Wetland exceeds 200. In order to maintain biodiversity, Taipower not only investigates the habitat utilization of waterbirds but also proposes conservation measures to reduce impacts and minimize development areas. After undergoing environmental impact assessments, an important local-level wetland of 41.25 hectares and a buffer zone of 15 hectares were preserved. The land area for gas-fired power generation was reduced to 34.5 hectares, while the remaining land was maintained in its current state. Future plans include designating it as land for carbon capture, utilization, and storage. The Hsinta Power Plant also aims to become an "Environmental Education Facility" certified by the Environmental Protection Administration. It seeks to collaborate with local elementary and junior high school schools, community organizations, and volunteers to integrate wetland ecology, salt-making culture, and the resources of the salt village in order to deepen environmental and cultural education, including wetland conservation concepts. By revitalizing the cultural and ecological resources of the Yong'an Wetland and developing a recreational environment that combines tourism and educational value, new vitality can be injected into the local industry.