台灣電力公司
Taiwan Power Company

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03 CHAPTER

Agent of Environmental Friendliness

Stakeholders

Government Agencies, Civil Groups, and Electricity Users

100%

The coal ash reuse rate reached 97.2%, and the desulfurized gypsum reuse rate 100%.

1,727 times

A total of 1,727 voluntary and environmentally-Voluntary Load Reductions were carried out across all power plants in 2024.

reduced 71.9%

Air pollutant emission intensity was reduced by 72% compared to 2016 levels in 2024.

As a power utility, Taipower is committed to maximizing its positive impact and minimizing environmental harm. The Company continues transitioning to cleaner energy and enhancing energy efficiency in collaboration with society and businesses. This approach aims to achieve both economic growth and environmental sustainability.

To address air quality and climate issues, Taipower is adjusting its energy mix by increasing the share of power generated from gas and renewables, strengthening pollution control equipment, and improving energy resource efficiency. The Company will continue working to reduce the environmental footprint of power facilities and fulfill its commitment to environmentally friendly operations.

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3.1 Strengthening Environmental Management

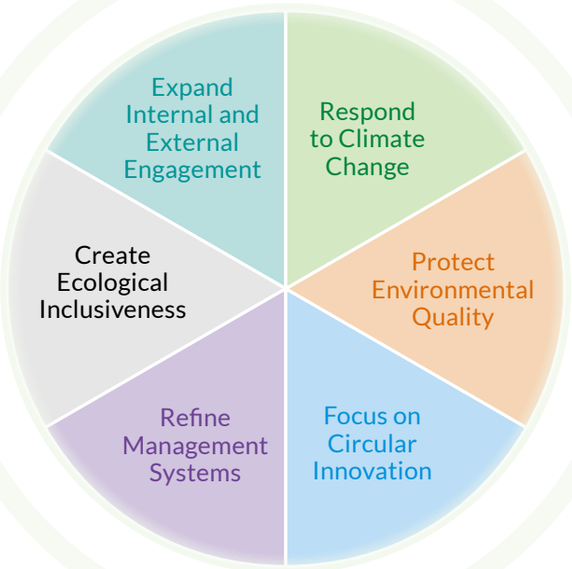
3.1.1 Environmental Policy and Environmentally Friendly Initiatives 305-4

As a power utility, Taipower must balance energy quality, supply security, and environmental sustainability. Guided by its mission to provide reliable electricity through environmentally friendly and cost-effective means, and its vision of becoming a trusted, world-class energy provider, Taipower actively responds to key environmental challenges and global sustainability trends.

In response to the UN's Sustainable Development Goals (SDGs) and Taiwan's 2050 net-zero emissions goal, Taipower has adopted six strategic directions within its environmental policy. These guide the implementation of company-wide action plans in adherence to the slogan of "One Integration (internal and external dialogue), Two Reductions(carbon and pollution), and Three Transformations" (intelligent operations, ecological harmony, and circularity). Through this approach, Taipower aims to build an environmentally friendly power infrastructure and establish a green, sustainable power generation, transmission, distribution, and retail system.

Taipower also adjusts its environmental initiatives in response to international trends, regulatory changes, and operational needs. Cross-department collaboration ensures that each business unit proposes forward-looking and feasible sustainability actions that are aligned with its operation and contribute to Taipower's vision of being a green enterprise.

The Six Major Aspets of Taipower's Environmental Strategy



Taipower's Environmental Policy – 2024 Highlights

Strategic Aspect	Description	2024 Highlights
Respond to Climate Change	Taipower continues to implement mitigation and adaptation measures in response to climate change. These include GHG management, renewable development, and investment in low-carbon technologies	Taipower continued to advance power sector transformation through renewable energy expansion, the increased use of natural gas, and coal reduction. Air pollution control equipment for the Taichung Power Plant's Units #5 and #6 was upgraded to enhance emission control performance, and Gas Unit #9 at the Datan Power Plant was added to the power grid to support low-carbon electricity supply.
Protect Environmental Quality	Ongoing reductions of Taipower's environmental and public health impacts through air, water, and radioactive waste.	As a result, the air pollutant emission intensity of thermal power generation in 2024 decreased by 71.9%, and CO_2 emission intensity dropped by 11.7% compared to the 2016 baseline.
Focus on Circular Innovation	Promote resource efficiency and circular resource use in line with circular economy principles; develop circular business models.	A dormitory renovation project at the Training Institute was selected as a demonstration site and incorporated circular design principles for space, energy, materials, and water.

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Taipower Environmental Policy – 2024 Highlights

Strategic Aspect	Description	2024 Highlights
Refine Management Systems	Strengthen and integrate environmental management systems and develop smart power management capabilities.	A total of 3.403 million smart meters were deployed, covering 81.52% of electricity usage nationwide.
Create Ecological Inclusiveness	Integrate ecology and biodiversity into facility planning and operations, and protect surrounding ecosystems.	The Wanta Plant restored local Taiwan soybeans on-site; The Maanshan NPP signed an MOU with Kenting National Park for butterfly conservation; The Hsinta Plant earned environmental education certification for its wetland conservation; Dajia River Plant improved fishways and deployed AI-based underwater monitoring with public education programs.
Expand Internal and External Engagement	Maintain active communication with internal and external stakeholders, share environmental and energy transition efforts, and support Taiwan's energy transformation.	Taipower hosted exhibitions and public events such as the Kilowatt Design Award and the "Love Mother Earth"campaign, reaching over 920,000 people with environmental communications in 2024.

In line with international sustainability trends, social expectations, and regulatory developments, and with consideration for Taipower's operational status, each unit through cross-departmental collaboration formulated feasible, forward-looking representative actions based on its business characteristics to help shape the Company's green enterprise vision.

Implementing Environmental Impact Assessments

To ensure a stable power supply, Taipower continues to develop and renovate facilities across Taiwan. However, these projects run the risk of impacting local environments and communities through pollution, noise, waste generation, or the disruption of natural and cultural resources. To mitigate these risks, Taipower conducts environmental impact assessments (EIAs) and public reviews before development, and implements continuous environmental monitoring during construction.

Development Projects Approved by the Ministry of Environment in 2024

- Offshore Wind Power Phase II Project – Second Revision of the Environmental Impact Statement, including review conclusions and updated cetacean protection measures
- Environmental Impact Variance Analysis Report for the Taichung Gas-Fired Unit Project – Addition of the a New Switchyard
- Environmental Impact Statement for Phase II of the Taichung Power Plant Gas-Fired Unit Construction Project
- Environmental Impact Statement for Penghu's Zhongtun Wind Turbine Renewal Project

Environmental Accounting

To clearly evaluate Taipower's investment in environmental protection, the Company has implemented an environmental accounting system (EAS) since 2008. Environmental expenses are categorized into capital expenditures (such as depreciation and amortization of environmental assets) and recurring expenses (such as reimbursements related to environmental activities). When employees make purchase requests, conduct procurements, or submit reimbursement requests, they input the appropriate environmental accounting codes. These are then compiled in the EAS for the analysis and tracking of environmental protection investments.
In 2024, Taipower's capital expenditure on environmental protection amounted to approximately NT$5.107 billion, and recurring expenses were approximately NT$3.204 billion.

External Environmental Communication Achievements

- A total of 49 positive media reports were published following press events during the 2024 Environment Month.
- Approximately 180 participants attended the lectures and forums held during the 2024 Environment Month in 2024.
- Around 980 participants joined Environment Month outreach activities that also lead to 28 instances of positive media coverages in 2024.
- The documentary "A Day as a Bat Box Inspector – Exploring a Green Energy World for Bats"reached over 12,000 views in2024.
- The documentary titled "Near-Zero Mission – Air Pollution Control Improvement at Taichung Power Plant Units 5–10" reached nearly 3,000 views in 2024.
- Public site surveys and hearings were conducted for the Third Nuclear Power Plant Decommissioning Plan and the Dajia River Guangming Pumped Storage Hydropower Project in 2024.



On-site inspection was conducted for the Dajia River Guangming Pumped Storage Hydropower Project



On-site inspection was conducted for the Decommissioning Plan of the Third Nuclear Power Plant

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3.1.2 Energy Resource Management

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Fuel Usage Management

To promote environmental sustainability, Taipower has opted for fuels with low ash, sulfur, and nitrogen content. The Company is committed to gradually transitioning from coal-fired to gas-fired power generation. It continues to construct and upgrade gas-fired units and their associated facilities to minimize pollutant emissions from thermal power generation.

Taipower's Use of Fuels

Types	2022	2023	2024
Gas (millions of m^3)	16,395	15,671	16,750
Coal (millions of tons)	28.115	26.823	24.563
Fuel Oil (1,000 kL)	933	822	928
Nuclear Fuel (10,000 lbs)	115.83	70.18	12.10

Sulfur Hexafluoride (SF_6) Reduction

Sulfur hexafluoride (SF_6) is a greenhouse gas with a high global warming potential that can gradually escape into the atmosphere during long-term use. Due to its excellent insulating properties, it is widely used in Taipower's power generation and transmission equipment. To reduce SF_6 emissions, Taipower has introduced reduction measures, including a maintenance procedure requiring relevant units to reclaim and purify SF_6 before substation overhauls, and to refill the purified gas afterward. This approach lowers greenhouse gas emissions, mitigates climate change, and supports circular economy and resource regeneration goals.

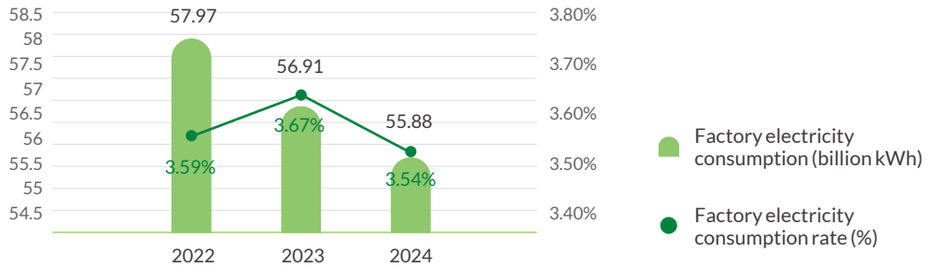
Improving the Energy Efficiency of Operations

Taipower has established a Material Flow Management Information System to monitor the inputs and outputs of energy, resources, and waste at each unit. All units are required to submit annual reports, allowing the Company to track and manage waste conditions. Moving forward, Taipower will continue to inventory the flow of energy and resources across its power generation, transmission, distribution, and sales value chains, while developing and expanding strategies to enhance overall efficiency.

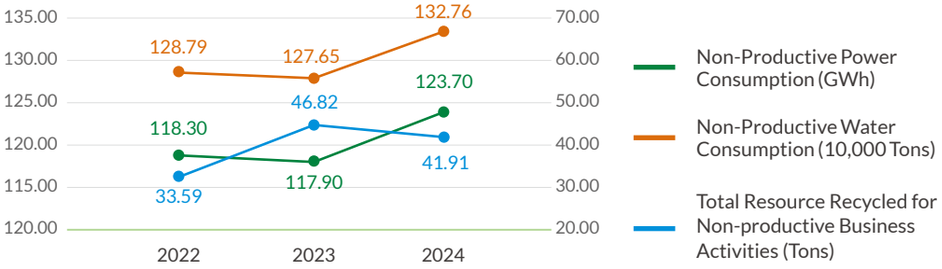
In 2024, Taipower continued to implement the Executive Yuan's Electricity Efficiency Enhancement Program for Government Agencies and Schools with an aim of achieving zero annual growth in electricity consumption. It also promoted water conservation in accordance with the Ministry of Economic Affairs' Water Saving Normalization Action Plan. Led by the General Management Office, the program was extended to regional offices and power plants to implement energy-saving and carbon-reduction actions. Monthly tracking of water, electricity, and fuel usage is conducted, and annual evaluations are carried out to recognize outstanding performance.

Taipower actively promotes energy-saving programs at thermal power plants through equipment upgrades and operational adjustments. Initiatives include the procurement of high-efficiency vehicles, lighting, elevators, air conditioning, and water-use systems. The Company also enhances unit efficiency by adopting variable-frequency motors, upgrading core components, and adjusting equipment operation modes such as vacuum pumps in condensers, ventilation fans in plant buildings, and steam warm-up timing for boiler soot-blowing-to improve overall energy-saving performance.

In-Plant Power Consumption Status of All Thermal Power Plants



Total employee consumption and resource recycling within the scope of Taipower



Notes:1.The statistics presented reflect resource recycling results from the Taipower Headquarters building.
2.Recycled items include paper, tin and aluminum cans, other metal products, plastic containers, glass containers, and more.
3. In 2024, higher average temperatures, power plant expansions, and increased personnel contributed to a rise in electricity consumption. Taipower aims to enhance energy efficiency through equipment upgrades.

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The Effectiveness of Non-Production Resource Management

Item	Measures in 2024
Water-Saving	● Priority was given to water-efficient equipment and rainwater reuse (e.g.,for toilet flushing and plant watering) to reduce tap water consumption. ● In line with the Water Saving Normalization Action Plan, water-saving equipment was installed, and outdated equipment replaced in offices, at construction sites, and in dormitories. ● Leak inspections of pipelines and the reuse of rainwater, condensate, andrinse water were strengthened to enhance water conservation.
Power-Saving	● Priority is given to the procurement of electrical appliances with energy efficiency labels or classified as level 1 or 2 in energy performance. ● Preference is given to air conditioning units with higher Cooling Seasonal Performance Factor (CSPF) values. ● Adjust the chilled water outlet temperature of central air-conditioning systems moderately to maintain cooling efficiency while reducing energy use. ● Establish energy management systems to enhance energy efficiency through monitoring and analysis of electricity usage. ● Actively replace outdated energy-intensive equipment , such as air conditioners and lighting,in office areas. ● Maintain indoor office temperatures at 26–28° C, supplemented with circulator fans. ● Shut down chiller units 30 minutes before the end of working hours, while maintaining water circulation and air flow. ● Prohibit the use of non-official electrical appliances in office spaces. ● Implement energy-saving operational modes for elevators and office equipment in all units.
Fuel-Saving	● Promoted carpooling in vehicle dispatch and strengthened vehicle maintenance andinspection to reduce fuel consumption. ● Allocated budget resources to accelerate the replacement of fuel-powered vehicles with electric vehicles, while increasing the usage rate of existing EVs. ● Vehicle fuel consumption at the headquarters decreased by 831 liters in 2024 as compared to 2023.
Paper-Saving	● Continued to implement paper-reduction initiatives through the use of official digital documents and online approval systems. achieving performance rates of over 70% and 85%, respectively. These figures are based on company-wide document statistics in accordance with the official formula for the Electronic Document Energy Saving and Paper Reduction Program. ● Additionally, double-sided printing was promoted among employees, resulting in the conservation of approximately 3.13 million sheets of paper.

Taipower will continue to phase out outdated and energy-intensive electrical equipment that has reached the end of its service life. With the goal of achieving zero growth in electricity consumption compared to the previous year, the Company will implement appropriate usage controls and introduce energy-efficient equipment to reduce energy consumption without compromising office environment quality. Additionally, Taipower has allocated a budget to expedite the replacement of fuel-powered vehicles with electric vehicles and to enhance the utilization of existing EVs.

3.2 Environmental Impact Management

3.2.1 GHG M 305-5 a 305-6 e 305-7)5-1 305-4

Material Topic: Environmental Impact Management

Policy	• Taipower aims to reduce environmental impact and fulfill its corporate responsibilities through resource recycling and reuse, air pollution control, water conservation, and waste management practices.
Management Approach	• Resource Recycling:Reduce waste and promote reuse through the auctionofdiscardedcables,theresaleofironreels,andonlinesalesplatforms. • Air Pollution Control: Reduce thermal unit loads during periods of poor air quality and gradually upgrade pollution control equipment to balance electricity supply and environmental protection. • Water Resource Management:Promote rainwater harvesting and wastewater recycling to reduce water consumption in power generation and support sustainable use. • Waste Disposal: Classify, store, and remove waste in accordance with regulations, and rigorously track waste flow to prevent illegal dumping. • Waste Reuse: Promote reuse of coal ash for land backfill and convert desulfurized gypsum into construction materials to improve resource utilization and reduce the environmental burden.
Action Plans	• Net GHG emission intensity from thermal power units • Air pollutant emission intensity
Actual Performance in 2024	• Net GHG emission intensity from thermal power units decreased by11.7% compared to 2016. • Air pollutant emission intensity decreased by 71.9% compared to 2016.
Targets for 2030	• Reduce net GHG emission intensity from thermal power units by 17% compared to 2016. • Reduce air pollutant emission intensity by 75% compared to 2016.

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Greenhouse Gas Emissions

Taipower is committed to developing high-efficiency power generation technologies in response to the global low-carbon energy transition. In recent years, the Company has actively pursued energy transformation by expanding the use of low-carbon power to reduce the carbon intensity of electricity generation. It has also promoted the use of cleaner energy sources to reduce greenhouse gas (GHG) emissions and provide cleaner electricity for both industries and households in Taiwan. For thermal power generation, Taipower focuses on two key strategies:

Gas Expansion and Coal Reduction

In 2024, the trend of using"gas as primary, coal as supplementary" continued, with the share of gas-fired generation exceeding that of coal-fired.

Gas-Fired Unit Upgrades

Older gas-fired combined-cycle units are gradually being replaced with newer, higher-efficiency combined-cycle gas turbines.

Taipower's GHG emissions originate from thermal power generation, coal storage yards, fuel-consuming equipment, insulating gases in electrical switches, and refrigerants in air conditioning systems. In compliance with the Climate Change Response Act and its relevant regulations, Taipower conducts annual GHG inventories that adhere to the"GHG Inventory and Calculation Guidelines." Each year, responsible units perform internal inventories and verifications, while third-party certification bodies are commissioned to conduct external verification. In 2024, Taipower disclosed that its total Scope 1 GHG emissions amounted to 91.45 million metric tons, with 90.78 million metric tons attributed specifically to emissions from coal, oil, and gas-fired thermal power units.

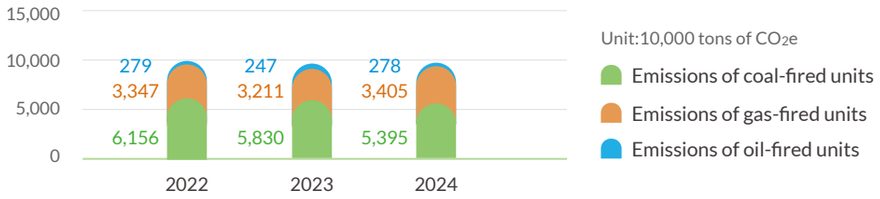
Greenhouse Gas Emissions

Unit:10,000 tons of CO_2e

Year	CO_2	CH_4	N_2O	SF_6	HFC	PFCs	NF_3
2022	9,775	25	31	12	3	0	0
2023	9,286	27	26	8	1	0	0
2024	9,085	25	25	7	3	0	0

Note:As Taipower is the primary electricity provider in Taiwan, the Company's total emissions inventory includes only direct (Scope 1) emissions. Indirect emissions from purchased electricity (Scope 2) are excluded to avoid double-counting.

Emissions of Thermal Power Units



Strengthening Air Pollution Emission Reduction

Taipower employs a three-stage approach to reduce air pollution from thermal power plants short-term load reduction, mid-term environmental upgrades, and long-term gas-fired unit development so that it can balance power supply stability with environmental protection.

1 Air Pollution Control Measures

During periods of poor air quality, Taipower implements environmental dispatching and load reduction to decrease emissions of PM, SOx, and NOx. Low-ash and low-sulfur fuels are prioritized, with a gradual shift toward cleaner energy sources. Continuous Emissions Monitoring Systems (CEMS) are installed at each plant to ensure compliance with emission standards.

2 Air Pollution Improvement Plans

Of nine scheduled improvement projects, seven have been completed. Ongoing upgrades at the Taichung Power Plant include equipment modernization and indoor coal storage construction. Taipower aims to reduce coal use by 3 million metric tons starting in 2032 and fully phase out coal by the end of 2034.



3 The Gas Expansion and Coal Reduction Policy

Taipower is advancing the construction of new gas-fired units to accelerate energy transition efforts.

The Actual and Regulatory Values of Major Air Pollutants

Unit: kg/GWh

Year	PM		SOx		NOx	
	Actual Value	Regulatory Value	Actual Value	Regulatory Value	Actual Value	Regulatory Value
2022	5	60	84	277	169	359
2023	5	58	77	263	160	331
2024	6	53	66	212	144	269

Note:The Regulatory values are calculated by estimating the total air pollution emissions for each thermal power unit based on the emission standards, and then dividing the result by the gross electric power generation of all thermal power plants in the current year.

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Management of Stationary Emissions

Short-Term Response – Load reductions for coal and oil-fired units during periods of poor air quality, with gas-fired units prioritized in dispatch

To demonstrate its commitment to environmental protection, Taipower has implemented voluntary environmental load reductions at coal and oil-fired thermal power plants since November 2017, on the condition that power system stability can be maintained. These measures include both proactive and friendly reductions. In 2024 alone, load reductions were carried out 1,727 times. By the end of December 2024, the cumulative number of load reductions had reached 10,653, with a total generation reduction of 99,059.91 GWh.

Principles for Load Reductions in Response to Air Pollution Levels

Reduction Action	Criteria for Taking Action	Action Planning
Voluntary Load Reductions	The Ministry of Environment's Air Quality Monitoring Network releases AQI forecasts daily at 4:30 p.m. If any area is forecast to reach a red level or higher (AQI > 150).	Provided that power supply is secure, coal-fired power plants located in or upwind of the affected air quality area will reduce their loads in advance during off-peak nighttime hours (e.g., 12:00 a.m.–7:00 a.m.).
Autonomous Load Reductions	When real-time data from the Environmental Protection Administration's Air Quality Monitoring Network shows that one-third or more of the monitoring stations within an air quality region have reached a red-level (Level 1) warning or above.	If the power supply is sufficient, coal or oil-fired power plants within the affected air quality area are scheduled for load reductions.
Mandatory Load Reductions	Air quality reaches severe deterioration levels (AQI > 200, 300, or 400).	Each power plant must comply with the Emergency Control Regulations for the Severe Deterioration of Air Quality, under which actual emission reductions must reach 10%, 20%, or 40% of the plant's daily permitted emission levels.

Load Reductions in 2024

Load Reduction Action	Frequency of Load Reductions (Times)	Reduced Load Amounts (10 MWh)		
		Annual Overhauls (Maintenance)	Non-Annual Overhauls (Maintenance)	Total
Voluntary Load Reductions	1,687	702,403	951,841	1,654,244
Autonomous Load Reductions	40	8,781	15,891	24,672
Mandatory Load Reductions	0	0	0	0
Total	1,727	711,184	967,732	1,678,916

Mid-Term Approach – Inventory, upgrade, and install high-efficiency air pollution control equipment

Taipower continues to carry out the comprehensive inventorying and upgrading of existing air pollution control equipment, while planning the installation of high-efficiency systems. Operational measures are also implemented to maximize pollutant removal efficiency.

Advanced and more efficient pollution control devices are installed in new power plants or integrated into upgrades at existing plants. To ensure emission transparency, continuous emission monitoring systems (CEMS) are installed on chimneys to facilitate real-time oversight.

Between 2017 and 2025, Taipower allocated a total of NT$69.229 billion to upgrade air pollution control equipment. Upon completion of these initiatives, the improvements are expected to reduce annual emissions of particulate matter (PM) by 398 metric tons, sulfur oxides (SOx) by 7,118 metric tons, and nitrogen oxides (NOx) by 15,460 metric tons.

The installed systems include electrostatic precipitators (EPs) with 99.8% dust removal efficiency, NOx removal efficiencies of over 80%, and SOx removal efficiencies exceeding 95%.

Long-Term Approach – A Power Source Shift from "Primarily Coal with Gas as Support" to "Primarily Gas with Coal as Support"

In line with national energy policy,Taipower is gradually shifting its thermal power generation from "primarily coal with gas as support" to "primarily gas with coal as support" in addition to increasing the share of renewable energy. According to the power development plan,all new thermal units will be gas-fired, aside from the ultra-supercritical coal-fired units at Linkou and Dalin, . The new gas fired-thermal units are located at the Hsieh-ho, Tunghsiao, Datan, Taichung, and Hsinta plants. This approach ensures both improved air quality and a stable power supply.

Once the new gas-fired units at Taichung and Hsinta begin commercial operation, some of the existing coal-fired units will be decommissioned or converted to standby mode, contributing positively to air quality improvement.

Management of Mobile Emission Sources

According to analysis by the Ministry of Environment, large diesel trucks account for the highest share of emissions among mobile pollution sources. In response, Taipower has inventoried its phase-one and phase-two compliant large diesel vehicles and is cooperating with the Ministry to phase out outdated vehicles. Each decommissioned older vehicle is estimated to reduce PM2.5 emissions by approximately 67 kilograms per year. For large diesel vehicles that meet phase-three standards, Taipower has installed diesel particulate filters, which are expected to reduce PM2.5 emissions by about 10 kilograms annually per vehicle.

Management of Fugitive Emission Sources

Taipower's fugitive emission sources include coal yards and construction sites. In addition to complying with the Management Regulations for Construction Project Air Pollution Control Facilities issued by the Ministry of Environment, Taipower has established guidelines for both Promoting Environmentally Friendly Measures at Green Construction Sites and for Penalties Imposed on Contractors for Violations of Environmental Protection Clauses in Contracts. These guidelines are incorporated into contracts based on project-specific conditions and are used to require contractors to carry out environmental measures accordingly, thereby reducing fugitive emissions during construction.

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3.2.2 Improving Water Resource Use Efficiency

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Water Resources Management

Taipower monitors the Ministry of Environment's wastewater discharge standards and regulatory updates in accordance with ISO 14001. For example, 24 new control items were added at the end of 2017. From 2021, ammonia nitrogen was gradually regulated, and limits on mercury, arsenic, and selenium in coal-fired flue gas desulfurization wastewater were tightened. From 2026 to 2031, water pollution fees will increase annually. In 2019, regulations were amended to require periodic testing and reporting, with penalties for violations. In response to regulatory changes, power plants increase testing frequency and reduce pollution in the short term, while optimizing wastewater treatment and equipment resilience in the long term.

During droughts, contingency measures include stopping irrigation, reducing domestic and miscellaneous water use, maintaining high storage tank levels, and reallocating agricultural water. Nuclear power plants have improved wastewater reuse efficiency, achieving a radioactive wastewater recovery rate over 99%, and strengthened chemical control and recycling.



RADIOACTIVE WASTEWATER RECOVERY RATE OVERTAKE

99%

Water Consumption for Power Generation at Thermal Power Plants in 2024 (Unit: m3)

Power Plant	Volume of Tap Water	Volume of Well, River, or Desalinated Water	Total
Hsieh-ho	273,519	6,790	280,309
Linkou	539,516	0	539,516
Datan	503,576.6	0	503,576.6
Tunghsiao	706,079	0	706,079
Taichung	5,283,908	0	5,283,908
Hsinta	1,163,606.2	0	1,163,606.2
Dalin	126,141	381,126	507,267
Nanbu	115,800	0	115,800
Jinshan	0	49,395.4	49,395.4
Tashan	0	26,012	26,012
Total	8,712,145.84	463,323.4	9,175,469.24

Taipower Water Consumption Statistics

Power Type		Unit	2022	2023	2024
Total Water Consumed	Thermal Power	m^3	9,503,885	8,488,819	9,175,469
	Nuclear Power	10,000 tons	63.7	25.43	18.03
Total Water Discharged	Thermal Power	m^3	3,239,482	2,699,166	2,878,480
	Nuclear Power	10,000 tons	7.11	3.49	3.37
Total Water Withdrawal	Thermal Power	m^3	12,743,367	11,187,985	12,053,949
	Nuclear Power	10,000 tons	70.81	28.92	21.40
Water Intensity	Thermal Power	ton /GWh	58.82	52.17	60.86
	Nuclear Power	ton /GWh	27.80	14.83	15.37

Note:Total water withdrawal = total water consumed (i.e., water used) + total wastewater discharge.

Wastewater Recycling and Reuse

Taipower promotes rainwater harvesting and wastewater reuse at thermal power plants to reduce water consumption. Reclaimed water is primarily used for landscape irrigation, dust suppression on roads and coal piles, boiler sealing and bottom ash handling, and other processes. Each plant monitors water usage monthly and quarterly in accordance with the "Water Management Procedures for Thermal Power Plants"under the Fossil-Fuel Power Department and uses water balance diagrams to control and track resource efficiency.

Recycled and Reused Water at Thermal Power Plants Unit: tons

	2022	2023	2024
Rainwater Reuse	61,292.7	50,513	86,802
Wastewater, Process Water, and Boiler Blowdowns	2,385,843	2,037,828	2,100,816

Note:Wastewater from flue gas desulfurization (FGD) is not reused due to high salinity, which may cause equipment corrosion and soil salinization. It is therefore excluded from the reuse statistics.

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3.2.3 Waste Management 306

Taipower implements mitigation and improvement measures to minimize the impact of major waste generated across all stages of its value chain, including power generation, transmission, distribution, and sales. The following outlines the measures taken for each type of power generation.

Mitigation and Improvement Measures for Major Waste by Power Generation Type

Generation Type	Main Waste	Environmental Impact	Materiality Narrative	Mitigation and Improvement Measures
Thermal Power	Coal ash (fly ash, bottom ash)	Improper storage may result in environmental pollution	Thermal power accounts for approximately 78.5% of Taipower's total electricity generation. Waste and by-products from generation are properly managed or reused	Coal ash is managed in accordance with the Waste Disposal Act and handled by licensed contractors for reuse as concrete admixtures or backfill materials
Nuclear Power	Low-level waste (resin, waste liquid, residues, protective clothing, components); high-level waste (spent nuclear fuel)	All nuclear waste is managed under the Ionizing Radiation Protection Act. To date, no environmental impact has been reported	Taipower strictly manages radioactive waste storage to ensure no harm to the environment or nearby communities	Waste is stored in temperature- and humidity-controlled facilities to ensure isolation. Reduction targets are set annually to lower low-level waste volumes
Renewable Energy	Decommissioned equipment	No waste is generated during operations; equipment has a long lifecycle, and environmental impact is minimal	Hydropower, wind, and solar generation rely on natural resources and have long service lives. Some wind turbines are now reaching decommissioning	Taipower works with the Ministry of Environment to treat retired blades as cement kiln fuel, and explores other reuse options such as construction or plastic additive materials. Licensed contractors will handle waste removal and recycling to minimize impact

Taipower manages coal ash accumulation by controlling ash levels and evaluating the load of fly ash, taking into account factors such as wind force, seismic activity, soil pressure, silo wall stress, and temperature variations. The Company analyzes structural safety by assessing bearing capacity, deflection, displacement, subsidence, and angular variation to ensure silo integrity and minimize potential risks. The accumulation level of coal ash is classified based on its potential hazard. Details for each coal-fired power plant are provided below:

Diameter, Height, and Actual Controlled Ash Levels of Fly Ash Silos at Various Coal-fired Power Plants

Power Plant	Linkou	Taichung	Dalin	Hsinta
Number of Silos	2	10	2	4
Diameter (m)	16.5	15~16	16	17
Height (m)	28	16~18	26.6	24
Control Ash Level (m)	22	14	10	20

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Industrial Waste Management Mechanisms

Taipower classifies, stores, transports, and reports on industrial waste in accordance with the Waste Disposal Act. Waste is tracked using a triplicate manifest system to prevent illegal disposal. For radioactive waste, short, medium, and long-term treatment and disposal plans are developed based on waste type. Taipower also monitors the "idle material rate"and "idle waste processing rate"annually to ensure management effectiveness.

Nuclear Energy-Related Waste Disposal Methods

	Short-Term	Medium-Term	Long-Term
Storage and Disposal Processes for Low-Level Radioactive Waste	Before 1996:Temporarily stored at the Lanyu Low-Level Radioactive Waste Storage Site. Since 1996: Temporarily stored at low-level waste storage facilities at nuclear power plants.	A centralized temporary storage facility is being planned, and waste will be transported to this facility for storage.	Waste will be transported from short-term or medium-term temporary storage facilities to a final disposal site.
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.		

Utilization of Industrial Waste

Reuse of Coal Ash and Desulfurized Gypsum in 2024

Waste	Coal Ash	Desulfurized Gypsum
Reuse Practice	Used in trench backfilling projects and sold as construction materials to increase reuse and reduce environmental impact.	Reused by the cement and fire-retardant board industries.
2024 Production	1,805 thousand tons	261 thousand tons
2024 Reuse Volume	1,754 thousand tons	261 thousand tons
2024 Reuse Ratio	97.2 %	100 %

Sale of Industrial Waste

Taipower disposes of waste cables and metal waste generated during operations through public bidding. In accordance with the relevant regulations, the Company commissions qualified vendors to handle removal and disposal, and all waste leaving the premises is tracked and reported online using the triplicate form system to ensure legal and compliant disposal. Pursuant to the Regulations Governing Determination of Reasonable Due Care Obligations of Enterprises Commissioning Waste Clearance, Taipower and the commissioned removal contractors bear joint responsibility for preventing illegal dumping. To further reduce the generation of industrial waste and minimize environmental impact, Taipower continues to promote online auctions of scrapped materials, thereby fulfilling its corporate environmental responsibilities.

Sales Volumes and Amounts for Taipower's Industrial Waste

Item	2022	2023	2024
Coal Ash Output (10,000 tons)	217.8	208.9	180.5
Volume of Scrap Cable and Other Metal (1,000 tons)	10.097	8.621	8.545
Value of Scrap Cable and Other Metal (NT$100 million)	16.427	15.03	16.47

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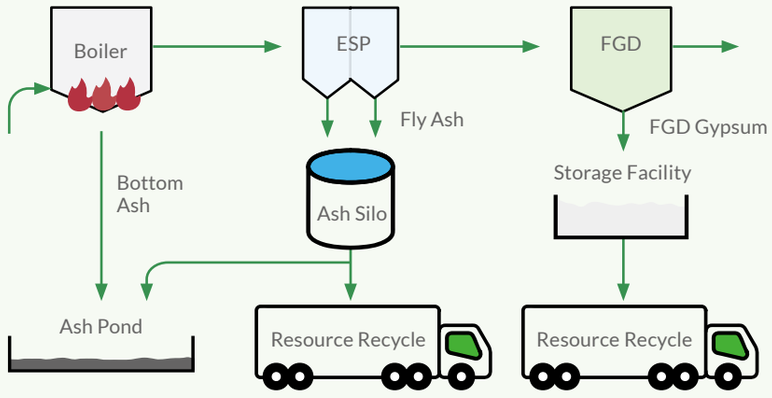
3.3 Creating a Circular Business Model

3.3.1 Practicing Circular Economy

Taipower has conducted research projects on circular economies, focusing on energy and resource inputs and outputs across the power sector value chain, including at the generation, transmission, supply, and distribution levels. Moving forward, Taipower will regularly update its strategic blueprint and formulate detailed action plans to support implementation.

Research, Development and Promotion of Coal Ash Reuse and Recycling

Taipower's coal ash output in 2024 reached approximately 1.805 million tons. In response to the government's resource recycling policies, Taipower not only invests in R&D and promotes reuse technologies, but also strengthens production management. Coal ash from coal-fired power plants can partially replace cement and serve as a binding material in concrete. Most of the coal ash produced is currently sold to the construction market, making it a model of circular resource utilization. Through diversified applications, Taipower aims to increase the reuse rate and added value while supporting the government's "waste reduction at source and resource reuse" policy, thereby contributing to both green energy and carbon reduction goals.





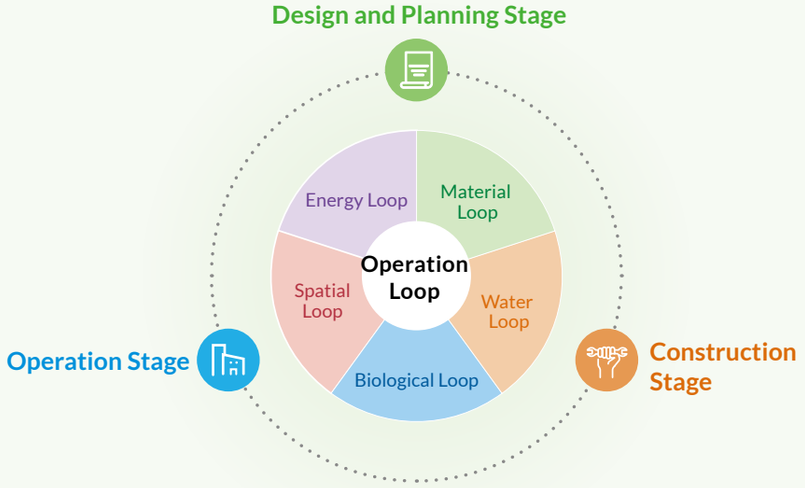
24th Taipower kW Design Award Ceremony: Promoting public engagement in power-related issues through creative design, in alignment with the theme of circular sustainability



A towering wind turbine is reimagined as a car fragrance diffuser-compact, calming, and inspired by renewable energy

Implementation of Circular Construction

Taipower possesses a significant amount of infrastructure. Promoting circular construction throughout the design, construction, operation, and decommissioning stages of that infrastructure enhances resource efficiency and reduces waste, supporting the goals of a circular economy. To support this transition, Taipower organized internal workshops and seminars to strengthen employee awareness. In 2023, Taipower consolidated its efforts into Circular Construction Implementation Guidelines and a Circular Construction Checklist as references for new construction and renovation projects. In 2024, the concept was applied to the Renovation of Dormitory No. 1 at the Training Center as a pilot project to guide future circular construction practices and realize sustainable building.



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3.3.2 Promoting Ecological Coexistence

Valuing Biodiversity and Reducing the Environmental Impact of Operations

Aspect	Key Initiatives and Results
Overall Strategy	Taipower promotes ecological coexistence with a focus on minimizing the environmental impact of its operations. Through environmental management, stakeholder engagement, and diverse action plans, the Company enhances its social and environmental contributions. In response to global biodiversity issues, Taipower has made proactive commitments to ensure that its development and operational activities comply with regulations. For sensitive areas, it follows a mitigation hierarchy approach-avoidance, minimization, mitigation, and compensation-to implement protection measures.
Governance and Management Mechanism	Under the Company's Sustainability Committee, Taipower has established the Sustainable Environment Promotion Task Force, which conducts annual reviews of ecological action outcomes.A designated department leads interdepartmental coordination to implement a full management process from policy to field-level action. Stakeholder feedback is regularly collected and used to review and adjust strategies to ensure practical outcomes.
Action Outcomes and Forward Planning	Taipower has strengthened internal training to enhance environmental and conservation awareness across all levels of staff. Externally, the Company actively monitors global developments and engages in both domestic and international dialogue. In 2024, a consultation meeting with external experts was held to collect recommendations on linking nature conservation with sustainable development. These insights reinforced internal cross-departmental collaboration. Looking ahead, Taipower plans to further expand its ecological co-existence initiatives at power facilities in 2025, including the formation of in-house conservation areas. Additionally, the Company will align with the international TNFD (Taskforce on Nature-related Financial Disclosures) framework by developing relevant methodologies and conducting nature and biodiversity risk assessments to ensure disclosure quality and alignment with global standards.



Environmental and Community Collaboration

Taipower actively builds community partnerships and promotes environmental education through activities such as beach cleanups, fish fry releases, and collaborative workshops.

Power Plant Expansion Assessment

Before adding new units, Taipower carefully evaluates environmental factors and communicates with local stakeholders to ensure legal compliance and mutual benefit.

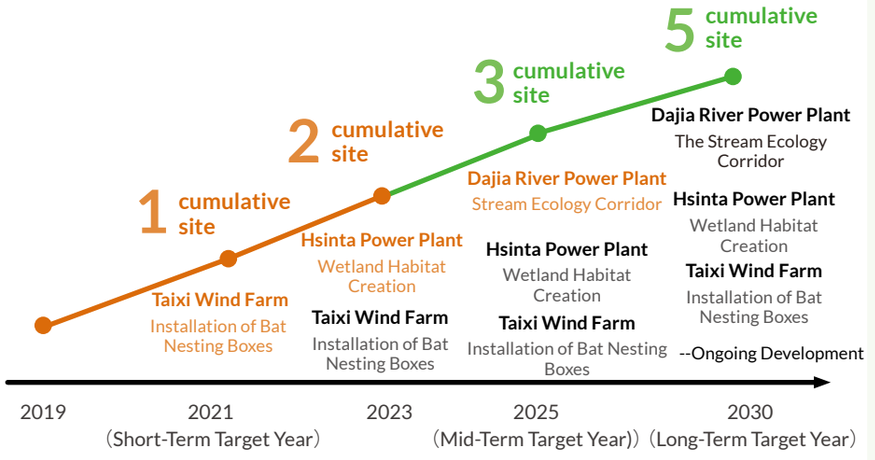
Sustainable Power Facility Sites

Taipower promotes the "One Plant, One Feature" approach to develop eco-friendly power plants. The Company also embraces the OECM (Other Effective Area-Based Conservation Measures) framework to expand habitat conservation, and is developing eight power facility sites featuring flagship species as demonstration areas.

Ecological Conservation Actions

In 2024, Taipower held six fish fry release events at thermal power plants and offshore wind farms. The events released approximately 1.33 million fry in total. The Company also promoted coral restoration through heat-resistant coral nurseries, improved transplant techniques, and ex-situ cultivation to advance biodiversity management.

Ecological Coexistence Goals for Power Facilities



Source:Taiwan Environmental Protection Administration

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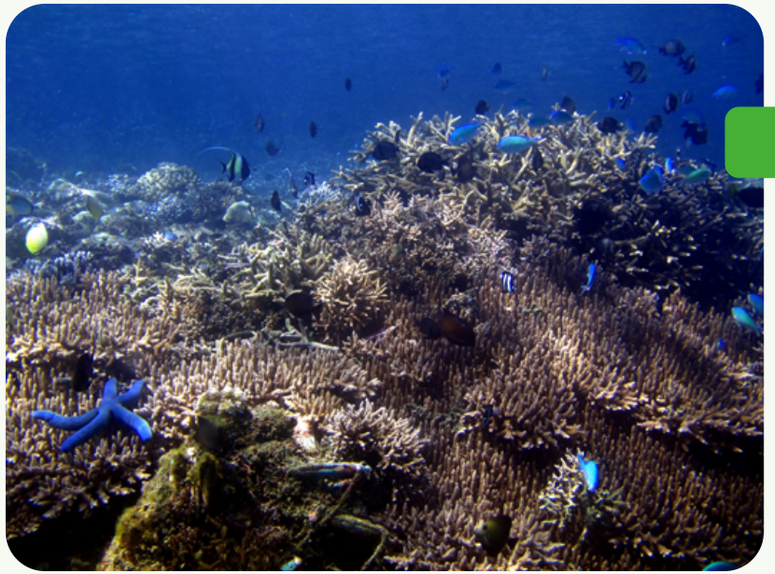

Protecting Coral Reef Ecosystems in Nanwan

Taipower actively supports international biodiversity conservation efforts and has launched coral reef restoration and ecological research initiatives in Nanwan in, Hengchun Township. The Nanwan reef hosts rich marine life and a diverse range of coral species, making it one of Taiwan's most iconic coral ecosystems. In collaboration with academic institutions, Taipower is conducting long-term underwater monitoring and coral restoration programs. These include coral planting, disease prevention, and public education to restore ecosystem functions and serve as a model for marine conservation and sustainability.

Ecological Map of Flagship Species at Eight Power Plants

Taipower is committed to both environmental sustainability and achieving net-zero power generation. Through upgrading environmental control equipment, introducing low-carbon gas-fired units, advancing carbon capture, and promoting hydrogen-ammonia co-firing, Taipower is accelerating its energy transition. The Company will continue to strengthen ecological conservation alongside the development of green electricity to ensure the coexistence of power development and environmental sustainability.



Ecological Conservation Achievements

Taipower surveyed over 100 power facility sites across Taiwan and published an Ecological Map featuring eight major power plants and ten flagship species, illustrating the long-term results of its conservation efforts. Highlights include: the Hsieh-ho Power Plant (coral), the Cholan Power Plant (the purple crow butterfly), the Dajia River Power Plant (the plumbeous water redstart and Formosan river loach), the Wanda Power Plant (the Musheshe longhorn beetle and Taiwan wild soybean), the Taixi Wind Farm (the East Asian free-tailed bat), the Hsinta Power Plant (the black-faced spoonbill), the Maanshan Nuclear Power Plant (the damselfish), and the Jinshan Power Plant (the water caltrop).

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Welcoming Nature's Guests with Care and Fostering Biodiversity

Taipower has made biodiversity a core element of corporate governance. Through ecological monitoring, conservation programs, and eco-friendly engineering practices, the Company ensures harmony between power plants and their surrounding environments. By continually advancing ecological preservation and sustainable corporate development, Taipower promotes the coexistence and mutual prosperity of energy development and the natural environment.

The Yongan Wetland (Hsinta Power Plant)

Long-term maintenance of wetland ecosystems provides vital habitats for migratory birds, making it a world-class birdwatching destination.

Bat Conservation (Taisi Wind Farm)

Migration corridors and bat boxes were installed, achieving a 95% occupancy rate and attracting more than 1,700 bats -the first corporate-led bat conservation program in Taiwan.

Coral Restoration (Hsieh-ho Power Plant)

Emphasizing marine ecological integration, Taipower applies avoidance, minimization, mitigation, and compensation strategies to create coral attachment sites on newly constructed breakwaters, helping to maintain a balanced marine ecology.

Marine Monitoring at the Maanshan Nuclear Power Plant

Real-time video and long-term data collection are used to track coral reef changes and safeguard local biodiversity.

A Once-in-a-Lifetime Encounter Yongan Wetland Becomes a Haven for Waterbirds

Yongan Wetland, located within the Hsinta Power Plant area, is an important stopover site for migratory birds passing through Taiwan. Taipower has designated a 41.25-hectare wetland conservation zone with both buffer and greenbelt areas. By using water level management techniques, the Company has created an eco-friendly habitat and collected over 500,000 ecological observation records since 2010. The wetland is home to more than 160 bird species. The number of black-faced spoonbills has quadrupled over the past decade, and some migratory birds have begun to reside year-round.

Taipower has adopted scientific management and integrated local education efforts, and has achieved the status of being the first thermal power plant in Taiwan to be certified by the Ministry of Environment as an environmental education site. In January 2025, Taipower held a Migratory Bird Season and Unveiling Ceremony to deepen collaboration with local schools.

The Company also released the documentary Flying Birds Power Plant, which has received recognition from multiple international film festivals.

Taipower will continue promoting ecological coexistence and striving to balance energy development with environmental conservation.





Underwater Coral Alley at the Breakwater Zone of Hsieh-ho Power Plant

The submerged breakwater zone of the Hsieh-ho Power Plant is located within a restricted area, shielded from human interference. This has created an ideal habitat for coral, demonstrating that power development and ecological conservation can coexist.

Although corals in this area were once a point of contention for opposition during the planning stages for the land reclamation element of the Hsieh-ho plant renewal project, they now serve as evidence of Taipower's effective coral conservation efforts in the region.

