# 2022 Sustainability Report

台灣電力公司
Taiwan Power Company

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# Statement from the Chairman

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In the post-pandemic era, as countries around the world gradually lift restrictions, ensuring a stable power supply is essential for restarting economic development. To continue providing the stable electricity needed for Taiwan's post-pandemic recovery and to effectively prevent the recurrence of large-scale power outages, Taipower initiated a 10-year program to enhance power grid resilience in 2022. Additionally, to address the concerns of stakeholders regarding sustainable development, Taipower follows the agreements made at the recent two United Nations Climate Change Conferences (COP26 and 27) to mitigate the climate crisis and progressively reduce reliance on fossil fuels. It actively promotes an energy transition focused on low-carbon sources while remaining aligned with the government's announced roadmap, strategies, targets, and action plans for achieving net-zero emissions and the Climate Change Response Act. Taipower is committed to achieving carbon Net Zero Electricity by 2050 and establishing a progressive pathway to eliminating emissions from the power sector. Furthermore, Taipower strives to enhance its environmental, social, and governance (ESG) practices by fostering ecological coexistence, deepening social responsibility, and maintaining sound corporate management. These efforts aim to enhance the competitiveness of sustainable business operations and contribute to the United Nations' Sustainable Development Goals (SDGs).

## Announcing a ten-year construction plan to enhance power grid and disaster resilience

Ensuring the stability and reliability of the power supply is Taipower's top priority. Based on reviews that followed the May 13, May 17, and March 3 power outages over the past two years, which identified the risks associated with the excessive concentration of the power grid, Taipower announced in September 2022 a power grid resilience enhancement construction plan with an estimated investment of NT$564.5 billion over a period of 10 years. The plan focuses on three main pillars that encompass ten key areas, namely, promoting distributed grid projects, enhancing grid infrastructure resilience, and strengthening system defense capability. The aim is to prevent the recurrence of nationwide blackouts. In the future, the power grid will move towards regional resilience and national interconnection with the aim of establishing a resilient infrastructure that enhances the ability to respond to incidents and restore stable operations within a short timeframe.

In addition to strengthening the resilience of the national power grid, Taipower is also dedicated to improving the disaster resilience of regional power grids. In July 2022, Taipower coordinated a joint effort with the Directorate General of Highways, Chunghwa Telecom, and the Forestry Bureau, and mobilized its entire workforce to undertake an underground cabling project along the 141-kilometer-long Ping-E Road. This project aimed to transform the road into a Scenic Provincial Highway while ensuring a reliable power supply. The Ping-E Road Underground Cabling and Tree Planting Project – 2.0 was originally projected to be accomplished in sections over a 10-year period, but was successfully completed within a remarkable 160-day timeframe. This accomplishment will greatly mitigate the area's frequent power outage problems that previously resulted from external factors like summer and autumn typhoons, as well as the regular mountain winds during the winter season.

## Continuing to drive energy transition and unveiling a path to net-zero electricity

In response to the challenges posed by climate change, Taipower has actively aligned itself with the government's 2050 net-zero emission policy and has devised a strategic pathway of pursuing low-carbon first and zero-carbon later. In the initial phase, while working within the existing energy infrastructure, Taipower has emphasized an energy transition that centers around increasing natural gas, reducing coal, expanding renewables, and non-nuclear as its key pillars. This includes integrating green energy into the grid, fortifying the power system, and the early implementation of forward-looking technologies. During the net-zero transition phase, Taipower will not only proactively promote carbon-free thermal power technologies but also continue to adopt innovative solutions such as long-duration energy storage to address the intermittency of renewable energy and make adjustments to the characteristics of its system. The energy storage system at Tainan's Salt Field Solar PV Farm, which was connected by Taipower in 2022, marked Taiwan's first integration of solar power and energy storage and set a record at the time with a storage capacity of 20 MW (megawatts) and a total energy storage of 20,000 kWh – the equivalent to providing one hour of electricity to 40,000 households. In the future, Taipower will gradually expand the deployment of energy storage facilities at its own sites.

Taiwan's revised Climate Change Response Act, which incorporates policies to address climate change, was successfully amended in early 2023. The Act sets the target of achieving net-zero emissions by 2050. In 2022, the National Development Council (NDC) proactively collaborated with various ministries and agencies to develop 12 Key Strategies for integrating resources across sectors to formulate action plans in the 12 areas expected to experience growth or change in energy, industry, and lifestyle. In accordance with the 12 Key Strategies, Taipower not only actively develops renewable energy and energy storage systems but also continues to promote the upgrading of thermal power plant units. By leveraging the expertise of international giants such as Siemens Energy from Germany and Mitsubishi Heavy Industries and Mitsubishi Corporation from Japan, Taipower has signed memorandums of understanding (MOUs) to facilitate the adoption of hydrogen blending in natural gas and ammonia blending in coal, thereby integrating existing power generation units with new energy applications. The target is to demonstrate 5% hydrogen blending by 2025 and reach a 5% ammonia blending milestone by 2030.

In the future, these initiatives will gradually be extended to other gas and coal power plants as technological development allows. Advanced technologies such as carbon capture and utilization (CCU) and co-combustion of zero-carbon fuels will also be introduced to accelerate decarbonization efforts in the power sector and facilitate the industry's energy transition.

## Creating a model ecological power plant and supporting public benefits

To align with the United Nations' initiatives on ecosystem restoration and innovative circular economies, Taipower continues to invest in ecological restoration projects at its power facilities, and aims to create both economic development and ecological conservation opportunities. Kaohsiung Hsinta Power Plant is currently Taipower's only plant that possesses both wetlands and environmental facilities. As such, it is expected to serve as a model for the development of other environmentally friendly power plants and wetland conservation projects.

Furthermore, as global warming intensifies and abnormally high temperatures occur more frequently in Taiwan, students in remote schools face the challenge of studying in hot summer conditions due to economic constraints. Since 2020, Taipower has supported the government's "Air Conditioning for Every Classroom" policy. In 2022, following just over a year of work and overcoming various difficulties, Taipower completed power improvement projects, air conditioning installations, energy management systems (EMS), and the installation of rooftop solar power generation equipment for nearly 3,500 schools across Taiwan. Through these tangible actions, Taipower contributes positively to society and enhances its social impact.

## Future prospects

With a vision of becoming an excellent and trusted world-class power corporation, Taipower remains committed to advancing its sustainable development initiatives. Through collective efforts and collaboration with the government and the international community, Taipower is striving to create a better environment. On the path to promoting sustainable operations, Taipower has embraced its mission of ensuring a stable power supply. It has accelerated energy transition, progressed steadily towards achieving net-zero emissions, and simultaneously implemented just transitions while upholding human rights declarations. By doing so, Taipower continues to be a reliable partner in Taiwan's sustainable development journey.

**Acting Chairman**
**Tseng, Wen-Sheng**

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# Reporting Principles

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This is the 17th annual Sustainability Report of the Taiwan Power Company (hereinafter referred to as Taipower or the Company). The content of this Sustainability Report has been compiled from data submitted by relevant units of the Company. The Company follows the GRI Sustainability Reporting Standards published by the Global Reporting Initiative (GRI) and the SASB Standards published by the Sustainability Accounting Standards Board (SASB) when compiling reports and disclosing information. Taipower has appointed Crowe Taiwan to perform a limited assurance engagement on the selected subject matter information based on the International Standard on Assurance Engagements 3000 (Revised), Assurance Engagements Other Than Audits or Reviews of Historical Financial Information, issued by the International Auditing and Assurance Standards Board. The Report was approved by unit managers, the President and Chairman before publication.

Taipower continues to fulfill its responsibilities to communicate with stakeholders. The Company has integrated the five major themes for the sustainable development of Taipower into the contents of each chapter to demonstrate its role in the sustainable development of the power industry. The chapters include Provider of Sustainable Power, Leader of Smart Grid Development, Provider of Services for Smart Living, Agent of Environmental Friendliness, and Practitioner of Corporate Social Responsibilities.

## Reporting Period

This report covers the period from January 1 to December 31, 2022. To ensure complete disclosure and comparability, the report includes past data as well as information from 2023. Any inconsistency in the reporting period will be noted.

## Scope of the Report

This report covers the main entities in Taipower's operations in Taiwan but does not include subsidiary or investee companies. The scope of the information and data includes Taipower's business development, social responsibility and environmental sustainability issues and achievements.

## Contact Taipower

Taipower has established a "Taipower Sustainability" section on its website to fully explain its performance results on various sustainability issues to stakeholders. The Company has also formulated a questionnaire to ensure smooth communication with stakeholders. One may download Taipower's Sustainability Report in either Chinese or English languages from the website. The section about "Information Disclosure" on Taipower's official website is updated regularly to provide the latest statistics on various aspects of management, power generation and the environment. The Company would like to receive any suggestions regarding this Sustainability Report. Your feedback is highly appreciated and will help us to better meet your expectations in our next Sustainability Report which will be published in the third quarter of 2023. Please feel free to contact us.

### Taiwan Power Company

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Taipower's Official Website

Sustainable Development Section Website

Past Reports

# Taipower's Value Chain and Operational Elements

## Mission, Vision and Core Values

### Mission

To supply stable power for the needs of diverse social developments with an ecofriendly approach at a reasonable cost

### Vision

To transform into a prestigious and trustworthy world-class power utility group

### Core Values

Integrity, Care, Service, Growth

## ESG Sustainable Development Profiles

**Governance**

- Provider of Sustainable Power
- Leader of Smart Grid Development

**Environment**

- Provider of Services for Smart Living
- Agent of Environmental Friendliness

**Society**

- Practitioner of Corporate Social Responsibilities

## Resource Input

### Financial Capital

- **Capital:** NT$330 billion
- **Total Expenditures:** NT$955 billion

### Equipment Capital

- **Power plants in operation:** 23 (Taipower owned)
- **Total installed capacity of thermal power plants:** 26,340 MW
- **Total installed capacity of nuclear power plants:** 2,890 MW
- **Total installed capacity of renewable energy power plants:** 2,510 MW
- **Installed capacity of pumped-storage hydroelectricity:** 2,600 MW
- **Installed capacity of purchased thermal power plants:** 8,330 MW
- **Installed capacity of purchased renewable energy:** 11,070 MW

### Natural Capital

| | |
|---|---|
| Natural Gas | 16,395 million cubic meters |
| Coal | 28.115 million metric tons |
| Fuel Oil | 861 thousand kiloliters |

Actual value in 2022.

Capital expenditure on environmental protection was approximately NT$5.3 billion in 2022, while the recurrent environmental protection expenditure was NT$3.3 billion

### Human Resources Capital

- **Total number of employees:** 28,079
- **Number of contracted workers:** 1,128

### R&D Capital

- **Number of research projects for the year:** 492
- **R&D expenditures for 2022:** NT$5.2 billion
  (Consisting of NT$4.7 billion in expenditures and NT$0.5 billion in capital expenditures)

### Social Capital

- **Number of users:** 14.93 million
- **Power development promotion and assistance fund:** NT$3.035 billion
- **Capacity of demand response:** 2,620 MW
- **Power supply partners:**

  11 Independent Power Producers (IPPs), 47 cogeneration power providers and 50,980 contracts for renewable energy (including solar power, wind power, hydro power and others)

## Power Generation → Transmission and Distribution → Electricity Retailing

### Power Generation

**Taipower's electricity generation in 2022**

| | |
|---|---|
| Thermal power generation | 156.0 billion kWh |
| Renewable energy | 6.3 billion kWh |
| Pumped-storage hydroelectricity | 3.1 billion kWh |
| Nuclear power | 22.9 billion kWh |

**Electricity purchased from external sources in 2022**

| | |
|---|---|
| Privately-owned thermal power plants | 42.7 billion kWh |
| Cogeneration | 3.4 billion kWh |
| Renewable energy | 15.3 billion kWh |

### Transmission and Distribution

- **Total length of power transmission lines:** 18,032.1 circuit kilometers
  Including overhead power lines and underground cables
- **Total length of distribution lines:** 410,071 circuit kilometers
- **Number of substations:** 621

### Electricity Retailing

| Percentage of electricity used (sold) by user type | | User power supply |
|---|---|---|
| Industry | 57% | 135.7 billion kWh |
| Residential | 20% | 48.1 billion kWh |
| Commercial | 15% | 35.4 billion kWh |
| Others | 8% | 17.6 billion kWh |

**Total sold:** 236.8 billion kWh

## Outputs

- **Earnings before tax:** NT$227.047 billion
- **Electricity fee income:** NT$645.1 billion

- **Net amount of generated and purchased power:** 250.7 billion kWh
  - Power generated: 188.3 billion kWh
  - Power purchased: 62.5 billion kWh
- **Facility utilization rate:** 79.1%
- **Line loss rate:** 3.82%

- **Greenhouse gas emissions:**
  - 98,480 kt $CO_2e$
- **Air pollution emissions:** (kg / GWh)
  - Particulate pollutants emitted: 5
  - Sulfur oxide emissions: 84
  - Nitrogen oxide emissions: 169

- **Number of new employees:** 2,028
- **Total number of participants in education and training:** 91,043
- **Incidents of work-related injury:** 7
- **Ratio of work-rated injuries:** 0.031%

- **Number of research reports:** 206
- **Number of papers published:** 115
- **Number of patents/intellectual property cases:**
  - 96 in the Republic of China
  - 2 in the United States
  - 1 in Japan

- **Customer satisfaction rate:** 95.1 percent

# Taipower Sustainable Development Plan

In order to focus the future development of Taipower, the Company created a Sustainable Development Plan that identifies five major sustainable development Profiles . These include: Provider of Sustainable Power, Leader of Smart Grid Development, Provider of Services for Smart Living, Agent of Environmental Friendliness, and Practitioner of Corporate Social Responsibilities. Taipower has also aligned itself with the United Nations Sustainable Development Goals (SDGs) and the Taiwan Sustainable Development Goals (T-SDGs) by establishing sustainability strategies with short, medium and long-term goals. The Company set various strategies with 2030 identified as a key milestone. Continuous reviews and improvements are implemented each year as key component of Taipower's sustainable development.

| Development Profiles | Expanding the Pathway | Action Plans | Measuring Indicators | 2022 Performance | 2030 Targets | SDGs | T-SDGs |
|---|---|---|---|---|---|---|---|
| Provider of Sustainable Power | Promoting Gas Expansion and Coal Reduction | Promote low-carbon energy, such as gas-fired power generation to ensure a stable power supply | Cumulative capacity of gas-fired power units | 13,149 MW | 25,924MW |  | T-SDG 3: Ensure healthy lives and promote well-being for all at all ages<br>T-SDG 7 : Ensure access to affordable, reliable, sustainable and modern energy for all<br>T-SDG13: Take urgent action to combat climate change and its impacts |
| | | Improve efficiency of conventional thermal power units to enhance environmental quality through recycling and reduce fossil fuel consumption | Average Efficiency of In-house Thermal Power Units (Excluding Purchased Power) | 41.29% | Higher than 47% | | |
| | | Promote carbon-free fuel co-firing plans and introduce carbon fixation technologies to reduce carbon emissions while ensuring a stable power supply | Introduce ammonia co-firing technology | On November 6, 2022, a memorandum of understanding on mixed ammonia technology cooperation was signed with Mitsubishi Heavy Industries and Mitsubishi Corporation | One of the Linkou Power Plant units has successfully completed the demonstration of 5% mixed ammonia use | | |
| | | | Introduce hydrogen co-firing technology | On April 26, 2022, the signing of the memorandum of understanding on hydrogen blending technology cooperation was completed, and on November 14, 2022, the procurement contract for the Hsinta Power Plant's 5% hydrogen blending power generation demonstration project was signed | The increase in hydrogen blending ratio will be reassessed based on the domestic hydrogen production capacity, energy infrastructure, and hydrogen storage and transportation technologies | | |
| | | | Push forward the construction of pilot fields for carbon capture and storage | Two bidding announcements have been conducted, but both resulted in bid failures. The re-bidding process is currently underway | A carbon capture demonstration plant is planned for 1 million metric tons of $CO_2$ per year | | |
| | | Address climate change impacts and adaptation on the power supply side | The reliability of the power supply under extreme weather conditions | The climate monitoring and adaptation analysis report has been completed | The system has formulated an action plan for power facility adaptation as part of its strategic planning (excluding outlying islands) | | |
| | Developing Renewable Energy | Promote renewable energy power generation plans and expand the development of zero carbon energy | The accumulated total capacity of Taiwan Power Company | 2,532.9MW | The cumulative total capacity is 4,522.3 megawatts (MW) | | |
| | | | Grid connection capacity of the Taipower system | 13,578MW | The system's grid-connected capacity is 41,718 megawatts (MW) | | |
| | | While ensuring a stable power supply, increase the proportion of clean energy (renewables, gas) generation in the Taipower system | Proportion of clean fuel (renewables, gas) generation | The generation ratio of the Taipower system is 36.2% for coal, 43.4% for gas, 9.1% for nuclear, 8.6% for renewables, and 2.7% for others (fuel and pumped storage) | The generation ratio of the Taipower system is 30% for coal, 50% for gas, 20% for renewables source | | |
| | | Increase the proportion of self-produced energy (Renewable energy) and maintain the long-term power supply in order to reduce supply chain risks in the fight against infectious diseases | Proportion of self-produced power generation (Renewable energy) in the Taipower System | 8.6%(Approximately 21.6 billion kWh) | The percentage reached 24.1% (approximately 68 billion kt) | | |

Note: After reviewing the 2022 targets, Taipower has revised 26 sustainable strategies into action plans and added 10 new sustainable development pathways at the higher level to enhance focus, readability, and ease of recollection. Furthermore, to align with the SDGs 2030 agenda and maintain goal stability, only the 2030 target values are retained, while short and medium-term targets are incorporated into operational strategy tracking.

| Development Profiles | Expanding the Pathway | Action Plans | Measuring Indicators | 2022 Performance | 2030 Targets | SDGs | T-SDGs |
|---|---|---|---|---|---|---|---|
| Leader of Smart Grid Developmen | Enhancing Grid Resilience | Establish a smart grid to improve power supply quality and operational efficiency | Reduction in the line loss rate | 3.82% | Year-on-year rolling reviews (Referring to the "Smart Grid Master Plan" target of 4.42%) | 7 AFFORDABLE AND CLEAN ENERGY<br>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE | T-SDG7: Ensure access to affordable, reliable, sustainable and modern energy for all<br>T-SDG 11 : Make cities and human settlements inclusive, safe, resilient and sustainable |
| | | Strengthen information security, build a cloud data center, and improve backbone/regional fiber optic communications capabilities | Information security protection | 8 IDS systems have been installed and incorporated into the Security Operation Center (SOC) for monitoring and alarm analysis | Continue to improve the overall security protection capabilities of the smart grid | | |
| | | | Cloud data center construction | This project was approved and issued a construction permit by the Changhua County Government in March 2022 | Complete the construction of a third cloud data center (Taichung), which can accommodate 2,000 cabinets | | |
| | | Promote applications of big data and AI on operational and maintenance information for transmission systems to reduce the System Average Interruption Duration Index (SAIDI) value | Reduction in the national power outage time (SAIDI) value | 14.936 mins / household / year | Reduce the national power outage time (SAIDI) value to 15.5 min / household / year | | |
| | | Promote smart grids and introduce the construction of IEC 61850 smart substations | Construct IEC 61850 smart substations | Completed 37 substations | Rolling reviews will be conducted based on the actual construction of IEC 61850 smart substations | | |
| | | Consolidate the information communication and smart management systems, optimize transmission and substation asset management systems, and establish predictive maintenance capabilities | Continued optimization of the transmission and substation asset management systems | The substation equipment asset management system has incorporated auxiliary equipment. The transmission equipment maintenance management system has been integrated with the oil pressure monitoring system for oil-filled cables | Consolidate and reinforce transmission and substation equipment management to implement CBM goals and improve outage prevention capabilities | | |
| | Accelerating Energy Storage Applications | Increase the quantity of energy storage equipment built on company-owned sites, and expand procurement of rapid auxiliary services | Cumulative storage capacity built on owned sites and procurement of rapid auxiliary services | Accumulate 150.8MW of storage capacity<br>1. Self-built 40MW: the Tainan Salt Field Solar Energy Storage System (20MW) and Luyuan energy storage projects(20MW)<br>2. Ancillary services 110.8MW: bilateral contracts (15MW) and qualified trading capacity (95.8MW) | The capacity of energy storage can be increased with the improvement of performance and economic value. Taipower shall implement flexible and continuous reviews based on generation capacity and load conditions | | |
| Provider of Services for Smart Living | Implementing Digital Transformation | Plan the IP of the entire fiber optics communication system in Taiwan to increase bandwidth and enhance reliability | Establishment of an ultra-high-speed optical cable communication system around the island | The construction of 590 sets of Phase 3 10G IP-MPLS access routers have been completed | Establish a communication network system for next-generation Communication technology | 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE<br>12 RESPONSIBLE CONSUMPTION AND PRODUCTION | T-SDG 11 : Make cities and human settlements inclusive, safe, resilient and sustainable<br>T-SDG 12: Ensure sustainable consumption and production patterns |
| | | Promote the infrastructure development of low-voltage AMI smart meter infrastructure | Deployment of smart meters | Complete the deployment of a total of 2.108 million smart meters | Complete the deployment of a total of 6 million smart meters after a continuous review of deployment benefits | | |

| Development Profiles | Expanding the Pathway | Action Plans | Measuring Indicators | 2022 Performance | 2030 Targets | SDGs | T-SDGs |
|---|---|---|---|---|---|---|---|
| Provider of Services for Smart Living | Promoting Energy Conservation | Refine customer services | Taipower APP Memberships | 1,155,878 | 1,500,000 |  | T-SDG 11 : Make cities and human settlements inclusive, safe, resilient and sustainable<br>T-SDG 12: Ensure sustainable consumption and production patterns |
| | | | The number of transactions via new technology payment channels for each period | Reached 1.27 million transactions for each period | Reach 1.5 million transactions for each period | | |
| | | | Cloud-based services | 46,000 per year | Number of cloud payment receipts will reach 300,000 per year | | |
| | | | Advanced value-added services on the high-voltage user service portal | Completed 1 additional advanced value-added service that provides a real-time price platform function | Add at least 6 additional advanced, value-added services | | |
| | | | Number of visits to the Power Consumption Examination Center's website | 224,000 | 310,000 | | |
| | | | The proportion of households receiving electricity | 100% | Except in cases for which legal restrictions exist, Taipower will provide electricity services and maintain a 100% rate of electricity applications | | |
| | | Assist in the promotion of home energy management systems (HEMS) | Encourage users to build their HEMS through demonstration sites and continue to cooperate with energy industry players to jointly promote, explore and develop value-added applications, and provide innovative business models | To advance the Company's entry into the home energy management services sector and gain insights into the commercial market development of energy management services, a research project on HEMS value-added service verification was completed in August 2022. This involved international research, market surveys, service plan analysis, and the development of value-added service algorithms (for abnormal electricity usage and family/friend well-being monitoring). Additionally, field demonstrations were conducted for the installation of AMI Route B communication modules and user experience surveys for site deployment, facilitation and to further discussions on commercial applications | Explore and develop value-added applications and provide innovative business models through cross-industry alliances | | |
| Agent of Environmental Friendliness | Enhancing climate change adaptation | Improve mitigation and adaptation capabilities | Net decrease of emission intensity at thermal power generating units (Greenhouse Emissions) from 2016 levels | Decreased by 7.1% | Decrease by 20% |  | T-SDG13: Take urgent action to combat climate change and its impacts |
| | | | Climate adaptation actions | Established the risk assessment management system for hydro and thermal power plants | Complete the Company's overall climate risk assessment report and communications | | |

| Development Profiles | Expanding the Pathway | Action Plans | Measuring Indicators | 2022 Performance | 2030 Targets | SDGs | T-SDGs |
|---|---|---|---|---|---|---|---|
| Agent of Environmental Friendliness | Creating a circular business model | Establish a circular business model | The proportion of wastewater recycled at thermal power plants | 73% | 85% |  | T-SDG 12: Ensure sustainable consumption and production patterns<br>T-SDG 14 : Conserve and sustainably use the oceans, seas and marine resources for sustainable development<br>T-SDG 15 : Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss |
| | | | Circular product supply models | The pilot project for the circular economy business model has been completed, with the transformation of the staff cafeteria in the headquarters building into a service-oriented model | Complete at least 3 circular product supply models | | |
| | | Restore marine ecosystems and cleaning coastal environments | Marine ecological restoration, conservation and development of marine pastures | Completed research on the business model for the Linkou Marine Pasture | Complete construction of one marine pasture around a power plant to facilitate marine ecological restoration | | |
| | | Restore the ecological balance in the vicinity of power facilities and maintain environmental preservation | Ecological integration plan for power facilities | Completed the interim report on the Yong'An Wetland ecological integration project at the Hsinta Power Plant | Complete at least 5 ecological integration plans around power facilities to promote ecological restoration and environmental maintenance at power facilities | | |
| Practitioner of Corporate Social Responsibilities | Building a happy electricity industr | Improve occupational safety | Employee injury rates | 0.12 | ≦ 0.1 |  | T-SDG 1 : End poverty in all its forms everywhere<br>T-SDG 8 : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all |
| | | | Contract labor injury rates | 0.32 | ≦ 0.18 | | |
| | | Establish a happy workplace culture | Employee satisfaction with internal communications | 83% | ≥ 65% | | |
| | | | Rate of participation in Employees' Heart-to-Heart assistance programs (81 in total) that care for employees | 28% | ≧ 30% | | |
| | Deepening social participation | Deepen social care activities | Cumulative investments and number of people reached by social care activities | Invested NT$0.464 billion and reach 48,000 people | Invest NT$6.6 billion and reach 800,000 people | | |
| | | | Cumulative investment in electricity discounts for disadvantaged Groups; Number of beneficiary households | Discounts of NT$99.94 million with 0.164 million beneficiaries | Discounts of NT$0.96 billion with 1.76 million beneficiaries | | |
| | | | Cumulative investment in the Power Development and Assistance Fund and the number of beneficiary townships/ districts | Total investment of NT$3.063 billion with 120 beneficiary townships / districts | Total investment of NT$27.5 billion with 1,100 beneficiary townships / districts | | |

| Development Profiles | Expanding the Pathway | Action Plans | Measuring Indicators | 2022 Performance | 2030 Targets | SDGs | T-SDGs |
|---|---|---|---|---|---|---|---|
| Practitioner of Corporate Social Responsibilities | Deepening social participation | Disseminate accurate energy knowledge | Cumulative number of people reached by diversified energy education | 758,000 people | 6,000,000 people | 4 QUALITY EDUCATION<br>11 SUSTAINABLE CITIES AND COMMUNITIES | T-SDG 4 : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all<br>T-SDG 11 : Make cities and human settlements inclusive, safe, resilient and sustainable |
| | | | Cumulative number of people reached by online promotions | Approximately 31 million people | 231 million people | | |
| | | Promote the preservation and rejuvenation of cultural assets connected to the electricity industry | Sharing of electricity industry cultural assets | A total of 633 cases of inventorying and documenting electrical industry cultural relics have been conducted | The "Cultural Heritage Collection Management System and Power Industry Cultural Heritage Website" have been launched, with the target set to be achieved by 2026. This aims to create an environment for sharing cultural resources and a research platform, enabling the continuous use of cultural influence to promote social communication and education | | |
| | | | Cumulative number of events and participants in annual cultural asset themed exhibitions, forums, book series sharing sessions and other related activities | Two workshops on Taiwan's power industry cultural heritage trail were organized, as well as one forum to present the results of the planning and research project on Taiwan's power industry cultural heritage trail | Hold 25 events or host more than 150,000 participants | | |
| | | | Preserved electricity industry cultural sites | The cultural heritage collection management system was completed in December 2022, and is expected to go live in September 2023 | 1. Launch the Yuan-Hsin Literature and History Library in 2026 as a professional site for research, the display of promotions and the preservation of cultural assets by the parent company and its subsidiaries<br>2. Establish permanent exhibition halls for electrical heritage in the Northern, Central, Southern and Eastern regions of Taiwan in 2030. Commit to the preservation of local electrical literature. Serve as the main medium for the Company's other types of exhibition spaces (museum complex) | | |

# Sustainability Performance

## Environment

- In order to protect air quality, we have achieved 1,301 instances of voluntary and friendly load reduction
- In 2022, the Hsinta Power Plant's Yongan Wetland ecological integration project was completed
- In 2022, approximately 1.09 million fish fry were released into the sea near power plants and offshore wind facilities

## Society

- In 2022, the total number of participants in educational training reached 80,822
- In 2022, the total number of participants in health and safety training reached 44,942
- In 2022, 821 health and safety-related seminars were held for contractors, with a total of 29,074 attendees
- In 2022, 99.3% of all employees were covered by the collective bargaining agreement
- In 2022, there were 3,758 neighborhood work projects and approximately NT$1,045.27 million in donations

## Governance

- In 2022, we were honored to receive the highest rating of "Excellent" in the Corporate Governance Evaluation for State-Owned Enterprises conducted by the Ministry of Economic Affairs
- By the end of 2022, more than 2.108 million AMI smart meters had been installed. In 2030 we have planned to invest NT$46.4 billion in smart meters and communication modules and the total deployment of 6 million AMI smart meters is expected
- Achieved another success at the 2022 Taiwan Corporate Sustainability Awards (TCSA) by winning the Taiwan Corporate Sustainability Report Platinum Award for the 4th time, the Taiwan Corporate Sustainability Excellence Award, and the Creativity in Communication Leadership Award

# The Construction Plan for Enhancing Power Grid Resilience

On March 3, 2022, the power supply to as many as 5.49 million users was affected by operational errors at the Hsinta Power Plant. Considering Taiwan's limited land area and population density, along with a 54% growth in peak load over the past 20 years, this incident highlighted the inadequate resiliency of the current power grid. In response to the new challenges and to address the insufficient resilience, Taipower has proposed an Enhancing Power Grid Resilience Construction Plan. Over a 10-year period, an investment of NT$564.5 billion will be made to comprehensively review the grid from a resilience perspective, gradually improve grid decentralization, reduce risks associated with excessive concentration, and promote regional resilience and national integration. The aim is to enhance Taipower's ability to respond to accidents and restore stable operations within a short timeframe.

### Promoting distributed power grid projects to reduce centralized grid risks

The total budget for distributed power grid projects amounts to NT$437.9 billion, making it Taipower's largest and most complex undertaking. It includes five major dimensions: power supply to industrial parks, decentralized green energy supply, clustering of key nodes, increasing distribution of nodes, and enhancing regional dispatch. Taipower will integrate the concept of local generation and nearby utilization into its power grid planning, enabling direct supply of natural gas-generated power to science parks and industrial parks. Increasing the integration capacity of offshore wind power in the northern region and solar power in the southern region will reduce the concentration of power sources and facilitate the effective utilization of renewable energy, and ultimately achieve the goal of net-zero carbon emission. In addition, the construction of additional switching yards at important hub substations will help mitigate the risks associated with a centralized power supply. Furthermore, the construction of new substations and the addition of new power distribution nodes is necessary to enable independent operation of regional power grids, accelerate power restoration and minimize the scope and impact of large-scale power outages.

In the planning of the 2050 net-zero emissions blueprint, there is a significant shift towards renewable energy as the primary source of power generation. Currently, a large number of interconnected renewable energy sites are under construction and concentrated in the central and southern regions of Taiwan. This breaks away from the past reliance on a few large power plants, allowing for greater diversification of power sources and the decentralization of the energy supply, thereby reducing systemic risks. To facilitate the smooth integration of renewable energy sites into the power grid across Taiwan, Taipower is actively constructing interconnection points and cable routes. As part of the Enhancing Power Grid Resilience Construction Plan, there are plans to establish 9 solar power stations with 10 transmission lines and 7 wind power stations with 7 transmission lines. Based on the current schedule, these projects are expected to be completed by 2032.

### Enhancing and fortifying power grid engineering to improve equipment stability

To reduce the instability associated with renewable energy and to enhance its usability, Taipower is actively expanding its energy storage facilities. The plan's enhancing and fortifying the power grid engineering dimension is centered on a total investment of NT$125 billion that will be allocated to three major areas: grid expansion and upgrades, widespread deployment of energy storage devices, and the transformation of outdoor substations into advanced indoor substations. Taipower has already launched an accelerated replacement program to strengthen the power grid. This involves not only equipment upgrades but also capacity expansion. In the coming years, traditional outdoor substations will be gradually replaced with advanced indoor substations, which offer enhanced protection against external damage and improved equipment safety. The main goal of enhancing and fortifying power grid engineering is to enhance equipment stability and minimize the losses caused by power interruptions.

### Enhancing system defense capabilities to prevent the spread of power outages and accidents

The enhancing system defense capabilities dimension includes strengthening defense in depth and real-time dynamic defense. It will utilize the investment of NT$1.69 billion to develop the relevant monitoring equipment and enhance defense accuracy with the aim of effectively preventing the spread of power outages following accidents. In the event of an unforeseen incident in the power grid, the ability to quickly isolate the fault point and minimize the scope of the incident helps expedite the restoration of stable operations. Within a period of two years, the plan is to enhance the depth of defense, making the overall power system's operations more robust and stable.

## Expected benefits

### The reduced probability of accidents

By shifting to indoor substations and replacing aging equipment, external accidents can be effectively prevented and the probability of equipment failures can be reduced.

### A minimized scope of impact

By constructing switch yards at critical hub substations for power convergence, establishing new substations to increase power distribution nodes and adding protection and defense equipment, the impact of accidents can be contained within specific areas.

### The shortening of power outage durations

By limiting the scope of accidents, the duration of power outages can be significantly reduced. Additionally, with improved regional dispatch capabilities, the restoration process can be accelerated.

## Future prospects

In the past, Taipower has faced resistance and challenges from the public when carrying out power infrastructure projects. However, following the 303-Incident, society has placed a greater emphasis on power grid resilience. Taipower will actively engage with local governments and the public to facilitate early completion of crucial resilience projects, such as:

1. Taipei City's Songhu Ultra-High Voltage Substation to meet long-term power demand growth in the eastern district of Taipei.
2. Accelerating the transformation of substations into indoor substations, such as the transition from the Taipei First Substation (outdoor) to the Wanlong Substation (indoor), to protect equipment like transformers from external impacts.
3. Extending one circuit from the southern hub (the Longqi Ultra-High Voltage Substation) to the Mili Substation to decentralize the risk to the power supply from a single substation.
4. Constructing the Tongwan and Beimiao switchyards to directly supply power from power plants to important power consumption centers, relieving the burden on transmission lines.
5. Constructing the Liuke Ultra-High Voltage Substation to enhance the integration capacity of renewable energy, while also decentralizing the concentration risk and increasing distribution nodes.

***Over a 10-year period, an investment of NT$564.5 billion will be made to enhance the grid resilience***

**Decentralizing** NT$437.9 billion

Reducing centralized grid risks

- Power supply to industrial parks
  Enabling direct supply of natural gas-generated power to science parks and industrial parks
- Decentralized green energy supply
  Accelerate the integration of renewable energy into the grid, enhancing local power supply
- Clustering of key nodes
  Decentralized power supply risk of substation hubs (Longtan, Zhongliao, Longqi)
- Increasing distribution of nodes
  Expanding critical substations to deliver electricity to cities
- Enhancing regional dispatch
  Establishing regional dispatch capability and decentralizing dispatch risk

**Fortifying** NT$125 billion

Improving equipment stability

- Grid expansion and upgrades
  Accelerating the upgrade and expansion of aging equipment and capacity
- Widespread deployment of energy storage devices
  Increasing green energy capacity and system stability
- Transformation of outdoor substations into indoor substations
  Avoiding external interference and threats from extreme weather

**Defense** NT$1.69 billion

Preventing the spread of power outages and accidents

- Strengthening defense in depth
  Enhancing protection relay settings at various levels within the power plant network
- Real-time dynamic defense
  Monitoring the status of power equipment to enhance defense accuracy

# The Energy Storage System at the Salt Field Solar PV Farm in Tainan

In conjunction with the government's promotion of solar power generation combined with energy storage system installations, Taipower aims to improve the resilience of its power system and increase the penetration of renewable energy. In 2020, Taipower partnered with renowned renewable energy company United Renewable Energy Co. to establish the Salt Field Solar PV Farm in Tainan, which became the country's largest demonstration site for integration of solar power and energy storage. On June 30, 2022, the plant successfully connected to the grid, with a capacity of 20 megawatts (MW) and a total energy storage capacity of 20,000 kilowatt-hours (kWh). At the time, the achievement set the record for the largest energy storage system in Taiwan and was capable of providing one hour of electricity to 40,000 households.

## Borrowing Light from the Sky to Illuminate the New Glory of the Salt Fields

Tainan receives more than 2,100 hours of sunshine annually, with even stronger sunlight along the coastal areas. In the past, the coastal regions of Beimen and Qigu used the area's intense sunshine to develop salt production industries. With the passage of time, the vast salt flats in Tainan, which once drove the prosperity of the area, have now become tranquil and quietly serve as detention basins. However, in recent years, Taiwan has actively developed renewable energy and set a goal of achieving a solar photovoltaic installation capacity of 20GW by 2025. This transformation has turned the unused salt flats – those without agricultural or other planned purposes – into sought-after locations for ground-mounted solar power plants. Taipower's newly constructed Salt Field Solar PV Farm in Tainan restores the area's former glory by again borrowing light from the sky.

## Construction supervision

Construction on this project began in May 2021 and coincided with the rainy season. Drainage was an important issue, so temporary drainage channels were excavated and subsequently integrated with the drainage equipment at the Salt Field Solar PV Farm to minimize the impact of accumulated water. During the installation of the equipment, large lifting machinery had to be employed. From planning and design to construction, each step was carefully supervised by professionals. Eventually, the main equipment's civil engineering foundation was successfully completed in January 2022.

During the COVID-19 pandemic, the transportation of imported equipment and the arrival of technical personnel from original manufacturers was very challenging. Apart from constantly tracking shipping conditions and closely communicating with the Ministry of Foreign Affairs to understand the latest pandemic-related regulations, remote connections were used for pre-installation preparations. Through these efforts, the installation of the equipment was gradually completed, and it was smoothly integrated into the photovoltaic field in June 2022.

## Building a sustainable Taiwan through the integration of solar power and energy storage

To assist in maintaining a high-quality, stable power supply for the electrical grid, Taipower is making good use of the land space within the Tainan Salt Field Solar PV Farm . The facility contains a total of eight energy storage containers that use lithium-ion batteries and are each capable of storing 2.5MWh of electricity. In total, the storage system can store approximately 20MW, which, if discharged entirely within one hour, can provide electricity for around 40,000 households.. The energy storage system can discharge power immediately to fill any power gaps, and its hour of duration provides enough time for all the natural gas units across Taiwan to start up and restore power. It is anticipated that similar energy storage facilities will be gradually established throughout Taiwan in the coming years. Apart from addressing the impact of intermittent energy sources on the power system, these storage systems will also allow excess solar power generated during the day to be stored and discharged during the peak electricity demand period at night. This will help enhance the stability and proportion of solar power generation, increase power dispatch flexibility, and significantly reduce voltage fluctuations caused by various unforeseen events.

## Environmentally friendliness

The project site provides clean renewable energy through two different modes: ground-mounted and water surface-mounted PV equipment. This required the installation of nearly 40,000 precast concrete piles that elevate the solar panels by 2.1 meters. During the planning phase, the pre-existing function of the salt flats as a detention basin was preserved, and a buffer green belt was created to provide a bird-friendly habitat. Considering the nearby wetlands are environmentally sensitive, sensitive zones were avoided during site selection. In compliance with the building coverage regulations, 30% of open space was preserved. The module frames were arranged with color contrasts resembling the salt flats and flatfish, creating a tourist and recreational destination that balances both power generation and ecological sustainability while preserving the integrity of the wetland ecosystem.

## Future prospects

Currently, energy storage relies heavily on foreign equipment suppliers. Regarding the risks, safety, and maintenance strategies during operation, Taipower will enhance employee education and training to increase the relevant capabilities of its personnel. Furthermore, the experiences gained at the Tainan facility will be fed back into the design of future projects to ensure smoother construction processes.

Taipower plans to install a 2MW energy storage system at the Changgong Wind Farm and, in doing so, will rely heavily on the experience gained with energy storage implementation in the Tainan salt flats. This will ensure that the project is completed on schedule and at a high quality. The Changgong project will be the first demonstration site in Taiwan that combines wind power with energy storage.

# Golden Art Festival - Reviving the Splendor of Shintoism

In the late 1980s, as gold and copper mining decreased and Taiwan Gold Corporation ceased operations, Taipower gradually took over the remaining mining facilities located in Ruifang, New Taipei City. Over time, some of these sites have been designated as municipal historical sites or historic buildings by local governments. In recent years, Taipower has actively engaged in the preservation of cultural heritage and combined it with public art to promote diversified local development. An excellent example of this can be found in the grand event – the Illuminating Thirteen Levels Ruins exhibition – held on Mid-Autumn Festival night in 2019.

Taipower's cultural assets in the Jinshui area include the Lile Copper Refinery, the Jinguashi Shrine, the Taizi Guesthouse which is currently undergoing restoration, the Shuinandong Smelter, and flue pipes at the Taiwan Gold LianDong Copper Refinery. In 2017, Taipower initiated a project to restore the Jinguashi Shrine, where architect Zhang Xingjie used a method of preserving the remnants and protecting the pillars from collapsing to protect the historic shrine. During the process, valuable artifacts such as the first-generation shrine torii gate, and stone lanterns were discovered. Additionally, reference was made to historical documents and over a hundred cherry blossom trees were planted along the pilgrimage path. After five years of restoration work, the project was successfully completed, allowing the Jinshui area to follow the success of the Illuminating Thirteen Levels Ruins event and once again shine with splendor.

## Reviving the Shinto Shrine's Remnants with Augmented Reality (AR)

The Jinguashi Shrine was established in 1898 and underwent renovations in 1936. It was the third shrine built in Taiwan and served as an important religious landmark in the Jinguashi area at that time. During World War II it suffered damage and only two torii gates, a few stone lanterns, and the foundation and pillars of the shrine's main hall remain. In 2007, it was designated as a municipal historical site by the Taipei County government (now New Taipei City).

To allow people to experience the past glory of Jinguashi Shrine, Taipower invited technological art teams such as RUMU Innovation and the Japanese architectural scholar Professor Kenji Horigome to combine over a hundred years of historical architecture with modern digital technology. Through augmented reality (AR) technology, they were able to recreate vanished historical scenes, including the first wooden torii gate, flags, and the sacred lamps of the second-generation shrine. Visual artist Yan Bojun designed the main visuals which depict imagery of the bright, rising moon to showcase Jinguashi's splendor. Limited edition theme masks and fans, designed by Yan Bojun in collaboration with Taiwan Beer, will also be distributed at the event.

# Encountering the Beauty of a Century

During the last Mid-Autumn Festival holiday, Taipower launched a Golden Gala Art Festival in conjunction with the revival of the century-old shrine. The first day of the festival featured a ceremony inaugurating the shrine, followed by a performance by the Boma Theater. The theater group, renowned for its coverage in The New York Times, gave a performance titled "Encountering the Beauty of a Century." Dancers led a procession along the shrine's approach and ascended to the remains of the shrine. On the following evening, the renowned choreographer Bulairen Pagelle, recently honored with a National Arts Award, led the Bulareyaung Dance Company in their first outdoor performance of the grand production "Road Calls." The performance also featured collaboration with local residents who set up stalls, fostering a sense of community participation. Additionally, local specialty drinks and snacks were available, including specially crafted beverages showcasing the flavors of Jinguashi. During the three-day art festival, guided tours of the Jinguashi Shrine cultural heritage site were provided by the restoration and AR teams, along with cultural heritage expert Professor Kenji Horigome, who introduced the restoration process and offered an AR experience that recreated the century-old historical site. Master craftsman Li Long hosted a workshop on the art of grass weaving, a nationally treasured craft. Dance workshops by the Boma Theater and Bulareyaung Dance Company were available, allowing participants to experience the golden years of the Jinguashi mines through their different senses.

During the preparation period, Taipower extensively visited district offices, police stations, schools, temples, and community leaders to establish cooperation and build closer connections with the local community. They actively engaged in joint public relations efforts in the Keelung region and deployed over a hundred personnel to ensure the smooth operation of the event. Effective traffic management measures were implemented to handle the influx of thousands of people, and over a hundred participating VIPs praised the warm reception and excellent organization. The event received extensive and in-depth coverage from mainstream media outlets.

### A tight schedule

The restoration of the Jinguashi Shrine faced delays due to the ongoing discovery of cultural artifacts from the Japanese colonial period. The restoration unit, Taipower, was informed that the project would be completed in mid-July 2022. Considering the shrine's long closure and the climate conditions in Jinguashi, the art festival was scheduled during the Mid-Autumn Festival holiday, allowing less than three months for preparation.

### No outsourcing of event PR

Due to the tight schedule, there was not enough time to engage an event PR company. Ultimately, the company relied on collaboration between different departments to complete the preparations.

### Large-scale procurement

In addition to the existing public art business, a significant amount of additional procurement was conducted to enhance setup efficiency.

### VIP reception and itinerary arrangements

Over 250 VIPs were invited to the art festival, with many of them bringing their friends and family. It was necessary to plan and respond on-site to the VIPs' schedules, movements, and dining requirements, starting from the inauguration ceremony in the afternoon until the outdoor performance in the evening.

### Addressing unforeseen situations

Any unexpected situations outside of the planned processes were immediately reported by the respective teams and addressed accordingly.

CHAPTER 01

# Taipower and Sustainability

## Development Vision

Taipower aspires to become an outstanding and trustworthy world-class power utility group. The Company has implemented sustainable governance, and continues to refine its environmental, social, and governance policies to increase its sustainability and resilience. Following the latest amendments to the Electricity Act, Taipower committed to overcoming the challenges of transformational change within the power industry. It began developing supportive measures to meet these transformational needs and planning to transform into a power generation and transmission, distribution and electricity retailing utility. It also moved towards adopting a parent-subsidiary control and group financial management model. Now, the Company is actively promoting energy transition while remaining accountable for providing a stable power supply. Through the process of its corporate transformation, Taipower will strengthen communication and cooperation with stakeholders. The Company will also internalize suggestions and feedback about operations from those stakeholders while gradually embracing the next generation of power industry trends.

## Performance Highlights

- Won the "Taiwan Corporate Sustainability Report Platinum Award," the "Taiwan Corporate Sustainability Excellence Award," and the "Innovation Growth Leadership Award" at the 2022 Taiwan Corporate Sustainability Awards (TCSA)
- In 2022, the Phase I Offshore Wind Power Project was honored with the "Silver Award" in the "SDG7 Affordable and Clean Energy "category at the Asia-Pacific Forum & Exposition for Sustainability and Taiwan Sustainability Action Awards
- Won the "Human Capital Investment Award" and the "Green Leadership Award" at the 2022 Asia Responsible Enterprise Awards (AREA)
- In 2022, the 161kV switch yard Construction Projects at the Datan and Linkou Power Plants were honored with the "Special Excellence Award" in the Facilities Category at the Executive Yuan's Public Construction Commission's 22nd Public Construction Golden Quality Awards

# Primary Awards

## Sustainable Development

### The 2022 Asia Responsible Enterprise Awards (AREA)

Won awards for the fifth consecutive year – the Taipower baseball team won the "Investment in People Award," and our net-zero emissions strategy won the "Green Leadership Award"

### The 2022 Asia-Pacific Forum & Exposition for Sustainability and Taiwan Sustainability Action Awards

The Phase I Offshore Wind Power Project was honored with the "Silver Award" in the "SDG7 Affordable and Clean Energy" category

### The 2022 Taiwan Corporate Sustainability Awards (TCSA)

Won the "Taiwan Corporate Sustainability Report Platinum Award" for the fifth consecutive year, the "Taiwan Top 100 Sustainable Enterprises Award," and the "Innovation Growth Leadership Award"

### 2022 Taiwan's World Smart Energy Week

The "Changbin Photovoltaic Field" was awarded the "Excellent Ground-mounted System Award" at the 9th "Ministry of Economic Affairs Energy Bureau Excellent Solar Photovoltaic System Awards"

### 22nd Golden Quality Award for Public Construction Projects from the Executive Yuan's Public Construction Commission

The Taipower Integrated Execution Department's turnkey project for the addition of 161kV Switchyards at the Datan and Linkou Power Plants, won the "Facility Category Excellence Award"

### 2022 Excellence in Water Conservation Unit Selection by the Water Resources Agency, Ministry of Economic Affairs

Won the "Outstanding Award in the Government Group" for recycling a total of 11,142 metric tons of water between January 2020 and September 2022. This accounted for approximately 7.2% of the Company's total water consumption

## Operations Management

### S&P Global Ratings AA+

On May 4, 2022, S&P Global Ratings upgraded our company's long-term issuer credit rating from "AA" to "AA+"

### 2022 Happy Enterprise by 1111 Job Bank

The Company was honored with the "Gold Award" in the Manufacturing category at the 1111 Job Bank's "2022 Happy Enterprise" awards. Taipower was the only state-owned enterprise in the manufacturing industry to receive this prestigious recognition

## Engineering and Innovation

### 2022 Annual Subsea Technology Award

The Company's "Offshore Wind Power Phase I Project" was recognized with an award from the Republic of China Institute of Marine and Underwater Technology

### 2022 Taiwan Innovative Technology Expo (TIE)

At the "2022 Taiwan Innovative Technology Expo (TIE)," jointly organized by the Ministry of Economic Affairs and the Council of Agriculture, the Company won a gold medal for the "Real-time Lowest Frequency Value Estimation System for Power Systems." Taipower received a total of five patent awards, including one gold and three bronze medals

### 2022 Asian Power Awards

We were honored with four awards at the "2022 Asian Power Awards":

- The Research and Development Department's Electric Vehicle V2G Technology Demonstration Project won two gold medals for the Annual Battery Storage Project and the Annual Reserve Power Project
- The Transmission and Distribution Department's Taiwan - Penghu Submarine Cable Construction Project won a silver medal for the Annual Transmission and Distribution Engineering Project. It also won the Taiwan Award of Annual Sustainable Development (note: the Taiwan Award is awarded based on country)
- Department of Nuclear and Fossil Power Projects won the bronze medal for the Annual Gas Cogeneration Power Project for its Taichung Power Plant New Gas Turbine Unit Project

### 2022 Taiwan Design BEST 100 by Shopping Design Magazine

Taipower's cultural and creative project, the "Mud from Sun Moon Lake" received the "Experimental New Classic" award at the 2022 Taiwan Design BEST 100 by Shopping Design Magazine. The award recognized the innovative concept behind the Tidal Power POP-UP Store

## Social Co-Prosperity

### The 2022 Sports Activist Awards

The Company was presented with three primary awards by the Vice President of Taiwan. These included the Sponsor Category Gold Award, the Sponsor Category Long-term Sponsor Award, and Promotion Category Gold Award

### The Ministry of Culture's "15th Wenxin Award"

The Company has received the "Wenxin Award" for three consecutive years in recognition of its efforts in Cultural Heritage Preservation, Cultural Artistic Performance, and Promotion. As a state-owned enterprise, we have allocated a budget specifically for cultural heritage projects and established dedicated units to recruit professional human resources

### The Hsinchu City Golden Glass Awards for Glass Art and Design Application Creative Competition

Taipower's cultural and creative project titled "the Retired Electric Meter Glass Recycling Program for the 54th Taipower Skills Competition Lecture and Commemorative Badge," received an award in the Design Application category

### 2022 Taiwan Creative Expo CET BEST AWARD

The award was presented for the Taipower Heating Pad which was made from recycled transformer boxes

### Ministry of Culture's Public Art Awards

The project titled, "Taipower's New Taipei Jinguashi Public Art Installation Phase I Subproject A and Phase II Public Participation Project II" was honored with the "Special Jury Award"

### 2022 Taipei City Workplace Gender Equality Bronze Certification Award

In recognition of Taipower's efforts in promoting gender equality in the workplace through equal salary treatment, work-life balance initiatives, friendly maternity measures, and gender-friendly workplace safety measures

# 1.1 Taipower Business Overview and Strategy

## 1.1.1 Taipower Profile

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Established on May 1, 1946, Taipower is a state-owned power industry group that operates in the generation, transmission, distribution, and the sale of electricity. According to the regulations of the Electricity Act, Taipower is responsible for providing a stable electricity supply. Revenue from electricity sales accounted for 97.5% of the Company's total revenue in 2022. As of 2022, the installed capacity in the Taipower System (including Independent Power Producers) was 53.74 GW, consisting mainly of thermal power generation with hydroelectricity and renewable energy. In terms of transmission and distribution, Taipower's system has 618 substations, and the total length of power transmission lines reached 18,032.1 circuit kilometers (Including overhead power lines and underground cables) while its total length of distribution lines reached 410,071 circuit kilometers in 2022.

In response to the recent global shift toward sustainability and the development of future electricity markets, Taipower has undergone an organizational transformation. In January 2016, the Company established four business divisions: the Power Generation Division, the Nuclear Power Division, the Transmission System Division, and the Distribution and Service Division. Following the establishment of these divisions, the headquarters and business divisions adopt a combination of centralized policymaking and decentralized operational management, in an effort to transform from a government agency into a highly efficient enterprise. In the future, Taipower will continue to abide by the requirements of the Electricity Act and transform itself into a holding company with subsidiaries, which aim to promote market competition, enhance business operation efficiency, and promote corporate sustainability. This will allow Taipower to become a prestigious and world-class power utility group that provides its customers with services of the highest quality.

Note : Circuit Kilometers = Number of Circuits * Circuit Length (Kilometers)

| | |
|---|---|
| Founded | May 1, 1946 |
| Coverage | Taiwan, Penghu, Kinmen and Matsu areas |
| Headquarter | Taipei City |
| Capital | NT$330 billion |
| Shareholding | 96.92% government-owned; 3.08% privately owned |
| Total assets | 2,325.5 billion |
| Operating revenue | 661.9 billion |
| Number of employees | 28,079 |
| Number of users | 14.93 million |
| Installed capacity | 53.74 GW in the Taipower system (34.34 GW are Taipower-owned) |
| Net amount of generated and purchased power | 250,700 GWh |

As of 2022/12/31

## Core Values

To successfully operate in the power industry, Taipower must contend with the trilemma of energy security, environmental sustainability, and affordable pricing. In response to global climate change, domestic energy transition, and competition resulting from the liberalization of the electricity market, Taipower revised its mission, vision, and core values in 2015. The changes are expected to guide the Company's business direction, change the mindsets of its employees, and allow it to move toward becoming a superior and sustainable power business group.

### Our Mission

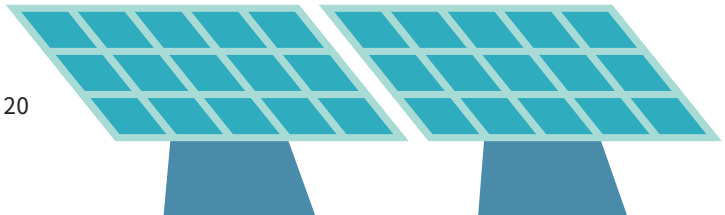
To supply stable electricity for the diversified development of society in an environmentally friendly manner and at a reasonable cost.

### Our Vision

To transform into a prestigious, trustworthy and world-class power utility group.

### Core Values

Integrity, Care, Service, and Growth.

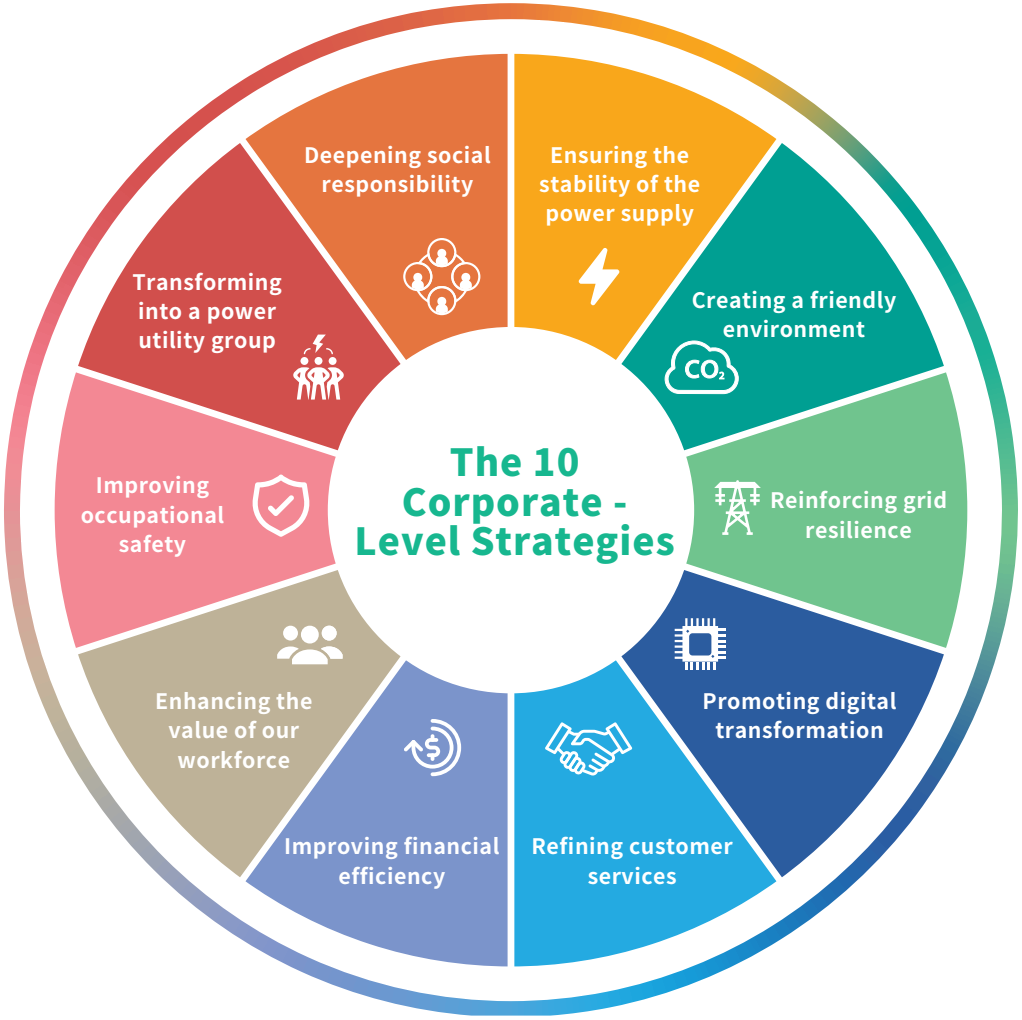


## Management Strategy

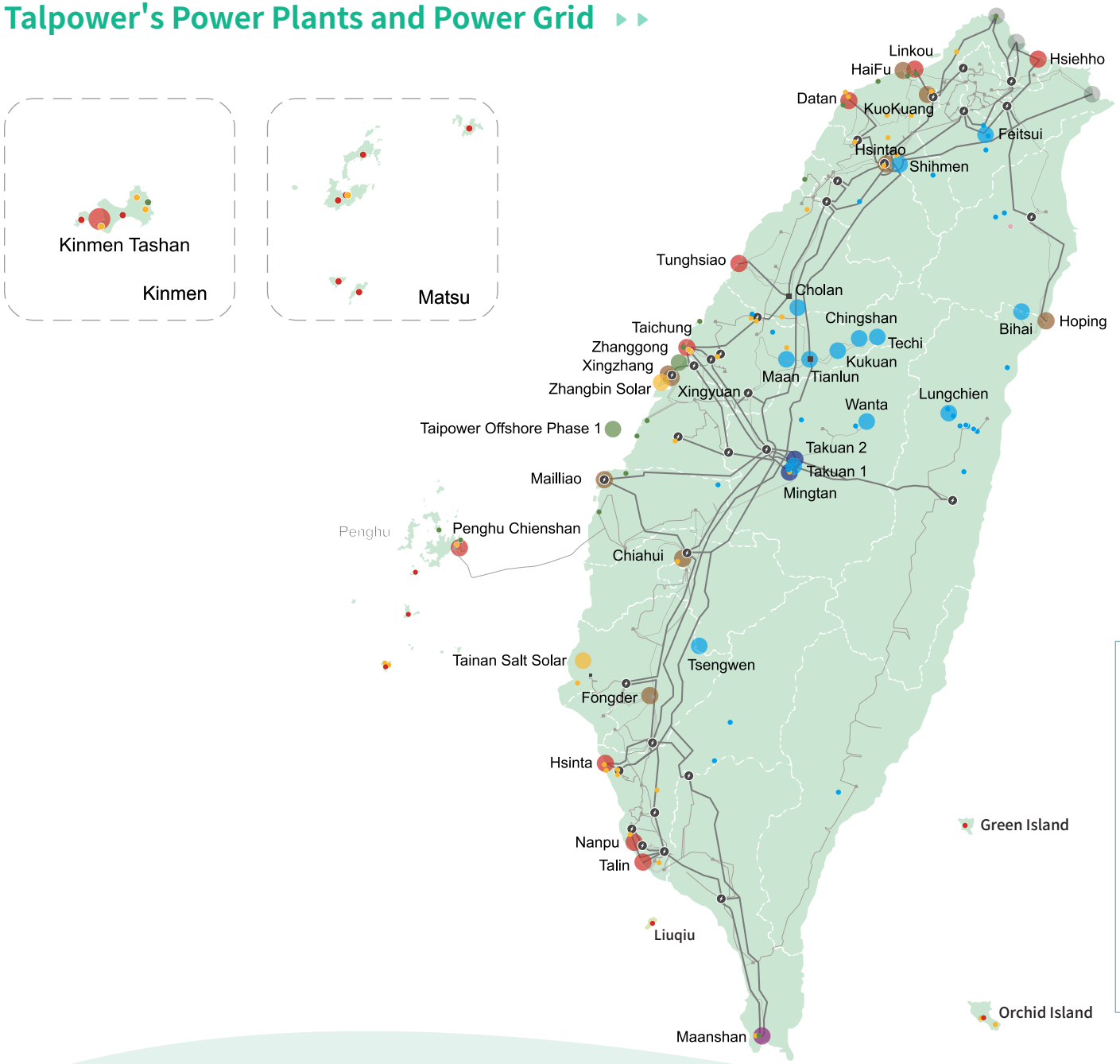
Taipower is responsible for providing stable electricity in a manner that is environmentally friendly and cost-effective, and for providing the fundamental conditions required for the development of public livelihoods and economic growth for a diverse society.

Each year, Taipower conducts reviews to ensure compliance with the latest amendments to the Electricity Act. The Company also considers a range of other factors such as green energy, carbon reduction, energy conservation, and the stability of the power supply when formulating its management policies. After reviewing its current business status, it analyzes and summarizes various essential background factors that affect the operation and formulates ten "overall strategies" to set its business direction in the next five years, and to reinforce scenario assumptions for the sixth to tenth years.

In order to promote and implement these strategies, specific action plans are discussed after the "overall strategy" is formulated by the CEO and the Vice President of each business unit and system. Subsequently, the Company sets corporate goals that are classified according to key performance indicators. The implementation status of each goal is then incorporated into the Company's target and review systems for management and control. Under the framework of the Plan-Do-Check-Act (PDCA) corporate management cycle, continuous adjustments and improvements are made to enhance the growth of Taipower's sustainable operations.




# Talpower's Power Plants and Power Grid



# 1.1.2 Operational Performance

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## Sustainability Operation Goals and Financial Performance

In recent years, Taipower has been actively strengthening its business constitution, implementing goal setting and performance management appraisals, and annually reviewing indicator items to meet its overall operating objectives. In 2022, 117 key performance indicators were set, and a total of 109 were completed. In 2023, 87 key performance indicators have been set as Taipower continuously improves.

In terms of financial performance, Taipower will maintain reasonable electricity rates and diversified management practices to achieve the multiple goals of a stable power supply, energy conservation, carbon reduction, and financial stability as it responds to changes in power generation and sales structures, fuel price volatility, and uncertainty in electricity rate adjustments. Taipower's financial performance from 2020 to 2022 was as follows.

## Financial Performance from 2020 to 2022

Unit: NT$ millions

| Year | Total assets | Operating revenue | Pre-tax profit (loss) | Equity |
|---|---|---|---|---|
| 2020 | 2,145,316 | 604,648 | 23,855 | 326,296 |
| 2021 | 2,205,847 | 620,970 | 22,348 | 350,932 |
| 2022 | 2,325,501 | 661,872 | (227,047) | 127,141 |

Note: 1. Taipower is a state-owned enterprise and, according to law, its final accounts are subject to review and certification by the National Audit Office. At the time of publication, the financial performance for 2022 has not been reviewed and certified by the Office and is thus reported according to the numbers resulting from audits by certified public accountants.
2. The numbers for 2021 have been reviewed and finalized. Following the completion of this process, there have been some changes to the disclosures made in the 2021 Sustainability Report.

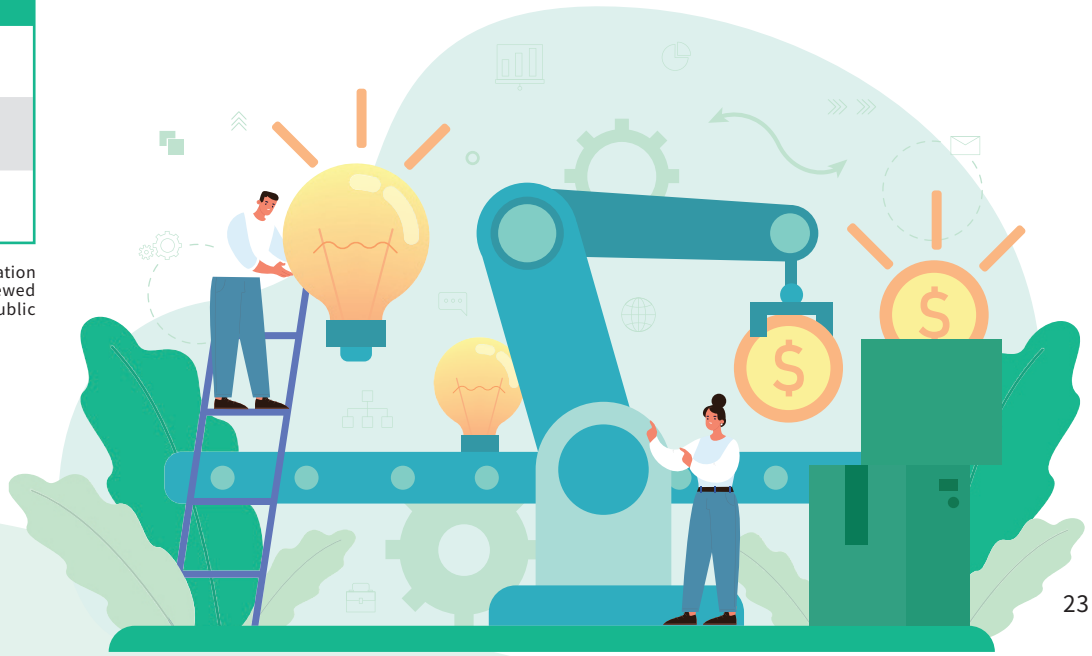
## Long-term financial planning

### Seeking government capital increases or subsidies

Taipower is seeking to enhance the Company's net worth with sufficient internal funds so that its budget can be increased. Additionally, the Company is striving to secure sufficient government budget allocation so that investment can be made in essential construction projects. An extraordinary shareholders' meeting held on December 16, 2022, has already approved the cash capital increase and the issuance of new shares in 2023. The board of directors decided on March 17, 2023, to carry out a cash capital increase and issue new shares worth NT$149.9 billion, with the record date set as March 31, 2023.

### Diversify funding channels to reduce funding costs

The Company is working to increase its flexibility in utilizing various funding channels to achieve low-cost sources of capital and raise necessary funds in a timely manner. It is also working to seize opportunities to seek government assistance in providing project financing and infusions of funds, expanding funding sources, and reducing the funding pressure on Taipower.



## Electricity Tariff Review Mechanisms

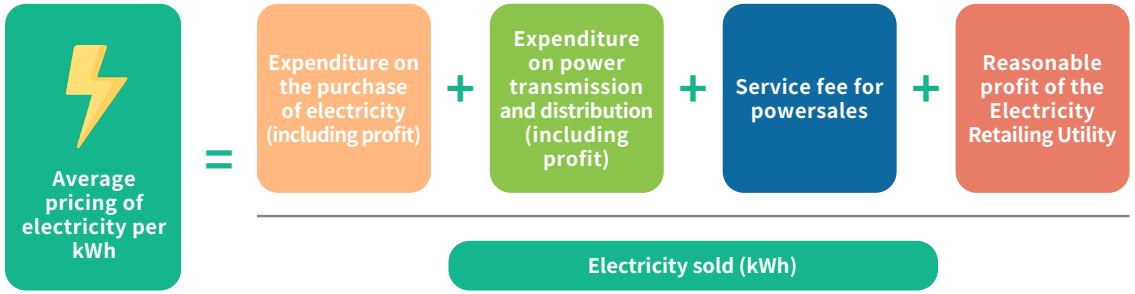
In accordance with Article 49 of the Electricity Act, the competent authority lays out calculation formulas and adjustment mechanisms for the electricity tariff. The current formulas were announced on November 6, 2017. According to the regulations, the electricity tariff is reviewed every six months. During the review process, Taipower may devise review plans for the electricity tariff, and adjust the tariff after obtaining approval from the Electricity Tariff Examination Council. The process allows electricity prices to immediately reflect international fuel price volatility. In principle, increases and decreases cannot exceed 3% in each adjustment. However, when the cost of the electricity supply continues to rise or fall sharply, the Electricity Tariff Examination Council may adjust the electricity tariffs based on the status of the electricity tariff stability reserve.

In March 2022, the Ministry of Economic Affairs held its first electricity tariff review meeting. In consideration of the need to closely monitor events surrounding the Russo-Ukrainian War, the decision on electricity price adjustment was temporarily postponed. Furthermore, the Ministry of Economic Affairs convened an interim meeting in June to discuss the electricity tariff rates. Due to the persistently high fuel prices and the need to have costs reflected in a timely manner to support the stability of the national power supply, it was decided to increase electricity prices for large electricity consumers. However, in an effort to stabilize living costs, electricity prices for residential consumers (up to 1,000 kWh), small shops, low-voltage users, six categories of high-voltage industrial users, and schools below the high school level will not be adjusted. The overall average increase in electricity prices was 8.4%, rising from 2.6253 NTD/kWh to 2.8458 NTD/kWh.

Following the aforementioned electricity price adjustment, the Ministry of Economic Affairs held its second electricity tariff review meeting in September. Although Taipower still faced pressures from fuel costs, significant domestic inflationary pressures and the price increase in July resulted in a decision to not to make any adjustments to the electricity prices during this review.

The portion of the electricity price that cannot reflect the costs will be advocated to the electricity price rate review committee for compensation from the electricity price stability reserve, and continuous efforts will be made to ensure a reasonable reflection of the electricity price.

The Electricity Retailing Utility Enterprises' formula for determining the electricity tariff is described below:




**The Average Prices of Residential, Industrial, and Commercial Electricityfrom 2020 to 2022**

| Category of Power Consumption | 2020 | 2021 | 2022 |
|---|---|---|---|
| Residential | 2.5596 | 2.5110 | 2.5571 |
| Industrial | 2.4461 | 2.4592 | 2.6309 |
| Commercial | 3.1787 | 3.1861 | 3.2447 |
| Other | 2.6586 | 2.6353 | 2.8596 |

Note: Other refers to electricity consumption that occurs outside the three aforementioned items. It includes street lights, schools, government institutions, and other non-business electricity consumption

## Affordable Clean Energy

Taipower upholds its responsibility and mission to provide stable and affordable electricity services through continuous technological innovation and energy transformation. It is committed to reducing energy costs and environmental impact. Taiwan has both electricity prices that rank fourth lowest globally and has also maintained long-term stability in operations while ensuring high quality and reliability. Taipower actively develops emerging energy industries such as solar and wind power generation, promotes the transition to cleaner energy sources to protect the environment and improve people's quality of life. Additionally, Taipower actively promotes the development of green energy to achieve energy transformation and sustainable development goals.

A comparison of average electricity prices across countries in 2021 based on the latest statistical data released by the International Energy Agency (IEA) and Enerdata in 2022, along with electricity price data from neighboring countries in Asia (Note 1).

**Residential Electricity Prices**

| Rank | Country | NT$/kWh |
|---|---|---|
| 1 | Malaysia | 1.4852 |
| 2 | China* | 2.2138 |
| 3 | Mexico | 2.3539 |
| 4 | Taiwan | 2.6365 |
| 5 | Turkey | 2.7064 |
| 6 | South Korea | 3.0389 |
| 7 | Hungary | 3.3091 |
| 8 | Canada | 3.4875 |
| 9 | Thailand* | 3.5028 |
| 10 | USA | 3.8457 |

**Industrial Electricity Prices**

| Rank | Country | NT$/kWh |
|---|---|---|
| 1 | USA | 2.0355 |
| 2 | Malaysia | 2.2978 |
| 3 | Finland | 2.3417 |
| 4 | Taiwan | 2.5822 |
| 5 | Canada | 2.5950 |
| 6 | Hungary | 2.6334 |
| 7 | South Korea | 2.6783 |
| 8 | Turkey | 2.7048 |
| 9 | China* | 2.7182 |
| 10 | Norway | 2.7408 |

Note:

1. The figures listed were originally denominated in US dollars, and have been converted at an exchange rate of 1 US dollar = NT$28.022 (the average exchange rate for 2021).
2. "*" indicates data for 2020.
3. The prices mentioned above are inclusive of taxes.

# Diversified Management and Strategies

In order to fulfill its responsibility for ensuring a stable power supply, Taipower needs to assess opportunities in emerging energy-related industries and follow global trends in energy transformation and net-zero carbon emissions. Drawing from the example of international power companies, Taipower has been actively promoting initiatives such as renewable energy development and smart energy management. Through company-wide meetings, Taipower is integrating internal and external advantages and resources to foster consensus on diversification strategies. It collects and evaluates information on the feasibility of diverse potential projects and regularly reviews its diversification strategies and short-, medium-, and long-term profit goals, and incorporates them into performance indicators for the responsible centers. Progress is tracked and controlled on a quarterly basis to ensure the Company's competitive strength and financial sustainability.

While adhering to its expansion strategy of "extending the core business in the electricity industry, enhancing asset revitalization, and venturing into derivative businesses," Taipower constantly faces challenges such as energy liberalization and organizational transformation. In addition to pursuing its goal of providing a stable power supply, Taipower is actively exploring opportunities for future business development. It aims not only for profitability but also to implement corporate social responsibility, support government-led industrial development, and ensure environmental sustainability. These aspects are evaluated through multiple dimensions and Taipower seeks to create a win-win situations for society and the Company through the integration of external resources in its pursuit of new business ventures.

At present, Taipower has successfully initiated intrapreneurship in areas such as power operations, nuclear techniques, maintenance, research and training, communications, real estate, cultural innovation, etc. It has also moved forward with reinvestment businesses such as coal and mine development, cogeneration, wind power training. The Company generated NT$8.31 billion in income from these diversified activities in 2022. In view of the significant changes in the internal and external business environment, and to achieve national energy policy goals and ensure the sustainable development of the Company, Taipower will continue to develop new businesses based on four key aspects: government policies, operational strategies, financial stability, and corporate social responsibility. It will assess various investment opportunities in new energy or alternative fuel sources. The goal is to integrate its existing strengths with external resources and actively explore energy-related businesses in a more flexible and proactive manner.

## The real estate revitalization achievements of Taipower's diversified business operations in 2022

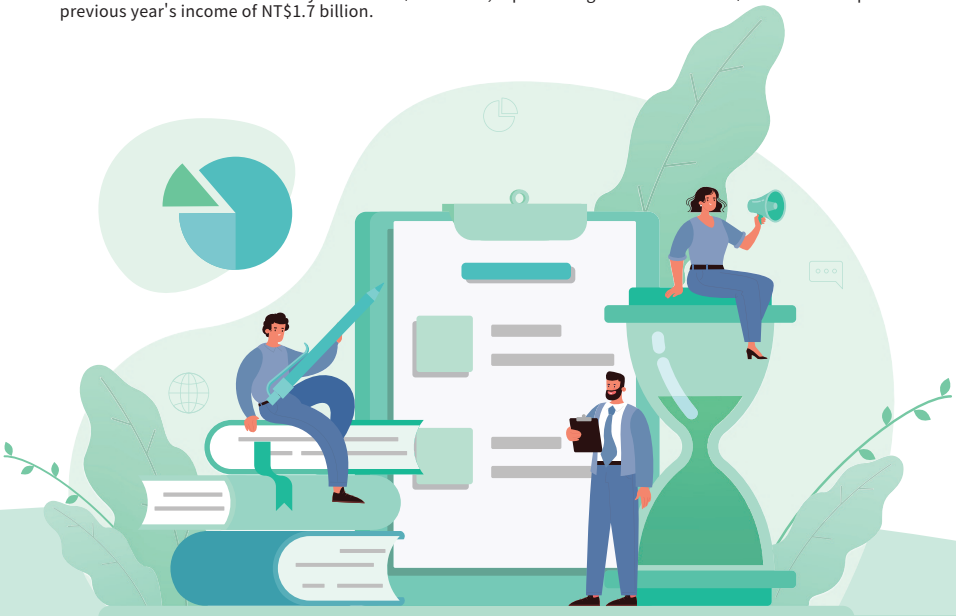
Due to changes in power automation, transportation, and other economic factors, some of Taipower's real estate properties are no longer required for electricity-related purposes. To address this, Taipower established a cross-functional "Land Revitalization Project Team" led by the Company's General Manager. The team consists of representatives from various units such as New Business Development, Finance, Accounting, Construction, Power Supply, Transmission and Distribution Engineering, and Business Operations. The team conducts asset revitalization initiatives and invites relevant unit supervisors or executives to participate in meetings as needed. To enhance the effectiveness of asset revitalization, Taipower may invite real estate professionals from the government, industry, and academia to serve as advisory committee members and hold consultation meetings with the Chairman to gather recommendations.

The main tasks of the Land Revitalization Project Team include reviewing land planning and utilization cases, continuously promoting, supervising, and evaluating revitalization plans and investment attraction efforts. Currently, the focuses are on multi-purpose land use for substations in metropolitan areas, participation in joint ventures or urban renewal for idle land, and promoting land revitalization through bidding and setting land use rights for large areas, thereby increasing the Company's income. In 2022, the team conducted six project team meetings, including working group sessions.

**Diversified Business Income in The Past Three Years**

| 2020 | 2021 | 2022 |
|---|---|---|
| 1.6 billion | 3.1 billion | 8.3 billion |

Note: The significant growth in diversified income for the year 2022 is mainly attributed to the impact of a substantial increase in international coal prices (an average increase of 189%) on the investment in coal mining development. The total annual income for the year was NT$7.1 billion, representing an increase of NT$5.4 billion compared to the previous year's income of NT$1.7 billion.



# 1.2 Promoting Corporate Transformation

## 1.2.1 Transformation Planning

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### Core Transformation Concept

The amendment of the Electricity Act was promulgated by presidential order on January 26, 2017. According to Article 6 of the Act, Taipower is required to undergo a transformation into a holding company by January 2023 and to establish separate power generation, transmission, distribution and sale subsidiaries. However, in consideration of developments in the electricity market, the electricity regulatory authority may request that the Executive Yuan postpone the implementation date. The first extension may be for up to 2 years, and the second extension may be for up to 1 year (thus, the longest extension would be until January 2026). Taking into account Taipower's responsibilities for ensuring a stable power supply and energy transition, as well as achieving net-zero emission transformation, and considering that there are still several issues related to the transformation to be studied and addressed, the Executive Yuan has approved the extension of the Company's transformation period until January 1, 2025, starting from April 1, 2022.

The transformation of Taipower from an integrated power company to a power business group is the first of its kind for a state-owned company. It is also an organizational transformation that is unprecedented in scale. Taipower has adopted "Strengthening the Foundation" and "Seeking Development" as its two core philosophies as it transforms into a power holding group. The Company is committed to continuing to provide a stable electricity supply, to maintaining positive competition in the market and to maximizing benefits for the Group.

#### Strengthening the Foundation ✓

As a state-owned power utility group, Taipower plays an important role in providing a stable power supply, air pollution reduction, energy transformation, net zero emissions, and the electric industry development components of the national policy objectives. As subsidiaries of the Taipower Group, the Power Generation Company and the Transmission, Distribution and Retail (TD&R) Company will strive to fulfill their statutory requirements with respect to the scopes of their businesses. The holding company will play a strategic coordinating role and integrate its subsidiaries to accomplish the missions of the Taipower Group.

#### Seeking Development ✓

The Electricity Act has fully opened up the range of choices for renewable power, and the electricity market may also be further opened. In the face of the increasing number of private operators joining the electricity market, Taipower Group must not only consolidate its existing business but also explore new growth areas by combining external resources with greater efficiency and flexibility to facilitate the Group's sustainable development.

In order to integrate the group's strengths across subsidiaries and create operational synergy, the parent company will be designed to perform the functions of group policy making, strategic coordination, and resource integration. Taipower plans to control its subsidiaries through a "strategic control" model that takes into account both the group's overall efficiency and business flexibility. In addition, it will establish an effective governance structure and system through the appointment of directors and supervisors, a strategic target system, personnel organization, risk management, budgeting and accounting, and internal auditing of subsidiaries.

### The Transformation of the Professional Division of Labor

As a parent holding company, Taipower will hold 100% of all shares in the two subsidiaries and assign them different tasks based on the nature of their operations:

#### The Parent Holding Company

The Company is not required to hold an electricity license. However, after the Company is divided, both the parent and subsidiary companies will remain state-owned enterprises. They must use their collective strength to support the national energy policies and fulfill the requirement of ensuring a stable power supply. The parent company has to play the role of coordinator and allocator of resources within the group, as well as to serve as a window of correspondence and reporting to higher authorities. In addition, if nuclear power plants are decommissioned as scheduled by May 2025, Taipower will follow the model of Tokyo Electric Power Company Holdings by retaining the nuclear power businesses in the parent company along with responsibility for nuclear power decommissioning and nuclear waste disposal.

#### The Generation Company

The generation subsidiary will retain the electricity generation industry licenses and shall become a non-public utility. It will be responsible for the planning, design, construction, operation and maintenance of the power generation and power sales businesses of the Group. It must closely follow trends in the industry, enhance its competitiveness, strengthen its core technologies, and actively plan electricity sales models that maintain its leading position in the power generation market.

#### The Transmission, Distribution and Retail Company (TD&R Co.)

The transmission, distribution and retail subsidiary will retain the transmission, distribution and public utility licenses. It will remain a public utility and operate in the electricity transmission, distribution, and retailing industries. The electricity transmission and distribution department will continue to bear responsibility for the planning, design, construction, operation and maintenance of the nationwide transmission and distribution networks. It must pay close attention to costs and control operational and maintenance expenses to generate a steady stream of income. The electricity transmission and distribution division should also actively construct smart grids to meet energy transformation goals. The electricity retailing utility division will handle the electricity purchase and sale business according to the needs of retail utility customers and will assume the legal responsibility for preparing the electricity reserve capacity and electricity carbon emission factors. In preparation for the possible further opening of the retail market, Taipower has gradually improved customer management and services and enhanced the added value of its business through innovative applications that will meet future challenges.

# 1.2.2 The Current Status of Transformation in Taipower

Regarding the transformation of Taipower, in addition to seeking external experience through outsourced research projects and benchmarking with other companies, a "Company Transformation Promotion Meeting" has been established. The meeting is held by the Chairman and has various preparatory groups to actively plan and prepare for organizational, financial, and operational considerations through internal discussions within the Company. The meeting's achievements in 2022 include: Developing an organizational framework for 1 parent company and 2 subsidiaries, as well as the processing of regulations on the division of responsibilities within the group, the development of a separate financial accounting system along with the progress on formulating principles for the allocation of assets and liabilities among the subsidiaries, and preparation and planning for the conduct of an inventory of operational interfaces for the subsidiaries after the transformation has been conducted. The aim is for the group to balance business operational flexibility and group synergy while ensuring the maintaining of the stable power supply and energy transformation.

## Progress and Achievements in 2022

The Electricity Act was amended on January 26, 2017, with the aim of establishing a market that facilitates diverse supply, fair usage, and freedom of choice. The purpose of the amendment is to promote the development of renewable energy, reduce reliance on coal and increase the use of natural gas, and achieve the national energy transformation goal of a non-nuclear homeland by 2025.

The amendment to the Electricity Act has had a profound impact on the market, posing significant challenges to Taipower's operations in the face of market structural changes. The Company has subsequently been active in taking measures to adapt, prepare, and plan.

### 1 Adapting to the liberalized electricity market and Taipower's support for new business opportunities

After the amendment, customers were granted the right to choose green electricity, in addition to resale options. Renewable energy generation companies were allowed to apply for establishment and to sell green electricity to customers through wholesale or direct supply arrangements. The electricity grid was designated as a common carrier to ensure fair access to the grid for the public.

To accommodate the opening of the green electricity market, Taipower has actively taken related measures, including assisting the electricity regulatory authority in conducting the first-ever review of transmission and distribution fees, establishing the direct supply of green electricity services, and completing separate accounting statements. To ensure grid neutrality, Taipower plans to achieve corporate separation by 2023-2025.

Furthermore, according to Article 11 of the Electricity Act, an open and transparent electricity trading platform should be established after the division of generation and distribution networks. Taipower established an "Electricity Trading Platform" in July 2021, which was officially launched in November of the same year. As of the end of 2022, a total of 35 companies with a capacity of 320MW have participated on the platform.

With various supportive measures and incentives in place, the green electricity trading market has been active since its launch in May 2020, with a total annual trading volume of 1.12 billion kWh in 2022. Additionally, multiple private renewable energy generation companies and renewable energy retailers have entered the electricity market (as of January 2023, there are 4 hydro, 64 solar, and 22 wind power companies, along with 36 renewable energy retailers). Through the introduction of green electricity and market mechanisms for ancillary services, it is expected that the electricity market will attract more participants and promote a diverse power supply environment.

### 2 Balancing energy transition and a stable power supply, Taipower's new statutory responsibilities

To ensure the stable operation of the market and achieve the government's energy transition goals, Taipower has taken on the responsibility for both public electricity supply and additional statutory requirements outlined in the amendment. These include power decarbonization control and reserve capacity for the power supply. Taipower is required to submit plans and annual reports on "power decarbonization coefficients" to the electricity regulatory authority to ensure that the power generation structure is moving towards low-carbon, sustainable development. Taipower will gradually align the power structure with the government's energy transition goals of "increasing gas, reducing coal, developing green energy, and creating a non-nuclear homeland" by combining various green energy incentives. To maintain the stability of the market after liberalization and to protect the rights and interests of electricity consumers, a reliability review committee has been established to determine appropriate reserve capacity rates (currently set at 15%) and to require electricity sellers (mainly public electricity suppliers and some green electricity suppliers) to assume responsibility for providing reserve capacity. Public electricity suppliers are ultimately responsible for power supply, and Taipower must submit annual plans and reports on reserve power capacity to ensure long-term power supply stability.

To further protect the rights and interests of electricity consumers, the amendment designated a central authority to oversee and regulate the electricity market. It also established procedures for electricity pricing and an Electricity Tariff Review Committee to review various fees and reasonable electricity prices for transmission, distribution, and public electricity supply. Through the establishment of a stable electricity pricing mechanism, fluctuations in electricity prices are minimized.

As the market gradually opens up and diversifies, the electricity sector is being supervised and managed through the implementation of statutory obligations such as reserve power capacity, an electricity regulatory authority, and review committees and related regulatory mechanisms, thereby ensuring the healthy development of the power sector.

# 1.3 Sustainable Governance

## 1.3.1 The Sustainable Development Commission

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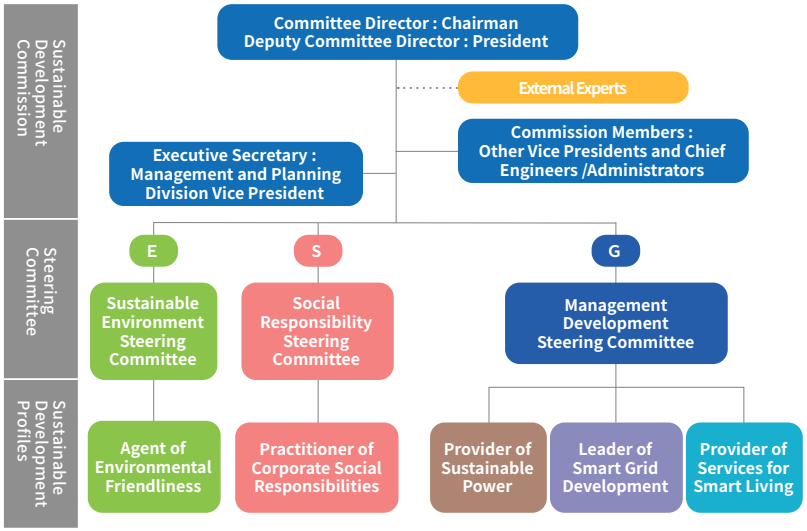
### Organizational Structure of the Sustainable Development Commission (SDC)

Taipower set up a Sustainable Development Commission (SDC), with the chairman of the Company's board of directors as the SDC's chairman, the Company's president as the SDC's deputy chairman, and vice presidents and the professional chief engineers/administrators as committee members. The SDC has three subordinate steering committees: the Management Development Steering Committee, the Sustainable Environment Steering Committee, and the Social Responsibility Steering Committee.

The managerial departments also have a Risk Management Committee, which has established risk management implementation plans. These plans include company-level risks, unit-level risks, audit mechanisms, educational training, and other management mechanisms. They are integrated into the internal control design and the execution of various operations. An annual project report is submitted to the Board of Directors to clarify implementation status. The roles and responsibilities of the Taipower Board of Directors and the Managerial Department are defined in the Board of Directors and Managerial Department Responsibilities Allocation Table and other relevant regulations.

#### Structure of the Sustainable Development Commission




### Key Tasks of the SDC

#### Management Development Steering Committee

The committee is currently focused on planning the management direction and executing its transformation. Management direction is set by establishing a vision, management structures and by implementing business plans. In terms of company structure, plans have been implemented for energy transformation, organizational transformation, digital transformation, and diversification management.

#### Sustainable Environment Steering Committee

The committee steers Taipower's green corporate image and promotes low-carbon environmental development in order to fulfill the Company's environmentally-friendly corporate mission. Taipower is committed to providing green power and building a green corporate image through environmental policy formulation, environmental goal planning, and environmentally-friendly actions.

#### Social Responsibility Steering Committee

The committee works to strengthen Taipower's corporate humanism and social welfare. It implements the Company's people-oriented business philosophy and corporate citizenship actions. Through cultural and employee assistance activities, Taipower demonstrates its commitment to social responsibility. The Company is committed to expanding its social involvement and proactively reaching out to the public.

### Operating Mechanisms and Achievements of the SDC

Through its 3 steering committees, the SDC is able to track the results of Taipower's progress on its short, medium and long-term goals. The three committees focus on management development, environmental sustainability, and social responsibility. They analyze the changes in the external environment and policy. The results are used as references for the planning of Taipower's long-term sustainable development strategies and for identifying the Company's materiality topics.

Taipower promotes sustainability issues mainly through the three steering committees mentioned above. For emerging sustainability risks and issues, the Company holds ad hoc meetings to allow for discussion across committees. For example, as the topic of carbon neutrality has come to international prominence, carbon management and disclosure, and climate change risk response have become emerging issues.

#### Actual Performance of the SDC and its Steering Committee in 2022

| Name of Meeting | Responsibilities | Actual Performance in 2022 |
|---|---|---|
| Sustainable Development Commission | Planning the Company's long-term sustainable development, establishing material topics and approving the Company's Sustainable Development Blueprint | Convened 1 meeting |
| Steering Committee | Formulating the Sustainable Development Plan and short, medium and long-term goals | Convened 3 meetings |
| Sustainable Development Profiles | Executing and following up on short-term goals | Meetings were convened when necessary |

### Role of the Highest Governance Body in Overseeing the Management of Impacts

Taipower's Board of Directors attaches great importance to the implementation of sustainable development. In recent years, the Board has been actively supervising Taipower's policy and implementation regarding environment, social, and governance (ESG). Each month, the President of Taipower reports to the Directors on major achievements or progress. Taipower's SDC has reported on the strategy and implementation of sustainable development to the Directors every year. The opinions of the Directors are listed and tracked item by item. For significant-risk events or policies, project reports on impact management and contingency measures are promptly submitted to the Board of Directors.

According to Taipower's Guidelines for the SDC, the committee is responsible for reviewing the sustainability report. The information disclosed in the report undergoes external verification to ensure its authenticity and is subsequently approved by department heads, the CEO, and the Chairman before being made public.

## 1.3.2 Identification of Stakeholders

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Taipower has spared no effort in building mechanisms that develop mutual trust and communicate with its stakeholders. A survey was conducted to identify the main groups of stakeholders for each of the Company's business units in accordance with the five principles outlined in the "AA1000 Stakeholder Engagement Standards (2015)." Taipower's significant stakeholder groups were identified to ensure thorough coverage of all stakeholders who are relevant to different aspects of Taipower's operations. Reviews on a yearly basis are conducted and adjustments are made as necessary.

| Stakeholder Party | Party |
|---|---|
| Board of directors | Directors |
| Shareholders | All shareholders |
| Employees | Employees and the union |
| Partners | Contractors, IPPs, suppliers and technology exchange partners |
| Government / competent authorities | The Ministry of Economic Affairs, the Bureau of Energy, the State-Owned Enterprise Commission, the Environmental Protection Agency, the Atomic Energy Council, the Legislative Yuan and local government agencies |
| Public representatives | Legislators and elected village/township representatives |
| The media | Printed, electronic and online media |
| Private organizations | Environmental conservation groups, enterprise associations, academics |
| Customers | General and large-scale customers |
| Residents / general public | Residents near facilities and the general public |

## 1.3.3 Stakeholder Engagement

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### Stakeholder Communication Performance

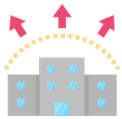
Taipower values stakeholder voices and communicates with them through multiple channels. In addition to listening to and collecting suggestions for Taipower's sustainable development, the Company also incorporates stakeholder suggestions into management measures and operational behavior optimization projects in order to respond to appeals and expectations. As of 2022, the total number of visits to the Sustainable Development section of the Taipower website has reached 500,000, fully demonstrating Taipower's performance and achievements in various sustainability issues.

To strengthen the effectiveness of communication with stakeholders and demonstrate proactive efforts and achievements in promoting sustainable development to the broader world, the Company participated in the "2022 Asia-Pacific Sustainable Action Expo" from August 12 to August 14, with over 20,000 visitors in attendance and coverage in over 330 media reports.

In order to minimize the impact on employees during the Company's transformation and to achieve effective communication with external parties regarding the plans involved, the Company has developed a communication plan and continues to engage in two-way communication with both internal and external stakeholders.

**Internal Communication**

This includes reporting progress to the Board of Directors, timely meetings with the Workers' Union to provide explanations, conducting communication and advocacy seminars for employees at various levels and units of the Company, as well as employee education and training for the union. Over 200 such events were held from 2017 to 2022. In the future, various communication activities will continue to be carried out in line with the transformation process.



**External Communication**

Timely meetings and correspondence with superior authorities to explain the Company's transformation plans and progress, and promptly contacting relevant authorities to seek explanations and suggestions for addressing difficulties and clarifications regarding transformation plans. In the future, communication channels with external stakeholders will be kept open as required by the transformation.

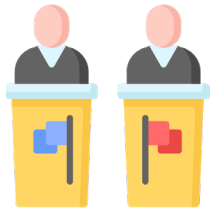
| Stakeholders | Main Concerns | Frequency and Methods of Engagement | 2022 Engagement Performance | Related Actions |
|---|---|---|---|---|
| Board of Directors | • Corporate governance and sustainable management<br>• Power Industry Transformation and Adaptation<br>• Management and Financial Performance<br>• Climate change and low-carbon strategies | • One regular Board and Functional Review Committee meeting per month<br>• At least one Audit Committee meeting per quarter<br>• Continuing education for directors (including independent directors)<br>• Annual Board performance evaluations | • Held 16 Board of Directors' meetings, 9 Investment Project and Business Plan review committee meetings, and 6 Land review committee meetings<br>• Held 8 Audit Committee meetings.<br>• Directors (including independent directors) received professional training on corporate governance totaling 189 hours<br>• Performance evaluation in 2022 was conducted in accordance with the Board Performance Evaluation Guidelines, and the results were disclosed on the Taipower official website<br>• Key reports on the progress of Taipower's transformation were presented | • Regularly reported to the Board of Directors on progress highlights<br>• Conducted timely reporting on projects |
| Shareholders | • Corporate governance and sustainable management<br>• Management and Financial Performance | • Shareholders' meetings<br>• Taipower's official website and Market Observation Post System (MOPS) | • Annual general meeting held on June 24 and shareholders' extraordinary meeting held on December 16<br>• Relevant information disclosed on the Public Information Observation Station and Taipower's official website under the Corporate Governance/Shareholders section | • Communicate status with shareholders through the minutes of the regular shareholders' meeting |
| Employees | • Power Industry Transformation and Adaptation<br>• Corporate Governance and Sustainable Management | • On-the-job training<br>• Labor-management meetings<br>• Keynote speeches, symposiums<br>• Communication briefings on organizational transformation | • On-the-job training at the Training Institute, training organized by each unit, and external training for a total of 80,822 participants<br>• Held seven labor-management meetings<br>• Organized five keynote speeches | • Organized corporate-level labor-management meetings and labor-management communication seminars for each system<br>• Collected proposals from union member representatives or branch directors and implemented them after discussions and resolutions at meetings |
| Partners | • Renewable and Clean Energy Development<br>• Worker Health and Safety<br>• Climate Change and the Low-Carbon Strategy | • Periodic consultation meetings | • Currently, these are in the preliminary discussion phase | • Ongoing discussions with partners. Discussions addressed whether the renewal of contracts involve environmental assessments or impact, additional investment in equipment improvement projects, costs, tenure of use, the signing of pure capacity contracts, etc. |
| Government Agencies / Competent Authorities | • Corporate Governance and Sustainable Management<br>• Stability and Reliability of Power Supply<br>• Accessibility and Affordability of Electricity<br>• Renewable and Clean Energy Development<br>• Power Industry Transformation and Adaptation<br>• Climate Change and Low-carbon Strategies<br>• Environment Impact Management<br>• Power Plant Renewal and Decommissioning | • Board of Directors' meetings<br>• Official documents<br>• Submission of various work schedules<br>• Cooperating and participating in meetings<br>• Smart generation and dispatching forum meeting<br>• Project communication meeting | • Important motions of the monthly Board meeting were submitted to the competent authority in advance<br>• The minutes of monthly Board meetings were submitted to the competent authority | • Provided relevant information and attended review meetings in accordance with government regulations and requirements |
| Elected Representatives | • Climate Change and Low-carbon Strategies<br>• Environment Impact Management<br>• Renewable and Clean Energy Development<br>• Power Plant Renewal and Decommissioning | • Attendance at committee meetings of the Legislative Yuan as a non-voting participant<br>• Coordination meetings and public hearings<br>• Provide relevant explanatory information on the corporate business<br>• Take the initiative to visit legislators | • Executives at the level of Vice President or above attended 56 sessions at the Legislative Yuan as non-voting participants<br>• Supervisors and staff at all levels attended coordination meetings and public hearings held by the Legislator's Research Office and provided information a total of 932 times throughout the year<br>• Executives at the level of Vice President or above had a total of 65 communication sessions with legislators throughout the year | • Arranged senior executive visits to elected representatives to explain important business<br>• Actively responded to elected representatives' queries and provided written information in due course<br>• Attended public hearings and coordination meetings to explain the implementation of the Company's business |

| Stakeholders | Main Concerns | Frequency and Methods of Engagement | 2022 Engagement Performance | Related Actions |
|---|---|---|---|---|
| Media | • Power Industry Transformation and Adaptation<br>• Renewable and Clean Energy Development<br>• Environment Impact Management<br>• Stability and Reliability of Power Supply | • Press releases<br>• Printed media<br>• Public hearings / Explanatory meetings<br>• On-site visits / Commissioner visits<br>• Taipower's official website<br>• Market Observation Post System (MOPS) | • Published a total of 68 press releases and 89 instant explanations on issues related to air quality improvement, power supply and demand percentages, renewable development, power development projects, environmental protection, and sudden major events to provide immediate external clarification or proactively release information to the media for dissemination<br>• Proactively releasing news materials in response to external concerns, such as promoting renewable energy, energy-saving measures, preservation of power-related cultural heritage, and recruitment of new personnel. These actions demonstrated Taipower's concrete efforts in response to energy transformation, active development of green energy, and transformation within the power industry.<br>• Implementing a spokesperson system to promptly respond and promote important Taipower policies in addressing societal concerns related to people's livelihoods. | • Offered complete press information proactively for media coverage regarding the Company's important business strategies and external concerns to demonstrated the Company's specific actions in response to government policies and social expectations<br>• Immediately clarified any misunderstandings in response to external concerns or temporary emergencies and issued press releases and "instant explanations" when necessary to communicate with the public promptly<br>• Arranged media interviews on diverse issues |
| Non-Governmental Organizations | • Environment Impact Management<br>• Power Industry Transformation and Adaptation<br>• Climate Change and Low-carbon Strategies | • Briefing sessions<br>• Proactive visits<br>• Participation in relevant forums and activities<br>• Taipower's official website<br>• Taipower publications | • Meetings according to project needs<br>• Publication of the Monthly Journal of Taipower<br>• Disclosed the latest corporate information on Taipower's official website | • Visited non-governmental organizations based on project needs to gain insight into public sentiment and needs and harmonized interactions with stakeholders<br>• Published the Taipower Journal, targeting government agencies, business-related units, Taipower employees (including retirees), colleges and universities, etc. |
| Customers | • Demand-side Management and Energy Conservation<br>• Digital Transformation and Information Security<br>• Accessibility and Affordability of Electricity<br>• Service and Product Satisfaction<br>• Climate Change and Low-carbon Strategies<br>• Stability and Reliability of Power Supply<br>• Environment Impact Management | • Customer comment box<br>• Specialist visits<br>• Occasional newsletters | • The customer comment box received 5,434 letters in 2022<br>• Conducted advocacy to promote the usage of high-efficiency electrical appliances and power conservation techniques. A total of 1,502 meetings were held in 2022, with about 200,000 participants<br>• Organized a series of power-saving activities over ten consecutive years<br>• Power-Saving Service Teams visited 4,456 customers in 2022, with an estimated power saving potential of 103.24 GWh | • Data collection for energy-saving advocacy campaigns: Each year, a schedule is set for advocacy sessions, which are carried out by regional business offices to promote the use of energy-efficient appliances and energy-saving techniques among users, effectively conveying energy-saving knowledge.<br>• Data collection for energy-saving events: Continuously organizing a series of activities to embed energy-saving education through entertaining methods, ensuring that energy-saving knowledge takes root and becomes a nationwide trend.<br>• Data collection for user visits by the energy-saving service teams: Each year, a target number of household visits is set, and regional business offices are responsible for assessing the potential for energy-saving and promoting demand response measures to achieve the desired visitation benefits. |
| Residents / The General Public | • Environment Impact Management | • The Taipower fan page on Facebook<br>• Public information on the official website | • The Facebook fan page had more than 40 million views in 2022<br>• Set up an "Information Disclosure Section" to provide information on corporate operations and tariffs, and established an independent section on sustainable development to deliver corporate performance information related to sustainable development<br>• Disclosed financial information and corporate governance status in the "Corporate Governance Section" | • The themes of the Taipower's fan page include electricity knowledge, electrical safety, energy-saving tips, and other content related to electricity in daily life, as well as the latest convenient services and activities. In terms of policy promotion, the Company explains the reinforcement of grid resilience, regional power outages, and Taipower's efforts towards net-zero emissions through infographics and texts |

# Material External Communication Policies

## Media Communication

Taipower proactively releases complete press information packages for media coverage that demonstrate the Company's specific actions in response to government policies and social expectations. For public concerns or temporary emergencies, such as air pollution issues, nuclear energy issues, regional power outages, and major emergencies Taipower issues press releases and real-time explanations for immediate clarification. In addition, Taipower actively assists in arranging media interviews to attract media coverage and enhance its corporate image.



## Communication with Elected Representatives

Elected representatives are at the frontline of communicating public concerns, policy direction, and planning. Taipower has been actively responding to questions of legislators and seeking policy planning support. Taipower attends various business-related issue commissions, public hearings, press conferences and explains policies and implementation practices to achieve bilateral communication. Taipower also establishes contact and meets with each elected representative to assist in handling business-related service cases and to establish mutual trust and communication. Through various means of engagement, Taipower gains understanding into the concerns of elected representatives and works out the best solutions to achieve win-win solutions.

## Communication with Customers and the General Public

Taipower actively maintains honest and transparent communication with customers and the general public. Through Taipower's various business areas and diversified mediums, the public can express relevant opinions in a timely and effective manner. Taipower also earnestly builds an image of positive corporate citizenship and conveys information on the Company's actions and performance in management, environment, and society by proactively communicating on issues in advance. The public can therefore engage in deeper interaction with Taipower and establish a sustainable social relationship.

## Participation in External Associations

The electricity industry is highly professional and its related technologies are evolving rapidly. Taipower enthusiastically participates in major technology and exchange organizations in the energy industry. In 2022, the Company engaged with 25 international organizations, 78 academic organizations, and 6 professional organizations for a total of 109 external organizations, including the World Association of Nuclear Operators (WANO), the Taiwan Business Council for Sustainable Development, the Industrial Safety and Health Association (ISHA) of the R.O.C., the Taiwan Wind Industry Association, the Taiwan Institute for Climate Change and Sustainable Energy, the Taiwan Electrical Contractors Association, and other international, academic, and professional organizations. The topics discussed included energy transformation, clean energy technology, sustainable governance, the energy economy, and occupational health and safety.

# 1.3.4 Key Sustainability Issues

3-1 3-2

In compiling the Sustainability Report, Taipower makes reference to sustainability reports from electricity industry participants in other countries. The material topics from these reports are consolidated to identify issues in the energy, solar, wind, and biofuel industries and then integrated with the industry materiality map issued by the Sustainability Accounting Standards Board (SASB). Material topics are then taken into consideration when selecting sustainability issues. The major industry issues are divided into four major categories – climate and energy, people and communities, biodiversity, and circular economy – in the report "SDG Sector Roadmap for the Electric Utilities Sector" published by the World Business Council for Sustainable Development (WBCSD) in March 2021.

In 2022, Taipower has aligned with international trends to evaluate and include "circular economy" in the list of key sustainability issues. Additionally, the topics of "information security and customer privacy" and "ecofriendliness" have been revised and enhanced to consider the implications of "digital transformation" and "biodiversity."

To identify the material topics of concern to stakeholders, Taipower refers to the GRI Standards to conduct materiality analysis that reviews and identifies the key material topics for the Company. In 2022, Taipower additionally sought to identify material topics by surveying stakeholders. Survey results were collected from 123 Taipower employees (including 39 senior executives) and 218 other stakeholders for a total of 341 responses.

## Identification Process for Material Topics

### Review and identification

- Review of sustainability issues identified in the previous year
- Examine relevant major sustainability trends at home and abroad, such as amendments to the SASB guidelines and domestic regulations
- Examine Taipower's management issues, benchmarks in the electrical industry, the opinions of internal and external stakeholders, and major news events
- Identified 22 sustainability issues

### Evaluation and prioritization

- The possible impacts of various issues on Taipower and the degree of their influence on different stakeholders are determined through a questionnaire
- 39 employee questionnaires were used to comprehend the impact of issues on the economy, society, environment, and to understand the importance of issues to business operations
- 302 questionnaires were collected from various other stakeholders to understand the impacts of issues on different stakeholders

### Confirmation of material topics

- Confirm the material topics matrix through materiality product sorting and Taipower's internal engagement
- Determine the structure and content of the Taipower Sustainability Report based on the analysis results

**Based on the identification process in the above table, a multi-dimensional overview of trends and events was used to adjust and prioritize the list of material topics in Taipower's sustainability report this year. The topics are outlined in the following table**

| Former material topics | New material topics | Adjustment | Explanation |
|---|---|---|---|
| Transforming into a Power Utility Group and Power Industry Reform and Fair Competition | Power Industry Transformation and Adaptation | Consolidated with other material topics and renamed | Taipower has merged the original topics of " Transforming into a Power Utility Group " and "Power Industry Reform and Fair Competition" and made slight adjustments by renaming it "Power Industry Transformation and Adaptation." This change reflects Taipower's response to the reform of the electricity industry law, its organizational restructuring, and its transformation into a holding group. Taipower has also formulated relevant plans to maintain its competitiveness in the future electricity market. |
| Information Security and Customer Privacy | Digital Transformation and Information Security | Renamed and Fine-tuned implications | The slight adjustment is a response to international benchmark trends in the power industry by incorporating the dimension of "digital transformation." This includes constructing digital infrastructure, building a smart power industry, and simultaneously strengthening information security management and ensuring customer privacy. |
| Environmental Impact Management and Air Quality | Environment Impact Management | Consolidated | The slight adjustment reflects the inclusion of air quality management. |
| Ecological Friendliness | Ecological Friendliness and Biodiversity | Renamed | In response to international sustainability trends, emphasis is now placed on the significance of biodiversity conservation. |
| NA | Circular Economy | New | Circular economy is an emerging topic within the international power industry, and in response to global trends, this sustainability theme has been included in the assessment of major topics. |
| Stakeholder Engagement and Information Transparency | NA | Consolidated | "Stakeholder communication" was deemed a necessary disclosure but does not require a major topic assessment. Therefore revisions have been made. "Information transparency" has been integrated into the theme of "corporate governance and sustainable operations." |
| Employee Rights and Benefits | Human Rights and Inclusivity | Renamed and fine-tuned implications | In response to international trends and the disclosure requirements of the 2021 GRI Guidelines, the theme has been revised to "Human Rights and Inclusion." Taipower is committed to respecting and protecting the human rights of all stakeholders, including employees, throughout its operations and strives to prevent any human rights violations. |

# 2022 Material Topics Matrix

Material topics

Common topics

Environment topics

Social topics

Governamce topics

Size of bubble : Impact on external economy, environment and society

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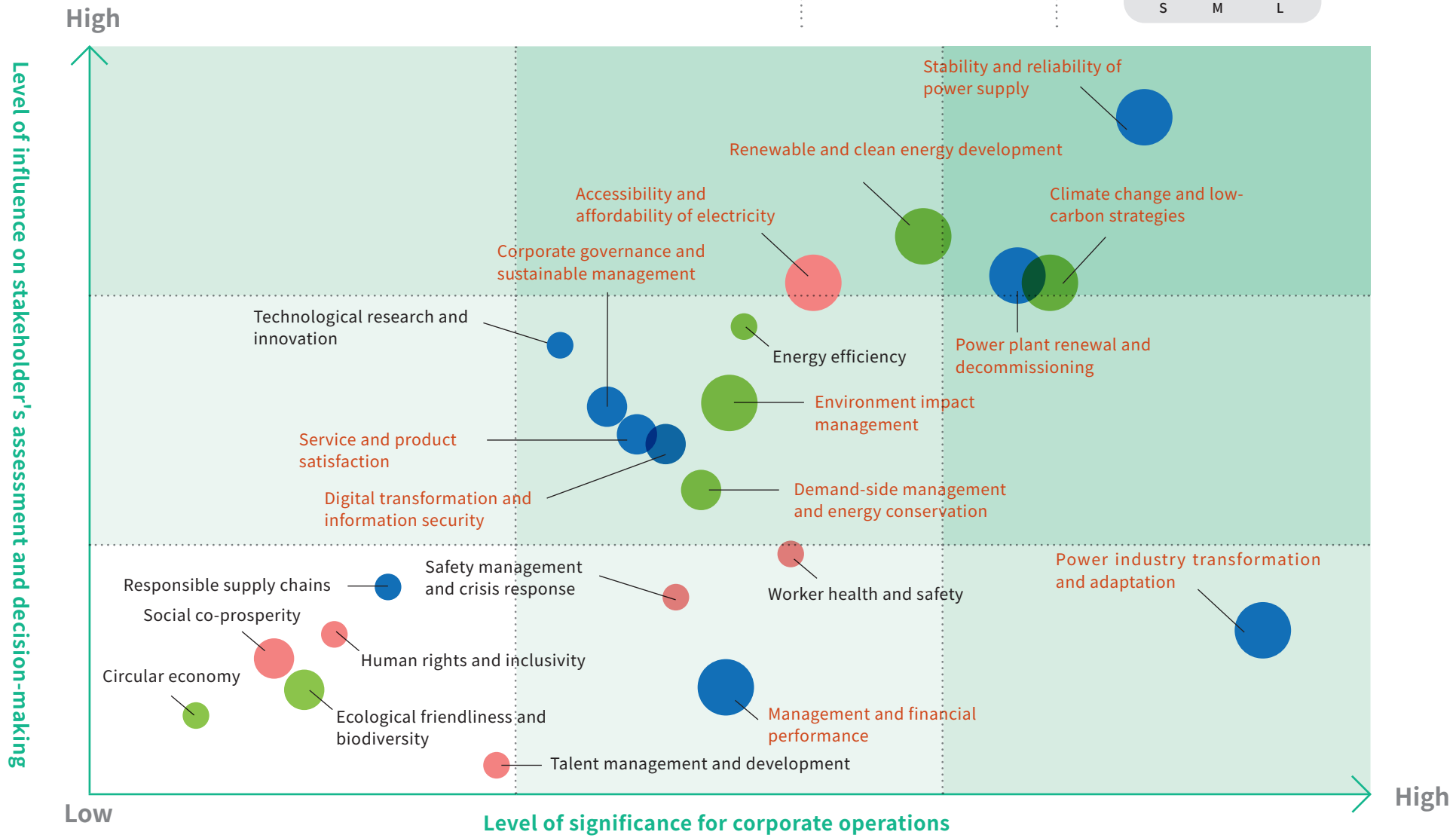


With the help of the material topics matrix Taipower has summarized the materiality of various sustainability issues. The Company sorted the issues based on the X, Y, and Z axis of each topic. Twelve material topics that fall within the scope of this report were identified through communications with stakeholders. These topics will be the main focus of this report. All of the topics are related to sustainability trends from around the globe and are also of significant concern to stakeholders. For example, in the aspect of governance, both "Corporate governance and sustainability management" and "power supply stability and reliability" have long been points of focus for Taipower. As the principal power supplier for the public and businesses in Taiwan, the Company is concerned about "Service and product satisfaction," "Digital Transformation and Information Security," and "Power Plant Renewal and Decommissioning." The topics "Power Industry Transformation and Adaptation" and "Management and Financial Performance" are also essential issues for the operation and future transformation of the power industry.

In terms of the environment, the development of energy transformation trends has brought issues such as "renewable and clean energy development," "climate change and low-carbon strategy," and "demand-side management and energy conservation" to the forefront. Consequently, enterprises must attach importance to the environmental impact caused by their operations. At present, Taipower's generation is still primarily based on thermal power. Therefore,"Environment Impact Management" is the emphasis of environmental disclosure under the current energy structure.

As a state-owned enterprise, Taipower is charged with fostering the development of quality of life and livelihood in Taiwan. As such, it devotes itself to improving the accessibility of electricity, gives consideration to providing reasonable electricity prices for the general public, and has continued to include "accessibility and affordability of electricity" as a material topic. The following are the material topics and where each material topic impacts ESG.

| Material Topics | Location of Economic / Environmental / Social Impact | | | | | | Relevant GRI Standards | Management Policies and Corresponding Chapters |
|---|---|---|---|---|---|---|---|---|
| | | Business Relationships | | Other Social Relationships | | | | |
| | Within Taipower | Partners | Users | Private organizations | Government units | Residents / general public | | |
| Corporate governance and sustainability management | ✓ | ✓ | | | ✓ | | General Disclosures: Governance and compliance with laws and regulations<br>Economic: Anti-corruption | 1.1 Taipower Business Overview and Strategy<br>1.3 Sustainable Governance<br>2.2 Risk Management and Response<br>2.4 Integrity and Compliance |
| Management and financial performance | ✓ | | | | | | General Disclosures: The size of the organization<br>Economic: Direct economic impacts | 1.1 Taipower Business Overview and Strategy |
| Power industry transformation and adaptation | ✓ | | | | ✓ | | Topics Specific to Taipower | 1.1 Taipower Business Overview and Strategy<br>1.3 Sustainable Governance |
| Digital transformation and information security | ✓ | | ✓ | | | | Customer Privacy | 5.1.3 Digital Transformation<br>5.2.2 Guarding Information Security |
| Accessibility and affordability of electricity | ✓ | | ✓ | | ✓ | | Economic: Indirect economic impacts | 1.1 Taipower Business Overview and Strategy<br>3.1 Providing Quality Electricity Service |
| Stability and reliability of power supply | ✓ | ✓ | ✓ | | ✓ | | Economic: Indirect economic impacts | 3.1 Providing Quality Electricity Service |
| Renewable and clean energy development | ✓ | ✓ | | | ✓ | | Economic: Indirect economic impacts<br>Environmental: Emissions | 3.2 Planning for New Sources of Energy |
| Power plant renewal and decommissioning | ✓ | | | | ✓ | | Economic: Indirect economic impacts | 3.2 Planning for New Sources of Energy |
| Service and product satisfaction | ✓ | | ✓ | | | | Topics Specific to Taipower | 5.2 Customer Service and Management |
| Demand-side management and energy conservation | ✓ | | ✓ | | | | Economic: Demand-side management<br>Environmental: Energy | 4.1 Smart Grid General Planning<br>5.1 Smart Electricity Service |
| Climate change and low-carbon strategies | ✓ | ✓ | ✓ | ✓ | ✓ | | General Disclosures: Governance<br>Economic: Indirect economic impacts<br>Environmental: Emissions and energy | 6.1 Strengthening Environmental Management<br>6.2 Reducing Use of Energy and Resources |
| Environment impact management | ✓ | | | ✓ | ✓ | ✓ | Environmental: Emissions | 6.3 Minimizing Environmental Impacts |

CHAPTER 02

# Corporate Governance

## Development Vision

Sound corporate governance and management strategies are the foundation of corporate value creation. For this reason, Taipower is committed to responding to risks and opportunities, and continues to refine its business strategies. It will strengthen internal auditing and control, and implement mitigation and adaptation measures to proactively address potential risks and opportunities. Taipower remains law-abiding and adheres to a spirit of integrity to ensure its stable operation and long-term development. The Company constantly discloses various information, and enhances the value of sustainable supply chains through cooperation with suppliers.

Taipower will continue to respond to significant challenges such as energy transition, organizational transformation, and digitalization. The Company will follow the policy direction of the competent authorities through ongoing reviews and refinements to enhance the function of its Board of Directors, particularly in its role of providing sustainable management policy supervision in the areas of environment, society, and governance. The Company will also strengthen the diversity of the professions and gender equality of directors, and continue to promote the functioning of the Audit Committee. Taipower will continue to enhance the supervision and internal communication of directors (including independent directors), refine the professional training in corporate governance for directors and personnel, and deepen the corporate governance culture. Taipower persistently strives to provide a high standard of sustainable power services.

## Performance Highlights

- In 2022, Taipower achieved the highest rating of "Excellent" in the corporate governance evaluation conducted by the Ministry of Economic Affairs. This recognition highlights the Company's outstanding performance and several advantages.
- The average attendance rate of board meetings was 99% for Directors and 100% for independent directors
- Professional corporate training on governance for Directors (including independent directors) totaled 189 hours.

# 2.1 Taipower's and Governance Structures

## 2.1.1 Governance Structures

2-9

Taipower currently has 16 departments and offices along with four business divisions that include the Distribution and Service Division, the Transmission System Division, the Nuclear Power Division, and the Power Generation Division. The Company has also established various subordinate units and committees to meet its business needs. These include the Taiwan Power Research Institute and the Department of Nuclear and Fossil Power Projects. In response to the latest amendment of the Electricity Act, Taipower is planning to transform into a holding company that consists of two subsidiaries: a Generation Company (Genco) and a Transmission, Distribution and Retail Company (TD&R Co.).

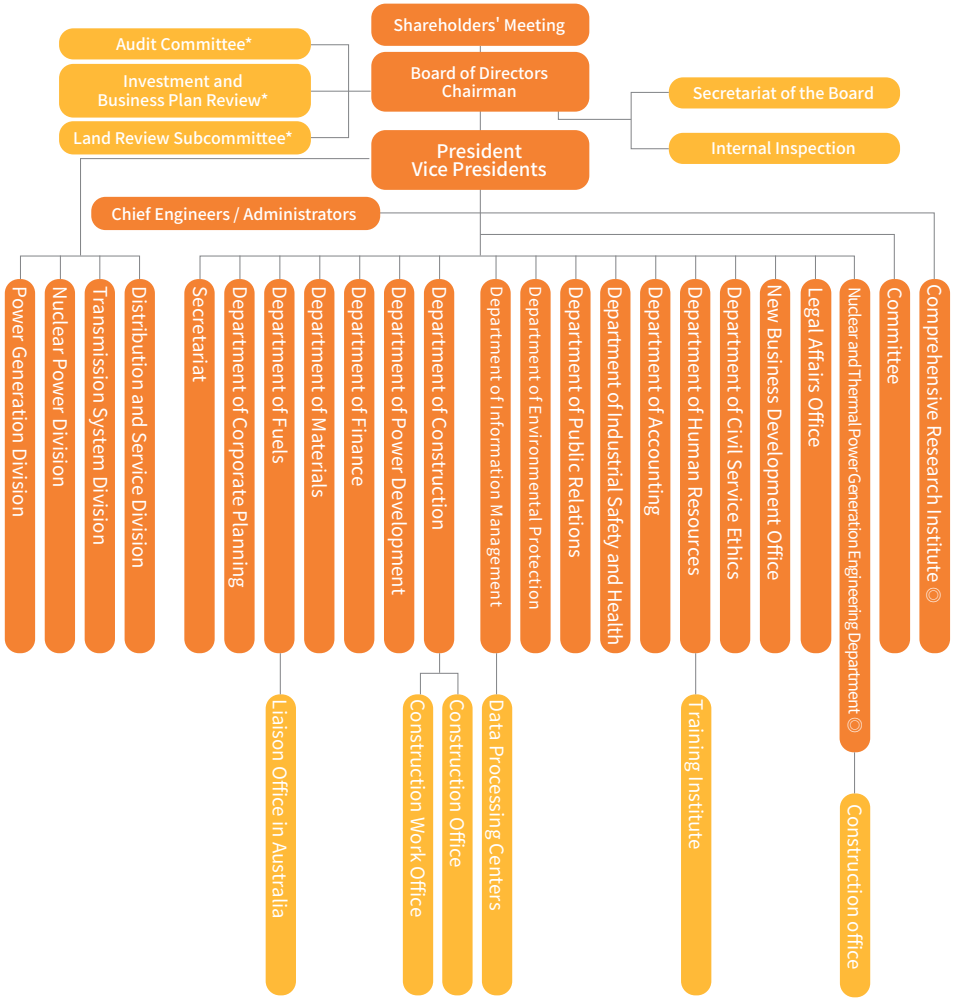
## 2.1.2 Board of Directors

2-9 2-15 2-17 2-19 405-1

### The Structure of the Board of Directors

According to Taipower's Articles of Association, the Board of Directors consists of 15 directors that are elected at the shareholders' meeting. In accordance with the provisions of the Securities and Exchange Act, the Board shall reserve three seats for independent directors, who also make up the Audit Committee. The Board of Directors shall elect five managing directors from among its members, one of whom must be an independent director. The term of service for directors (both independent and managing) is two years, and they are eligible for reelection. According to the Administrative Law of State-Owned Enterprises, at least one-fifth of the directors of each state-owned enterprise that represent state capital shall be recommended by the labor union. Thus, Taipower's Board of Directors consists of 15 directors, including five managing directors (one of whom serves as an independent director), three independent directors, and three labor directors.

Taiwan Power Company - Organizational Structure Chart




Note: 1. ◎ Indicates that this unit is not under the direct supervision of the General Administration Department.
2. The head of the Research Institute reports directly to the General Manager.
3. * is a functional committee. Its functions can be referred to in the "Corporate Governance Report" section of Taipower's 2023 Annual Shareholder Meeting Report.

# Diversity of Board Members

The Directors of Taipower are nominated by the Ministry of Economic Affairs in accordance with the Guidelines for the Management of Directors, Supervisors and Other Important Officers Assigned by the Ministry of Economic Affairs and Subordinate Units to Public and Privately-Held Businesses and Foundations, and are appropriately nominated in accordance with Taipower's operational needs. They must also be elected at the Shareholder's Meeting. In recent years, the Company has been actively implementing the government's gender equality policy and has increased the number of female directors. Overall, the professionalism, experience, and gender ratio of Taipower's directors are diversified. The Board members in the current term (July 2021 to July 2023) are as follows:

1. Professional backgrounds: In addition to experience within the industry, many new areas of expertise have been added to the Board of Directors. These skills will help meet the long-term strategic needs of energy transition. Areas of expertise include smart grids, circular economy, intellectual property, green energy, energy, environmental protection, electrical engineering, civil engineering, economics, IT, accounting, land administration, law, etc.
2. Industry and academic experience: The directors include nine representatives from the government or academia, three independent directors, and three directors from the labor union.
3. Gender: Taipower currently has five female and 10 male directors on the board.
4. Age: The age range of directors spans from 46 to 65 years, covering a diverse distribution of both younger and middle-aged individuals.

### Members of Taipower's Board of Directors in 2022

Information accurate as of December 31, 2022 (Note)

| Title | Name | Concurrent Position |
|---|---|---|
| Acting Chairman (Managing Director) | Tseng, Wen-Sheng | Vice Minister, Ministry of Economic Affairs |
| President (Managing Director) | Wang, Yao-Ting | President, Taiwan Power Company |
| Managing Director | Lin, Faa-Jeng | President, National Applied Research Laboratories |
| Managing Director | Chang, Tien-Chin | Professor, Institute of Environmental Engineering and Management, National Taipei University of Technology |
| Managing Director (Independent Director) | Chou, Shya-Li | Vice President, Taiwan Institute of Economic Research |
| Director (Independent Director) | Liu, Chia-Wen | Professor, Department of Accounting, National Taiwan University |
| Director (Independent Director) | Liu, Chih-Wen | Specially Appointed Professor, Department of Electrical Engineering and Graduate Institute of Electrical Engineering, National Taiwan University |
| Director | Lin, Tze-Luen | Associate Professor, Department of Politics, National Taiwan University |
| Director | Chiang, Yau-Chi | Associate Professor, College of Maritime Law and Policy, National Taiwan Ocean University |
| Director | Chuang, Ming-Chih | Executive Secretary and Counselor, Research and Development Commission, Ministry of Economic Affairs |
| Director | Guo, Xiao-Rong | Director, Northern Region Branch, National Property Administration, Ministry of Finance |
| Director | Luo, Cui-Ling | Executive Secretary, Ministry of Economic Affairs and Executive Secretary, Legal Affairs Committee |
| Director (Labor Director) | Ding, Zuo-Yi | Senior Specialist, Department of Power Repair, Taiwan Power Company |
| Director (Labor Director) | Peng, Chi-Chung | Inspector, Department of Power Supply, Taiwan Power Company |
| Director (Labor Director) | You, Zheng-Da | Section Chief, Chiayi Branch Sales Office, Taiwan Power Company |

Note: The former Acting Chairman Wei-Fuu Yang and President Bin-Li Chung were discharged on March 8, 2022. At that time, Wen-Sheng Tseng took over as Acting Chairman and Yao-Ting Wang as President.

# Disclosure and Transparency of Corporate Governance Information

Taipower's official website includes a Corporate Governance section. Information on the organization and operation of the Shareholders' Meeting, Board of Directors, Audit Committee, and a Shareholder's Area are published on the website and included in the annual report for Taipower's Shareholders' Meeting in accordance with laws and regulations. The annual report is also disclosed on the Market Observation Post System.

# Continuing Education for Directors

Taipower is a publicly offered company but is not listed on either the Taiwan Stock Exchange (TWSE) or the Taipei Exchange (TPEx). Despite this, the Company actively arranges continuing education opportunities for the directors to assist them in effectively implementing sound corporate governance. The training is conducted in accordance with regulations and is consistent with the continuing education system for the Implementation of Continuing Education for Directors and Supervisors for TWSE and TPEx Listed Companies. In 2022, Taipower directors (including independent directors) participated in corporate governance-related courses for a total of 189 hours. This met the threshold proscribed in the aforementioned standards. The topics covered included ESG (Environment, Social, and Governance), finance, technology, regulations, management, forums, and seminars.

# Mechanism to Avoid Conflicts of Interest

According to Taipower's board meeting policy, for any proposals in which directors (including independent directors) or the juridical person they represent are an interested party, the director shall explain the critical content of their interest at the meeting. When their interest is likely to harm the interests of Taipower, directors shall not participate in the discussion and avoid voting on the proposal. They are also unable to act on behalf of another director. Prior to each board meeting, reminders of these conflict-of-interest recusal rules are stated in-meeting notifications.

# Remuneration Policy for Directors

Taipower is a state-owned enterprise, and hence, the standards for remuneration of its directors, including the Chairman, are set by the competent authorities (the Ministry of Economic Affairs) and reported to the Shareholders' Meeting in the absence of a Remuneration Committee. Apart from monthly compensation, independent directors may not collect earnings distributions, year-end bonuses, or other forms of compensation. As directors designated by the labor union fall under the category of Taipower employees, their compensation is determined in accordance with the Basic Principles of Employee Compensation Authorization for State-Owned Businesses and the Management Guidelines Governing Remuneration for Employees of Subordinate Units under the MOEA. They may not collect the same remuneration as other directors. In 2022, the remuneration for Taipower directors (including the Chairman, independent directors, and labor directors) constituted -0.00715% of the Company's net income after tax.

# 2.2 Risk Management and Response

## 2.2.1 Risk Management Mechanism

In response to external risks and opportunities in its business operations, Taipower constantly strives to effectively identify risk factors and develop rapid and effective response strategies. To strengthen risk management, the Risk Control Center was established, consisting of expert teams from the generation, nuclear, transmission, and distribution systems. The center monitors critical risks, enhances supervision and control based on risk levels, and works to prevent large-scale power outages from occurring. Furthermore, Taipower promotes energy transformation and decarbonization at the power source, power grid, and on the demand side. This includes increasing gas usage, reducing coal dependency, expanding green energy, and introducing zero-carbon fuels such as hydrogen and ammonia co-firing. Taipower also strengthens power grid engineering and establishes energy storage systems while implementing strategies such as demand response and energy conservation. The aim is to gradually achieve the goal of net-zero emissions in the power sector. Taipower will continue to implement risk control measures and enhance risk awareness among its personnel. It will employ a rolling process of risk identification, assessment, review, and response to mitigate potential risks and reduce operational risks.

### Risk Management Steering Committee

In Taipower's risk management structure, the Chairman acts as a supervisor, the President acts as a committee director and the Risk Management Commission operates as a task force. The Commission is composed of the CEOs from the four major divisions (Power Generation, Nuclear Power, Transmission System, and Distribution & Service) and their VPs and the Chief Engineers/Administrators from the four major systems (Strategic Administration, Financial Resources, Construction & Engineering, and Digital Development). The Chief Engineers/Administrators are also members of the commission. The Vice President in charge of the Department of Corporate Planning also serves as the executive secretary with a deputy executive secretary that assists with the relevant staff and administration of the Commission.

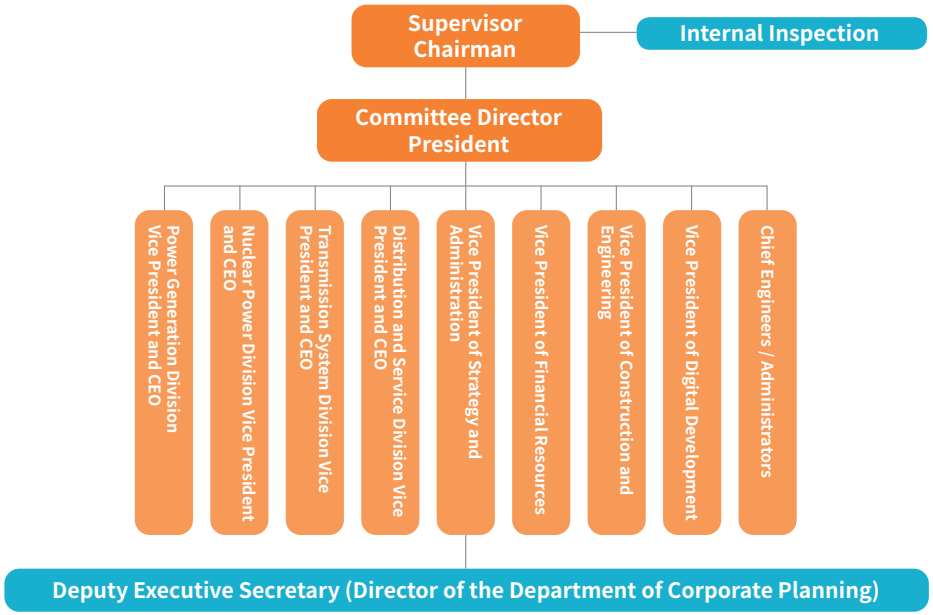
The Risk Management Commission has established a risk management implementation plan, including corporate level risks, unit level risks, an auditing mechanism, employee training, and other management mechanisms. The plan integrates the design and implementation of internal controls for each operation. The commission submits reports to the Board of Directors on the implementation of the project annually. The Board of Directors and the management department of Taipower have established a division of authority and responsibility between the Board of Directors and the management department, and other related regulations are implemented accordingly.

### Risk Management Policies

Taipower has established four risk management policies as guidelines for organizational risk management. They are as follows:

- ✓ Provide the necessary resources to establish, maintain and continually improve the effectiveness of the risk management system in order to reduce operational risks.
- ✓ Promote risk management organization and the implementation of risk assessment, risk management, risk monitoring and risk communication.
- ✓ Ensure that employees have the ability to perform risk management, create a supportive work environment, and shape a risk-managing culture.
- ✓ Strengthen communication between staff and stakeholders, raise staff awareness of risk management and thoroughly implement related policies.

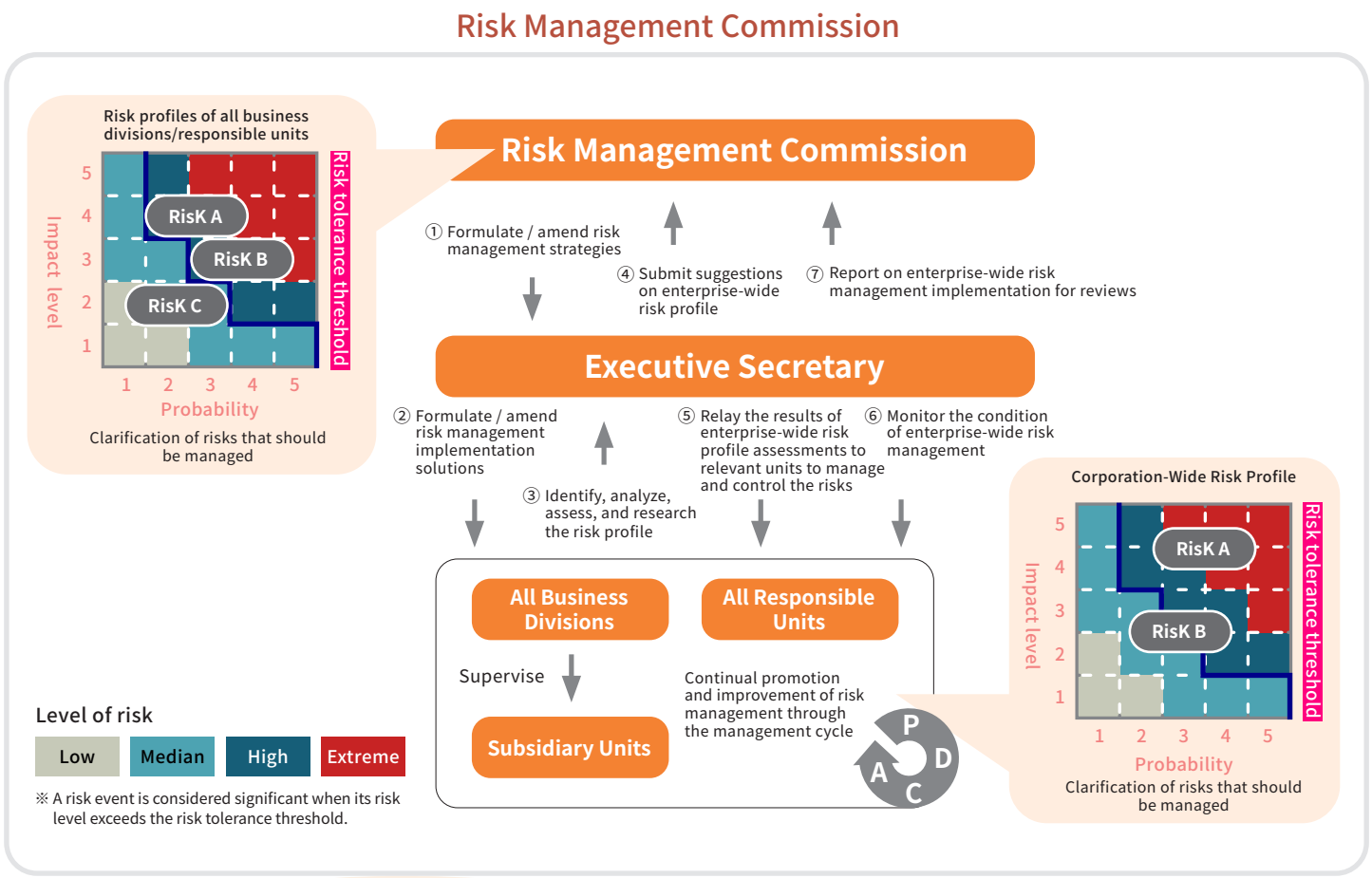
Taipower's Risk Management Organization Structure



# Risk Management Process

Taipower's risk management process begins with strategies established by the Risk Management Commission. Subsequently, the Department of Corporate Planning formulates corresponding risk management implementation solutions to be delivered to relevant first-tier units before they are analyzed and included in the Company's risk profiles. These risk profiles are then compiled by the Department of Corporate Planning into a company-wide risk profile to be submitted to the Risk Management Commission for review. After the review, the Risk Management Taskforce relays the results of the review back to all supervisory units for risk control.

The Department of Corporate Planning is also responsible for monitoring company-wide risk management status and reporting its implementation results periodically to the Risk Management Commission. Each year, the Department of Corporate Planning reports on risk handling and control results. These reports are reviewed by the Risk Management Commission. Risk management policies are reviewed and revised for the next year based on changes to internal and external environments.




# Risk Control Center

Taiwan experienced power outages on May 13 and May 17, 2021, and less than a year later, another major outage that affected 5.49 million households occurred on March 3, 2022. These incidents highlighted the inadequacy of current risk management and control measures. As a response, Taipower established the "Risk Control Center" with General Manager Wang Yao-Ting as the Chief Risk Officer. The center brings together experts from the power generation, nuclear energy, power supply, and distribution systems to form a risk management team. This team aims to identify critical risks from a broader perspective, identify potential risk factors that could affect cross-system operations, power generation, supply, and distribution. They will then implement risk mitigation measures based on risk levels and progressively strengthen the supervision and control of power supply operations to prevent the recurrence of large-scale power outages.

## Daily risk operation item inspections

The Risk Control Center conducts a daily inventory of risk operation items reported by various units for the upcoming one to three days. This is achieved through daily meetings for discussion and confirmation by the risk control team. Additionally, communication software without time or space limitations is utilized to ensure 24/7 comprehensive control, including nights and holidays, to ensure the safety and reliability of the power system. This means that in addition to the existing on-site unit control, risk operations are also simultaneously reported to Taipower's headquarters departments responsible for nuclear energy, power generation, power supply, distribution, as well as the Risk Control Center.

## Rigorous communication mechanisms across units and systems

The on-site units assess work tasks that are deemed to have a lower level of risk significance. Under the supervision of the Risk Control Center, if they identify hidden high-risk factors that are interconnected with cross-system or cross-unit risks, the risk significance level of the respective task is elevated. The Risk Control Center plays a pivotal role in coordinating various systems or units and rigorously examining process workflows. When necessary, adjustments to the operation schedule may be requested to mitigate hidden risks that could have lateral implications. For instance, when operating the 345kV ultra-high voltage power lines, the management and supervision levels are increased to prevent human errors. Additionally, a controlled operation mode, such as the implementation of gas-insulated switchgear, is introduced, along with more advanced measures. The Risk Control Center oversees the comprehensive operation and inspection processes, before, during, and after work procedures. With the current rigorous risk control system in place, incidents similar to the one at the Hsinta Power Plant can be prevented from happening again.

## Enhanced Training and Active Supervision

The Risk Control Center plans to implement regular and ad hoc dual audits. The regular audits include daily risk control meetings to review risk control forms and management actions. Monthly, there will be at least four on-site audits conducted by the Risk Control Center, and a large-scale joint audit will be conducted once every six months. Ad hoc audits are further divided into project-based and focus-based audits. Project-based audits target specific issues or units, such as at the Hsinta Power Plant after its major incident. Focus-based audits are conducted on specific topics or units as deemed necessary.

## Recognizing Exemplary Risk Management and Demonstrating Commitment to Stable Power Supply

The primary focus of the Risk Control Center in the first phase of this year will be on ensuring the grid security of the 345kV ultra-high voltage lines and the Science Parks. In the second phase, the scope will expand to include the 161kV, 69kV lines, and the risk management status within the internal transformer departments of the regional divisions. Furthermore, in response to business needs, Taipower's Generation, Power Supply, and Distribution divisions are expected to establish new risk control departments. Consequently, each division will strengthen its supervisory and auditing efforts towards risk management practices in various plants and departments.

# 2.2.2 Risk Assessment and Identification

In conducting risk identification and analysis, Taipower will take the following factors into consideration:

1.Issues that pertain to Taipower's stakeholders

2.Material topics that affect the Company's operations or safety

3.New policies or changes due to major incidents

4.Incidents tracked by the supervising agency or affairs that the competent authorities have deemed to warrant specific attention

## Risk Incidents and Countermeasures

Taipower uses its risk assessment mechanism to monitor potential risks. When an incident is classified as extremely high risk, it will be listed as a top priority. Incidents classified as high-risk are the second priority and may require specific plans so that necessary resources are provided to ensure they are fixed. Risks at the medium level are simply monitored continually by the relevant departments. Low-level risk indicators are handled in accordance with the Company's general procedures.

In 2022, Taipower identified 13 risk events. Each risk event has its own risk scenario and corresponding control measures planned in advance. The effectiveness of control measures and their risk changes are reviewed on a continuous basis to improve the effectiveness of prevention beforehand and response afterward. Through this systematic risk management, Taipower is able to analyze risks and sustainability issues, strengthen risk awareness, master opportunities, and move toward its vision of sustainability.

| Risk Category | Risk Identified |
|---|---|
| Power Supply Operation Risks | • Critical power infrastructure security and resilience compromised<br>• Short-term imbalance between supply and demand<br>• Medium and long-term major power generation projects behind schedule<br>• Medium and long-term major transmission and substation projects behind schedule |
| Environment and Climate Change Risks | • Impact of environmental pollution<br>• Lower-than-expected carbon emission reductio |
| Legal Compliance and Issue Risks | • Severe safety and health accidents<br>• Negative news expansion<br>• Violation of major regulation<br>• Outbreaks of labor-management disputes and employee protests |
| Strategic and Financial Risks | • Accrual of losses resulting in greater impacts to the Company's operations<br>• Insufficient cultivation of core technology<br>• Failure of protection in the information system |

## Processes to Remediate Negative Impacts

In order to enable stakeholders to raise concerns and seek remedies for potential and actual negative impacts caused by Taipower, including those related to human rights, Taipower has established an effective, accessible, fair, and transparent complaint mechanism. Stakeholders can submit complaints through multiple channels, including the user feedback mailbox on the official website, the 24/7 customer service hotline at 1911, and the Taipower APP.

To assist employees in solving difficulties that cannot be resolved by other administrative systems, Taipower has set up a Personnel Difficulties and Matters of Grievance Processing Committee and formulated Guidelines for Processing Matters of Grievances Concerning Working Personnel. Please refer to section 7.2.2 Labor-Management Communication and Collective Bargaining for further information.

Taipower has committed to putting an end to sexual harassment. To create an environment that is safe from sexual harassment for all Taipower employees and visitors, Taipower formulated Guidelines for Measures of Prevention, Complaint, Investigation, and Punishment of Sexual Harassment. In addition to continuing to disseminate information on sexual harassment and its prevention to all units, Taipower has set up a grievance channel. The dedicated Sexual Harassment Complaint Review Commission (hereinafter referred to as the Review Commission) is responsible for handling sexual harassment complaints. The structure, procedures, and grievance channel for the Commission are as follows:

### Employee Grievance Channel

| Grievances Handling Commission | Commission Structure | Procedures |
|---|---|---|
| Personnel Difficulties and Matters of Grievance Processing Committee | • The Vice President in charge of human resources serves as the Chairman of the Commission, while the head of relevant headquarters units and the Power Labor Union appoint equivalent representatives as committee members. Each unit's taskforce shall be convened by the unit supervisor, and its members shall consist of three to six relevant department heads from the unit. The corresponding labor union branch of the unit will appoint an equivalent number of employee representatives as members. | • Employees may file a complaint with their unit's processing taskforce. Upon receipt of a case, each processing taskforce shall first investigate the facts and promptly communicate with the parties concerned to resolve the matter. If the taskforce is unable to resolve the problem or the party concerned does not accept the results, the case shall be referred to the Grievances Handling Commission.<br>• A case processed by the handling committee shall not be filed again within two years. |
| Sexual Harassment Complaint Review Commission | • The Review Commission consists of eleven members. The President shall appoint the Vice President in charge of human resources to serve as the Chairman of the Commission.<br>• The remaining ten members shall be employed or appointed concurrently from the Company's first-level executives, social justice figures, representatives of non-governmental organizations, experts and scholars, and the female members shall be no less than one-half. | • After a complainant or his/her representative files a complaint to the Company's Review Commission, the complaint will be sent to the member on duty that month for immediate confirmation of acceptance within three days. Within three days of the acceptance, the Chairman of the Commission shall designate a special task force to conduct an investigation.<br>• Upon completion of the investigation, an investigation report will be submitted to the Review Commission for deliberation. The investigation shall be completed and a resolution shall be made within two months (with a one-month extension as necessary) from the day following acceptance. Both parties shall be notified. |
| Taipower Sexual Harassment Grievance Channel | | |
| The Company is subject to sexual harassment complaints through the following contact channels:<br>Grievance hotline: (02) 2366-7730<br>Grievance e-mail: a960601@taipower.com.tw | | |

# 2.3 Climate Change Management

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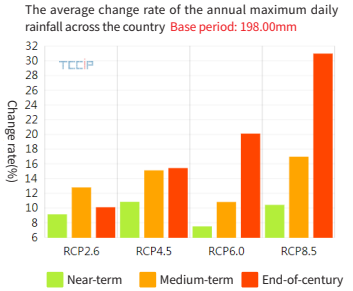
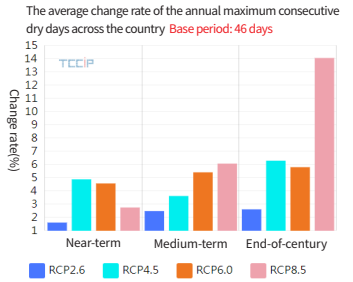
Taipower follows the framework of the Task Force on Climate-related Financial Disclosures (TCFD) when gradually incorporating climate change risks into its climate change management. It discloses information regarding climate risks and opportunities in line with its principles.

## Governance

As a provider of electricity in Taiwan, Taipower's Board of Directors recognizes that addressing medium- to long-term climate change is a significant management challenge. Predicting future climate change and accurately assessing the potential social changes and their impacts on Taipower's business environment is highly challenging. However, despite the high level of uncertainty, Taipower strives to avoid or mitigate future losses through highly accurate risk assessment and analysis. Through this process, Taipower aims to identify new business opportunities and achieve sustainable operations that align with society's expectations.

Taipower upholds operational transparency and believes that a sound and efficient board of directors provides a solid foundation for corporate governance. In driving climate change and sustainability management strategies, the board also plays supervisory and guiding roles, authorized the establishment of the Sustainable Development Committee to assist in overseeing corporate sustainability and climate change-related practices and regularly reporting its activities and resolutions to the board.

# Climate-related risks and opportunities

| | Risk / Opportunity Description | Potential Financial Impact | Potential Timing of Occurrence |
|---|---|---|---|
| **Physical Risk** - Acute | Climate change-induced catastrophic weather risks, such as destructive typhoons and floods, may lead to damages at power generation and electricity transmission/distribution facilities, resulting in supply interruptions including blackouts and increased costs. For example, in 2022, Typhoon Surigae caused power outages for over 7,000 households in Yilan.<br>**Climate risk analysis**<br>Taipower utilized the Representative Concentration Pathways (RCPs) proposed by the Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report (AR5), including the RCP2.6, RCP4.5, RCP6.0, and RCP8.5 scenarios. Using publicly available data from the Taiwan Climate Change Projection and Information Platform (TCCIP), Taipower analyzed the "average change rate of annual maximum daily rainfall" (as shown in the figure below) to identify potential near term (-2035), medium-term (2046-2065), and end of century (2080-2100) scenarios. Compared to the reference period (1986-2005), Taiwan, in the worst-case scenario (RCP8.5), may experience an increase of 35.34 millimeters (mm) in the maximum daily rainfall, potentially reaching 221.34 mm. This increase raises the chances of "short-duration heavy rainfall" situations that pose the risk of inundation of existing urban drainage systems, power plants, and power grids.<br>  | Increased operating costs and capital expenditure | Short term |
| | Climate change leads to an increased frequency of drought, which can result in the shutdown of hydroelectric power facilities. For example, in 2021, the Techi Dam power plant, which relies on water from the Dajia River for hydropower generation, had to suspend operations for the first time due to low water levels caused by drought.<br>**Climate Risk Analysis**<br>Taipower utilized scenarios proposed by the Intergovernmental Panel on Climate Change (IPCC) in their Fifth Assessment Report (AR5), including RCP2.6, RCP4.5, RCP6.0, and RCP8.5. By leveraging the information and adaptation knowledge available in the Taiwan Climate Change Projection Information and Adaptation Platform (TCCIP) from publicly accessible data, an analysis of the "average change rate of annual maximum consecutive dry days" across Taiwan was conducted for the near-term (-2035), medium-term (2046-2065), and end-of-century (2080-2100) periods under different scenarios (see figure below).<br>Compared to the baseline period (1986-2005), Taiwan faces an increase in the maximum number of consecutive dry days in the worst-case scenario (RCP8.5). The number of such days is projected to increase by 14%, from 46 days to 52 days. This increase poses operational challenges for 12 hydroelectric power plants across Taiwan, leading to a significant reduction in hydroelectric power generation capacity.<br>  | Increased operating costs and capital expenditure | Short term |
| **Transition Risk** - Policy and Legal | Taiwan officially enacted the Climate Change Adaptation Act in 2023, which includes the target of achieving net-zero emissions by 2050. In response to this law, adjustments to the energy structure are expected to align with the requirements of the Climate Change Adaptation Act. | Increased operating costs | Short to medium-term<br>Medium to long-term |
| **Transition Risk** – Technology | Energy transition will render traditional technologies or assets obsolete. To align with Taiwan's net-zero transition plan and implement the "Increase Gas, Reduce Coal" policy, Taipower aims to increase the use of natural gas while decreasing coal consumption. Additionally, Taipower plans to expand the capacity of renewable energy installations, prioritizing mature technologies such as wind power and solar power. In the long term, Taipower aims to maximize renewable energy generation, with an eventual target of 60% of power generation. This will be achieved through the integration of gas-fired units with carbon capture, utilization, and storage (CCUS) technologies, as well as the introduction of hydrogen-based power generation to establish a carbon-free electricity system. | Increased operating costs | Medium to long-term |
| **Transition Risk** – Reputation | As the challenges related to climate change intensify, there is an increased risk of accidents, delayed responses to natural disasters, changes in taxation, and other practices, all of which contribute to rising operational costs. | Decreased revenue | Medium to long-term |
| **Opportunity** – Resource Efficiency | The feasibility study of the gas combined cycle power plants planned for an increase in net efficiency from 60.7% in 2019 to 62.5% in 2022 (Note: Net efficiency of the power plants is based on the site conditions, LHV). | Decreased operating costs | Short to medium-term |
| **Opportunity** – Energy Source | Since the Paris Agreement, there has been a growing global demand for carbon capture and storage technologies, presenting potential new revenue sources for Taipower. Internationally, emerging carbon-free power generation technologies are being developed, such as the use of hydrogen or ammonia as alternatives to fossil fuels, or implementing carbon capture, utilization, and storage (CCUS) to capture, store, and reuse $CO_2$ emitted from power generation processes. Taipower is actively planning to demonstrate and eventually adopt Hydrogen (Gas-fired power plants) and Ammonia Blending (Coal-fired power plants) as well as Carbon Capture, Utilization, and Storage (CCUS) technologies. Taipower is also collaborating with international technology-leading companies to drive these initiatives forward. In order to achieve net-zero carbon emissions by 2050, Taipower is planning a pilot demonstration project for carbon capture at the Taichung Power Plant, which involves the installation of carbon capture equipment. | Increased revenue and decreased operating costs | Medium to long-term |

# Moving towards Net Zero Emissions

Taipower's main sources of greenhouse gas emissions include the power generation process, coal yards, fuel-consuming equipment such as vehicles and engines, insulating gases used in electrical switches, and refrigerants used in air conditioning systems. To monitor the Company's greenhouse gas emissions, Taipower conducts annual greenhouse gas inventories and internal verification supervision. In addition, third-party verification organizations are commissioned to conduct external verification of greenhouse gas emissions from thermal power generation. In 2022, Taipower's Scope 1 greenhouse gas emissions were approximately 98.48 million tons.

Since 2015, Taipower has been implementing energy management system installations in power plants. This initiative has successfully assisted units such as Datan, Hsinta, Nanbu, Dajia River, and Takuan Power Plants in obtaining new version certification. The energy management system installations have been completed in the Nanbu, Dajia River and Takuan Power Plants. In 2020, Taipower also assisted in the implementation of energy management system in Linkou and Talin Power Plants, and in September and December 2021, external verifications were conducted and certifications were obtained.

Taipower has completed the greenhouse gas inventory and calculation guidelines in accordance with the regulations of the Environmental Protection Administration. The following emission quantities are derived from the greenhouse gas inventories conducted by various units of Taipower, following the aforementioned guidelines.

## Greenhouse Gas Emissions from 2020 to 2022

| | $CO_2$ | $CH_4$ | $N_2O$ | $SF_6$ | HFC | PFCs | $NF_3$ |
|---|---|---|---|---|---|---|---|
| 2020 | 9,266 | 23 | 30 | 13 | 2 | 0 | 0 |
| 2021 | 9,808 | 26 | 32 | 8 | 3 | 0 | 0 |
| 2022 | 9,772 | 25 | 31 | 12 | 3 | 0 | 0 |

Unit: 10,000 tons of $CO_2e$

## Emissions of Thermal Power Units from 2020 to 2022

| | 2020 | 2021 | 2022 |
|---|---|---|---|
| Emissions of coal-fired units | 5,934 | 6,253 | 6,156 |
| Emissions of oil-fired units | 244 | 316 | 279 |
| Emissions of gas-fired units | 3,089 | 3,244 | 3,347 |

Unit: 10,000 tons of $CO_2e$

Taipower actively supports the government's goal of achieving net-zero emissions by 2050. In the short term, the Company is focused on expanding renewable energy, reducing coal usage, and strengthening the power system. Over the long term, Taipower aims to transition to carbon-free technologies such as hydrogen and ammonia power, carbon capture and storage (CCS), geothermal energy, and marine energy. Taipower also plans to adopt new technologies like long-term energy storage and high-voltage direct current (HVDC) transmission to accommodate intermittent renewable energy.

To achieve net-zero emissions, Taipower has developed strategies from three approaches: the supply side, the demand side, and the grid side.

**1. The Supply Side:** To achieve net-zero emissions in power generation, Taipower is actively exploring emerging carbon-free technologies. These include the development of new technologies that use hydrogen or ammonia as alternative fuels for power generation, as well as the implementation of carbon capture, utilization, and storage (CCUS) technologies to capture and store $CO_2$ emissions from the power generation process. Taipower is planning demonstration projects for hydrogen (gas-fired units) and ammonia co-firing (coal-fired units) and CCUS, and is collaborating with international technology leaders to drive these initiatives. Taipower is proactively preparing for future technologies by aligning with global trends. In 2025, Taipower plans to establish a carbon reduction technology park at the Taichung Power Plant for testing purposes, with a carbon capture capacity of 2,000 tons per year. The park will also feature a plant factory and an exhibition center to communicate carbon reduction technology information and showcase the Company's achievements in carbon reduction to the public.

Taipower's short to medium-term strategies for power generation align with the government's energy transition goals. In the long term, Taipower will focus on developing advanced carbon-free technologies as outlined below:

## Promoting Green Energy

To achieve the goal of promoting green energy, Taipower aggressively promotes renewable energy and sets up both offshore and land-based wind power, solar photovoltaic, geothermal, and small and micro hydropower facilities. In addition to its own development projects, Taipower continues to strengthen its construction of the grid to create a friendly grid-connection environment that encourages the private sector to join in the development of renewables, Taipower is cooperating with the private sector to push forward renewables, and contribute to the country's low-carbon energy structure.

Recent achievements and future plans are as follows:

- In 2020, Taipower completed a 150MW salt field solar power plant in Tainan. In 2021, a demonstration wind farm project was completed with an installed capacity of 109.2MW. The 0.84MW geothermal power plant in Renze, Yilan is expected to be connected to the grid in 2023. There are also plans for future offshore power generation testing at Green Island.
- By 2025, Taipower plans to invest in 9 stations and 10 lines of power grid infrastructure to accommodate solar power integration, providing a grid capacity of 6.5GW. By 2030, in support of offshore wind power development, Taipower plans to invest in 7 stations and 7 lines of power grid infrastructure, providing a grid capacity of 11GW.

## Increasing Natural Gas

Taipower is striving to transform its power generation structure from the "primarily coal with gas as support" model of the past to a "primarily gas with coal as support" model. The Company is actively renewing and expanding power plants by adding new gas-fired units that have lower carbon emissions and are cleaner than coal-fired units, and pursuing the construction of additional high-efficiency gas-fired combined cycle units, so that the generation system can progress towards lower carbon emissions. To ensure a stable supply of natural gas, Taipower, in conjunction with CPC, has pursued the construction of a third gas receiving terminal. It is hoped this will aid in the unloading and storage of natural gas, stabilize the regional power supply capability, reduce air pollution, and improve energy supply security and the overall power supply economy.

## Reducing Coal Use

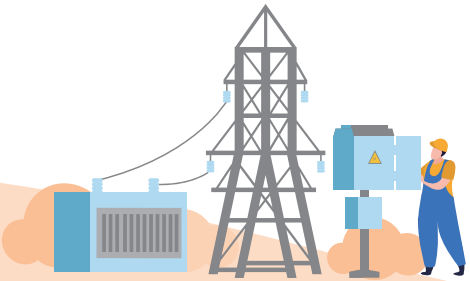
Considering the impact of coal-fired generation on air pollution and greenhouse gas (GHG) emissions, Taipower plans to conduct a feasibility assessment on the renewal or retirement of environmental protection equipment in existing coal-fired power plants provided a stable power supply can be ensured. At the same time, eco-friendly coal is being adopted to effectively control the air pollution and carbon emissions in the generation process, so that coal-fired units can continue to serve as vital backups.

**2. The Grid Side：** In addition to developing grid connections through existing systems to permit the extensive future addition of renewables, Taipower has initiated Phase 1 of its Offshore Wind Power Grid Strengthening Project. The project will undertake grid reinforcement to accommodate potential offshore wind power projects. Additionally, solar power and an inventory of potential land sites are reviewed on a continuous basis by the Bureau of Energy at the Ministry of Economic Affairs. These grid reinforcement projects utilize a case activation and adjustment approach. Given the gradual and proportional increase in renewable generation, Taipower is actively promoting smart grids as a critical component of a stable power supply. The overall schedule is divided into three stages. The first stage consists of the ongoing deployment of infrastructure. The second stage entails practical operations, where promotion and expansion are the primary tasks. The last stage is to effectively integrate and achieve wide application. According to the policy of national net zero-emissions by 2050, the proportion of renewable energy will reach 60-70% in 2050. In response to the corresponding increase in green power equipment, Taipower's very long-term (post 2030) plan will evaluate and introduce long-term energy storage and build new pumped-storage variable frequency hydro units to maintain a stable power supply. The Company will introduce hydrogen production technology for hydrogen energy storage, produce green hydrogen from surplus renewable power, and provide raw materials required by domestic industrial and transportation sectors, while maintaining the stability of the system. In terms of energy storage, Taipower plans to achieve stability in the energy storage battery system by 2025 with a target capacity of 1,000MW (160MW self-built, 840MW procured). This will help the system to mitigate the effects of the intermittent characteristics of renewables. In the event of an outage, this will allow the system to withstand the tripping of a large unit without triggering a low-frequency relay action that trips off the user load. Recent achievements include the completion of the Donglin Pumped Storage System project (10MW) and the Luyuan Dam Pumped Storage System project (20MW). Taipower will continue to promote the Longtan Energy Storage System project (60MW). In terms of solar energy storage, Taipower has already commissioned the Tainan Salt Field Solar Energy Storage System (15MW), and in the coming years, the Changbin Solar Power Station Energy Storage System project (5MW) will be completed.

**3. The Demand Side：** Demand-side management typically entails demand response and energy conservation. Demand response can, in turn, be divided into two categories depending on the economic incentives: price-based or incentive-based. Price-based responses, such as seasonal electricity prices and time-of-use rates or providing time-zone differentiated rates, allow users to decide to reduce power consumption in specific periods according to price signals. In contrast, incentive-based responses, such as planned, temporary and demand-based bidding measures, provide tariff deduction incentives and agreed load shifting during periods of tight power supply or high cost. Taipower has actively implemented demand response through five mechanisms. These include holding large user forums and power-saving activities, screening target users, producing publicity materials, strengthening cooperation with government units, and cooperating with industrial and commercial conferences for publicity.

In the domain of energy conservation, Taipower has pursued energy-saving advocacy and promoted various activities in line with the government's policy. Measures include:

- Planning new power-saving measures: asking users to save electricity during specific hours through the Home Energy Saving Program with smart meters
- Advocating through multiple channels: continuously expanding the organization of various power conservation advocacy meetings, media exposures, and creative power conservation competitions, etc.
- Promoting energy-saving consumption diagnosis: providing users with power-saving recommendations
- Providing smart digital services: e-billing and the Taiwan Power APP
- Coordinating with government policies: the County-City Collaborative Electricity Saving Initiative for Residential and Commercial Users discloses information about residential, commercial, and industrial electricity consumption in each county and city on the website, and continues to optimize the data



# 2.4 Integrity and Compliance

## 2.4.1 Integrity and Compliance

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### Ethical Code

**All Personnel**

All Taipower employees shall abide by laws and regulations such as the Code of Ethics for Personnel under the Ministry of Economic Affairs and the Directions on Lobby Registration and Checks for the Executive Yuan and its Subordinate Agencies. Any employee who requires clarification on any ethical issue or has legal compliance-related questions may consult specialists from Taipower's Department of Civil Service Ethics, with full protection of their rights and interests.

**Procurement Personnel**

Taipower's procurements shall abide by the Company's Ethical Guidelines for Procurement Personnel, and the Points of Attention for Interaction between Procurement Personnel and other Businesses. The Company offers frequent training for its procurement personnel to help them perform their duties fairly, honestly and in compliance with pertinent laws without giving, asking, or expecting favors. Taipower has also established an Anti-Corruption and Legal Affairs Office to offer consultation services. The Company emphasizes fair and open procurement processes in order to improve procurement efficiency, performance, and quality.

**Management**

Taipower seeks to ensure that reviews for individuals with administrative liabilities or suspected in fraud or bribery cases are dealt with in a timely, effective and fair manner. As such, the Company reviews the administrative liabilities of both individuals involved in fraud/bribery and their managing supervisors to ensure the implementation of Taipower's integrity management.

### Anti-Corruption Measures

As a state-owned enterprise, Taipower executes specific policies and measures from the Executive Yuan's National Integrity Building Action Plan. The Company has implemented the Ministry of Economic Affair's Guidelines for the Implementation of the National Integrity Building Action Plan in its planning and promotes various ethics-related tasks. Taipower has also integrated these measures within the private sector, as the Company employs the highest integrity standards for itself and in its external interactions.

Every year, Taipower sets up a plan for supervising the integrity of its business administration. Part of this plan seeks to implement Management by Wandering Around (MBWA). Through on-site visits, case file investigations, and comprehensive seminars, Taipower is able to ensure the understanding and implementation of civil service ethics within each unit. The aforementioned tasks are conducted in order to improve work deficiencies, enhance work performance, and demonstrate the function of civil service ethics within the organization. In 2022, a total of 59 units were inspected through on-site and phone interviews. The civil service ethics units have effectively implemented tasks related to civil service ethics.

Additionally, Taipower holds an Ethics Conference once a year. Attendees are responsible for planning an Integrity Work Plan, as well as performing consultations, supervision, and evaluations of the subsequent implementation of the ethical operations. For details on the conference, please refer to the Ethics Conference section of Taipower's official website.

Taipower launched a Business Risk and Integrity Investigation Authority Communication Platform in 2019. The platform seeks to reduce integrity risks and eliminate inappropriate interference. The Company has also organized regular meetings and visits, invited prosecutors to give speeches, and held business transparency seminars to ensure smoother business operations for Taipower. In 2022, a total of 69 Taipower units visited local prosecutors or chief prosecutors in their districts. Taipower invited prosecutors to give 23 lectures to promote business transparency. The Company will continue to pursue good relations with judicial authorities and to promote business transparency.

Regarding interactions between procurement personnel and suppliers, Taipower makes reference to the Ethical Code for Personnel under the Ministry of Economic Affairs and has promulgated a set of Precautions on Interactions between Taipower Procurement Personnel and Other Businesses. The precautions not only provide specific guidelines for interactions between procurement personnel and suppliers, but also safeguard the professionalism, integrity and reputations of procurement personnel. The Company continues to strengthen employee integrity education and training and to promote avoidance of conflicts of interest in accordance with the Implementation Plan for the Enhanced Dissemination of Civil Service Ethics at Taipower.

Taipower has established two procurement integrity platforms: the "2022 High-Calorific Value Coal Spot Purchase" and the "Offshore Wind Power Second Phase Project - Wind Farm Material Procurement with Installation." These platforms facilitate cross-sector communication and collaboration between Taipower, the Northern and Central Prosecutors' Offices, anti-corruption agencies, investigation units, and relevant vendors from both public and private sectors. Additionally, Taipower has set up a dedicated section called the "Procurement Integrity Platform" located on the Business Announcements/Information Disclosure section of its website. Through this platform, Taipower proactively provides relevant information on procurement cases for external scrutiny and oversight, aiming to enhance the planning and execution of procurement projects.

Procurement Integrity Platform

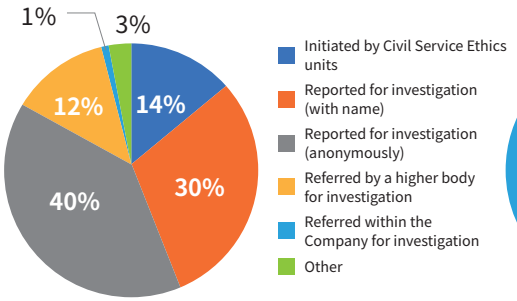
## Promotion of Anti-Corruption Campaigns

Taipower actively conducts anti-corruption advocacy for employees and suppliers, enhances understanding of the ethics and laws among relevant personnel, and consolidates an anti-corruption consensus between Taipower and its suppliers to prevent corruption. The training sessions held in 2022 included the publication of a monthly integrity e-newsletter, employee integrity project promotion, online training courses, and integrity seminars.

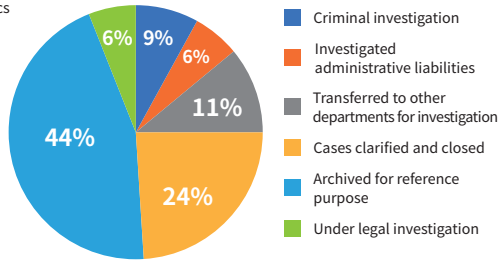
## Cases Investigated in 2022

There were 492 ethical investigation cases closed in 2022. They were categorized according to the source of the cases, as shown in the figure below. Among them, the ratio of "anonymously reported" cases is still high at 40%. Nevertheless, as long as the content of reports is specific and has verifiable information, Taipower conducts proper investigations.

Sources of Corporate Ethics Cases in 2022




Handling of Corporate Ethics Cases in 2022




### Cases in Which Employees Are Charged with Regulatory Violations

In 2022, Taipower had one employee who was prosecuted for violating the Anti-Corruption Act. The case involved suspicions of accepting bribes related to the formulation of procurement regulations for a vendor. In response to the above incident, Taipower reiterated its anti-corruption position and approach. In accordance with its anti-corruption policy, Taipower will reinforce integrity education and training and anti-corruption related advocacy for its employees and vendors to prevent the recurrence of similar incidents.

### Cases in Which Employees Are Sentenced for Violating the Anti-Corruption Act

In 2022, Taipower had one case where an employee failed to comply with procurement regulations. The employee colluded with a vendor to falsely report payment items for computer purchases and to misappropriate funds. This action constituted a violation of the Anti-Corruption Act, specifically the offense of embezzlement by a public servant taking advantage of their position. The court rendered a final judgment in this case, sentencing the employee to 2 years of imprisonment with a 5-year probation period.

## Internal Risk Control

The internal control system is designed and implemented by the management department. The first and second lines of defense are reviewed, adjusted, and improved on a continuous basis according to risk identification and self-assessment results. To further confirm the effectiveness of the internal control system, the internal control of a third line of defense is carried out. In accordance with the Financial Supervisory Commission's Regulations Governing the Establishment of Internal Control Systems by Public Companies and the Enforcement Rules for Internal Inspection of National Corporations under the Ministry of Economic Affairs, Taipower's Internal Inspection Office of the Board of Directors devised and executed an Annual Inspection Plan in 2022.

In 2022, patrol inspections took place at 66 units. There were also an additional 18 special project inspections. The Company then completed an annual internal control system self-assessment report. The scope of the assessments included all of Taipower's operating units, allowing the Board of Directors and the President to assess the effectiveness of the Company's overall internal controls. The report also served as the primary basis for the Company's 2022 Annual Internal Control System Statements. Future improvements in internal auditing are proposed as follows:

### (I) Assist in implementing internal control audits and the control of high-risk matters

1. Assist the Business Division in promoting internal control audits, verify the risk issues identified by the Business Division or the issues presented by the CEO. Hold an annual internal control audit review meeting to share and exchange information.
2. Strengthen the inspection and tracking of high-risk internal control issues by using patrol inspections, project inspections, and the internal control information platform. Assist the management department in implementing internal control of high-risk issues.

### (II) Examine immediate responses to risks, reinforce prevention management, and enhance the value of inspections

1. Conduct project inspections based on Taipower's preventive mechanisms for power outage incidents, continuously monitor the progress of relevant units, strengthen control measures for high-risk internal control issues, and conduct in-depth investigations based on significant corrective actions from higher authorities such as the Audit Department and Control Yuan, to assess the improvements made by each unit.
2. Align with Taipower's 2023 annual goals of "stable power supply," "grid resilience," "financial sustainability," and "net-zero emissions," develop inspection directions and focus areas to assist units in preventive management and enhance operational efficiency.

# 2.4.2 Compliance

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Taipower is a state-owned public utility and its operations are governed by the Company Act, the Securities and Exchange Act, and other general laws and regulations, in addition to the Administrative Law for State-Owned Enterprises and the Electricity Act. Consequently, Taipower's organization, accounting, auditing, budgeting, business planning, utility rates, and development and management of electricity resources must be approved by the Ministry of Economic Affairs. Specifically, the Ministry's State-owned Enterprise Commission is responsible for supervising and managing the various operations at Taipower. The Bureau of Energy is the regulatory authority for the electricity industry, and is responsible for communicating and transmitting relevant instructions to other ministries, such as the National Development Council, or the National Audit Office. The implementation of corporate policies must comprehensively account for the provisions of various laws and regulations and their impacts on policy development.

## Legal Compliance and Awareness Campaigns

In an effort to boost employee awareness of the Company's legal affairs and to ensure compliance, the Legal Affairs Office organizes multiple sessions of its "Practical Legal Issues – Case Studies and Solutions Seminar" at different units along with other training events each year. The office also provides legal consultation services to help units address and resolve legal issues in their operations and to ensure that all employees abide by the pertinent regulations.

## Administrative Sanctions for Labor Issues

In 2022, there were three labor penalty cases that fall within the scope of this report (the cases were directly connected to Taipower rather than related legal entities). All three cases were associated with violations of the Labor Standards Act. Key points are as follows:

(1) Taipower was fined NT$50,000 for failing to include the "full attendance bonus" in the calculation base for hourly wages, resulting in inadequate payment for overtime hours. This case mainly arose due to the difference in wage categorization between Taipower and the labor authorities. The salary and benefits provided to Taipower employees are governed by the Administrative Law of State-Owned Enterprise and relevant regulations from superior supervisory authorities, implementing a unified salary system. The categorization of wages is not within the Company's authority and is determined by the authorities. The aforementioned cases have all been appealed through the statutory remedial procedures and are currently under administrative litigation. A review has been conducted on the previous penalties, and response strategies have been proposed, reiterating the Company's stance and practices.

(2) Taipower was fined NT$50,000 for failing to notify the labor union within the statutory 24 hours when employees' working hours exceeded 12 hours due to an unforeseen incident. Additionally, a fine of NT$20,000 was imposed for not providing compensatory leave to employees within 7 days after suspending their rest days due to an unforeseen event. Furthermore, the Company was fined NT$50,000 for failing to pay overtime wages for working on a "compensatory workday." In the future, the unit will enhance its promotion and awareness of relevant labor laws and regulations to prevent similar incidents from occurring again.

## Administrative Sanctions for Industrial Safety

Taipower received 21 penalties for industrial safety in 2022 and the types of cases are as follows:

- Failure to implement work communication and adjustments
- Failure to inspect the workplace
- Failure to use insulated protective equipment, protective devices, and facilities
- Failure to inform labor about the working environment or hazardous factors in advance
- Failure to set up necessary safety and health equipment and measures

In response to the aforementioned violations, Taipower has planned training (re-education) sessions and strengthened pre-job training for employees in accordance with the Guidelines for Enforcement of Violations of Safety and Health Regulations by Contractors of Taiwan Power Company. When the same types of failures or violations of the Terms and Conditions of Safety and Security of the Ministry of Economic Affairs occurs, the Company rigorously imposes additional fines. In addition, based on the result of big data analyses, units with more violations or serious cases will be selected for enhanced inspection and listed as targets of enhanced inspection for the year.

In the future, Taipower will continue to participate in the Ministry of Labor's Inter-ministerial Platform Conference on Disaster Reduction at State-owned Public Enterprises and in the Ministry of Economic Affairs' Disaster Reduction Working Group. Taipower will continue to participate in quarterly conferences to discuss and review matters related to industrial safety and disaster reduction and will promote the implementation of occupational safety and health in its business.

## Administrative Sanctions on Environmental Protection Issues

In 2022, a total of NT$330,000 in environmental fines was imposed on Taipower. The number of penalties (excluding policy penalties) was a decrease from the previous year. The case with the highest environmental penalty amount in 2022 involved an electrostatic precipitator (EP) malfunction at Unit 3 of Taichung Power Plant. During the EP malfunction, the opacity level of the Continuous Emission Monitoring System (CEMS) exceeded the emission standards, violating Article 20, Paragraphs 1 and 2 of the Air Pollution Control Act. The Company was fined NT$600,000. At the time of the EP malfunction, the Taichung Power Plant's ongoing operation was essential to maintaining a stable power supply and Unit 3 could not immediately be shut down. Consequently, the plant submitted a written report to the Taichung City Environmental Protection Bureau within the required timeframe, thus meeting the criteria for an exemption from penalties under Article 89 of the Air Pollution Control Act. Despite this, the Taichung City Environmental Protection Bureau insisted on imposing the penalty. The case was subsequently reviewed and settled on March 25, 2022, and it was determined that the violation was not attributable to factors directly within the control of the power plant but rather to policy factors.

Environmental penalties are particularly prone to negative evaluation by the general public and seriously affect the Company's image and operations. Therefore, the following proactive actions for environmental protection will be taken to effectively prevent environmental penalties and maintain the Company's image:

- Implementation of an environmental management system and follow-ups on items that did not meet requirements
- Inspections of environmental protection for on-site operations without prior notice
- Annual discussions on environmental protection violations
- Construction of indoor coal bunkers and the improvement of wastewater treatment plants
- Promotion of the setting of prices for individual environmental protection facilities and implementation requests

The Company's thermal power plants and engineering units are committed to continuing to improve the operational processes that have failed to meet environmental regulations. Unit supervisors and deputy supervisors have also been asked to strengthen on-site environmental protection management by wandering around and verifying compliance with environmental protection regulations.

| | Number of Sanctions | Penalties Amounts (Thousand NTD) |
|---|---|---|
| 2020 | 6 | 680.5 |
| 2021 | 7 | 5,384.5 |
| 2022 | 3 | 330 |

Note: The number of penalties in the table has excluded policy-related penalties. The statistics for the past three years are as follows:
In 2020, there were seven policy-related fines and the amount of fines was NT$5,761 thousand.
In 2021, there were three policy-related fines and the amount of fines was NT$650 thousand.
In 2022, there was one policy-related fine and the amount of the fine was NT$600 thousand.

# 2.5 Strengthening Supplier Management

As a state-owned enterprise, Taipower manages all types of suppliers in accordance with the requirements of laws and regulations. Suppliers must satisfy all environmental, social, and other legal requirements for all services and materials they provide. The Company uses these regulatory criteria to select appropriate partners during its tendering and evaluation processes.

## 2.5.1 Supplier Management

2-6

Taipower's suppliers include providers of fuel, materials, and equipment necessary for power generation and as well as suppliers of external electric power. The Company monitors the potential risks associated with suppliers with different characteristics and manages their quality, output, and impact on the environment and society. Management of different types of suppliers is described as follows:

### Fuel Supplier Management

The main fuels used in Taipower's thermal power plants are natural gas, coal, and fuel oil. Nuclear power plants also require nuclear fuel. Taipower adheres to the four strategies of energy supply diversification, long-term supply contracts, safe inventories, and stable coal transportation to ensure stable fuel supplies. The Company provides power plants with fuel promptly and of a suitable quality and quantity to ensure the safety and stability of the power supply. Detailed measures and actions are described below:

#### Energy Supply Diversification

**LNG**
- Supplied by CPC; Continual tracking of CPC's sources of supply.
- CPC has long-term contracts with sources in Qatar, Australia, Papua New Guinea, and the United States to achieve the goal of energy supply diversification.

**Coal**
- Caps are set on coal originating from each single coal source country and supplier for long-term contracts.

**Fuel Oil**
- Fuel oil is supplied by CPC Corporation.
- Diesel fuel is supplied by both CPC Corporation and Formosa Petrochemical Corp.

**Nuclear**
- Nuclear fuel processing is spread out across 2-3 suppliers.

#### Long-Term Supply Contracts

By signing various long-term contracts, Taipower is able to reduce uncertainty in procurement and achieve a steady fuel supply.

**LNG**
- Signed fixed-term contracts with CPC
- Plans to construct LNG receiving stations at Taichung and Hsieh-ho power plants and to independently import LNG that will be used by some of the newly constructed gas units.

**Coal**
- Fixed-term contracts for 70-80% of the coal supply with the remainder replenished by spot contracts.

**Fuel Oil**
- Procured from local suppliers through fixed-term contracts to guarantee security of supply.

**Nuclear**
- Given that current long-term contracts and inventories are sufficient to accommodate demand, uranium procurement has been suspended.
- Signed long-term contracts for all nuclear fuel enrichment services.

## Safe Inventories

### LNG

- Accordance with the stipulations of the Taipower and CPC Contract and Early Warning Mechanism for LNG Supply and Demand, Taipower urges CPC to maintain ready LNG inventories of more than 80,000 and 100,000 tons for dispatch to the CPC Yong'an and Taichung Plants respectively.
- Planned corresponding responses with CPC in the case of accidents and established terms agreed to by both parties.

### Coal

- The law requires that coal inventory must be sufficient for at least 30 days of the average daily amount consumed in the previous year.
- Taipower has adopted 40 days of inventory as its planned basis for 2022, in which one day of inventory is defined as the average daily usage of coal in the previous year.

### Fuel Oil

- The operating stock of fuel oil is 140,000~190,000 kilotons.
- The diesel inventory is established in accordance with the specific supply and transmission conditions at each power plant.

### Nuclear

- The safety stock for uranium is set at three year's volume of use.

## Stable Coal Transportation

Taipower's coal carriers transported approximately 3.4 million tons of coal with a 11.58% shipping ratio in 2022. The self-management of coal transportation ensures stable fuel supply and dispatching

## Natural Gas Procurement

In response to the current energy transition policy, Taipower's thermal power generation has entered an era of primarily using gas with coal as support. As a result, the steady supply of natural gas has a critical influence on the stability of electricity supply. At this stage, all of Taipower's natural gas is supplied by the CPC Corporation (hereinafter referred to as CPC). Hence, Taipower is actively working with CPC to establish an even more complete contact mechanism to cope with the impacts of the external environment on the electricity supply. Taipower's natural gas expenditure reached $252.1 billion in 2022.

Taipower will disperse its sources of natural gas procurement in the future. In addition to purchasing LNG from CPC, Taipower plans to construct its own LNG receiving stations at the Taichung and Hsieh-ho power plants. Related feasibility studies have been approved by the government and the government's approval has been granted to purchase LNG from the international market to be used by newly constructed gas-fired power generation units at the Taichung, Hsieh-ho and Tung Hsiao Phase 2 power plants. This not only enables Taipower to have greater autonomy in its sourcing of LNG to reduce the overall cost of fuel procurement but also works to the Company's advantage in power dispatching and providing system characteristics that increase LNG supply stability and safety.

### The Natural Gas Supply and Demand Contact Mechanism and Early Warning System for Taipower and CPC

| Frequency | Means of Communication |
|---|---|
| Annually | · Each year before the end of May, Taipower sends revised data to CPC if monthly estimates for gas consumption in the second half of the year require revision.<br>· Each year before August 20, Taipower sends CPC monthly estimates of total gas consumption and maintenance schedules for all gas units for the following year.<br>· Each year before the end of October, Taipower officially informs CPC of any revisions to its monthly estimates of total gas consumption. |
| Quarterly | · Both parties take part in a quarterly supply coordination meeting to discuss relevant issues on LNG usage. |
| Monthly | · Before the 25th of each month (N), Taipower sends a written "Planned Daily Gas Consumption Table" for the next two months (N+2) and its planned monthly gas consumption for the next three months (N+3) to CPC by mail. In turn, CPC is required to verify its 45-day/90-day shipping schedule with international suppliers prior to the 15th of each month. This ensures that appropriate dispatching is performed according to Taipower's requests. |
| Daily | · CPC updates its LNG usage and inventory notice by no later than 10:30 a.m. every day (including holidays) through fax or email.<br>· Prior to 4:00 p.m. on each workday, Taipower faxes its Daily LNG consumption estimates for the next fortnight to CPC. If the gas usage for the next fortnight affects LNG supply and the shipping schedule cannot be changed, CPC will contact Taipower and ask for appropriate adjustments to the daily estimates on LNG usage for the following two weeks.<br>· Should CPC's gas pipeline construction affect the normal LNG supply for Taipower, CPC will try to schedule construction during holidays and send notice to Taipower in advance so that Taipower can make relevant adjustments without compromising power supply safety. |
| Under Special Circumstances | · If the planned construction of CPC's gas pipeline project is expected to affect the normal gas supply of Taipower, it should be scheduled during holidays whenever possible. CPC should also provide written notification to Taipower in advance, allowing Taipower to cooperate while ensuring the safety of power supply is not compromised.<br>· As Taipower is responsible for supplying power to CPC's Yong'an and Taichung LNG storage systems, in the event of power outage/rationing that affects the supply of LNG, Taipower will coordinate with CPC first to make optimal arrangements. |

## Coal Procurement

For coal procurement, Taipower has established a Coal Procurement Review Taskforce, with membership consisting of personnel from the Department of Materials, Procurement Regulation Enforcement, Procurement, and the Legal Affairs Office. To make decisions more comprehensive and information more transparent, external experts in energy, economics, and legal affairs are invited to serve as advisory committee members. To ensure that environmental protection requirements are met, high-quality coal is provided to all coalfired power plants.

Taipower has enhanced the competitiveness of its bidding projects by revising its procurement regulations and diversifying its coal sources. In the process of conducting the "2022 Coal Procurement", Taipower has strategically timed its coal purchases and effectively utilized the quantity selection rights in each long-term contract. When compared with market prices, Taipower has successfully reduced its coal purchasing expenses by approximately NT$27.5 billion.

| | 2021 | | 2022 | |
|---|---|---|---|---|
| Coal Expenditure (Billion) | 820.78 | | 2,120 | |
| Coal Source | Total Procurement Quantities (Unit: Ten Thousand Tons) | Ratio (%) | Total Procurement Quantities (Unit: Ten Thousand Tons) | Ratio (%) |
| Australia | 1,499 | 52% | 1,460 | 50% |
| Indonesia | 1,222 | 43% | 1,290 | 44% |
| Russia | 92 | 3% | 122 | 4% |
| Colombia | 54 | 2% | 42 | 1% |
| South Africa | 8 | 0% | 23 | 1% |
| Canada | 0 | 0% | 9 | 0% |

## Fuel Supply

Taipower currently purchases fuel oil exclusively from CPC, but diesel from both CPC and the Formosa Petrochemical Corporation. Both contractors have ample supply capability and conform to the relevant governmental laws and regulations. The appropriate operating stock of fuel oil and diesel oil is set according to the supply and transmission conditions at each power plant, and the fuel expenditure in 2022 reached $23.1 billion.

## Nuclear Fuel

The procurement of nuclear fuel involves the purchase of uranium and subsequent processing services for conversion, enrichment, and fabrication. To comply with the government's nuclear-free homeland policy, Taipower has suspended uranium procurement as the current inventory is sufficient for the operation of nuclear power plants until they are decommissioned. Demand for Nuclear fuel processing services will exist until 2025, and has been covered by long-term contracts. In 2022, nuclear fuel expenses reached $0.893 billion.

## Suppliers of Materials and Equipment

### The Materials Supply Chain

Taipower provides professional internal training and consultation for issues associated with the Government Procurement Act. Training ranges from front-end material numbering, supplier capability reviews, and the establishment of qualified supplier lists and management to requisition and demand management, procurement, acceptance, and logistics operations. Taipower is also actively implementing supply chain digitalization and has established Enterprise Resource Planning (ERP), a Supply Chain Management (SCM) platform, and a Warehouse Management System (WMS) to achieve internal and external network collaboration and to construct a comprehensive system.

### The Equipment Supply Chain

Taipower used ISO 9001 to integrate its evaluation/re-evaluation/inspection/feedback steps on defects when executing supplier management and auditing. This ensures the quality, cost, and delivery of power-related equipment and devices provided by suppliers. Taipower also revised relevant regulations to establish a quality assurance program for electrical equipment. The Company requires suppliers to develop the capacity to design and supply qualified products and to prevent non-compliance throughout the production process from design to service.

## Electricity Suppliers

To ensure a stable supply of electricity and to enhance economic vitality and flexibility, the government lifted restrictions on private power producers and adopted Taipower's avoidable costs generation as a pricing principle. Starting in 1996, Taipower was permitted to purchase thermal electricity generated by independent power producers (IPPs) in accordance with an announcement from the Ministry of Economic Affairs that allowed for the establishment of private power plants. The process works as follows: the Ministry of Economic Affairs first conducts qualification reviews. Qualified operators then submit their electricity prices for bidding before Taipower signs a contract with the winning bidder.

For the purchase of electricity generated through cogeneration and renewable energy, the procedure is governed by the Enforcement Rules of the Cogeneration System and the Renewable Energy Development Act. Taipower is obligated to purchase the electricity wholesale, but is not required to follow the bidding procedures outlined in the Government Procurement Act.

However, as of January 2017, following the promulgation of the most recent amendments to the Electricity Act, the Ministry of Economic Affairs will no longer permit privately-owned power plant license applications. Taipower's power supply capacity will now be determined by the electricity industry's regulatory authority when assessing the power supply. When there is electricity demand, a procurement procedure will be initiated. Contracts will be reviewed and the starting price for bidding will be set. Then public bidding will be handled following the provisions of the Government Procurement Act. A public meeting will be held to explain the bidding process to potential suppliers that are interested in bidding. The bidding will be closed and finalized after a qualification and specification review, as well as bargaining and comparing prices.

As of the end of 2022, Taipower has signed contracts with 11 independent power producers (IPPs), 47 co-generation power providers, and has 50,980 contracts for renewable energy including solar, wind, hydropower, and others. A full 62.5kWh of electricity was purchased from external sources in 2022.

# 2.5.2 Creating a Sustainable Supply Chain

## Review and Procurement Standards for Taipower Suppliers

### Supplier Review Standards Pursuant to the Government Procurement Act

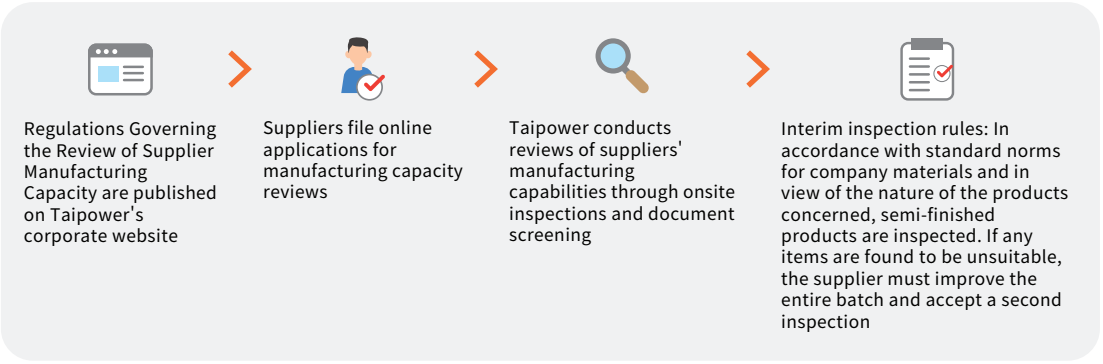
To ensure material quality, maintain power supply safety, and to improve procurement efficiency, Taipower reviews the bidding documents of suppliers in keeping with the Government Procurement Act.

In 2022, Taipower received a total of 3,328 material procurement tenders from 1,055 domestic suppliers and 45 foreign suppliers, for a total of 1,100 suppliers. A total of approximately NT$113.3 billion in tenders was awarded. Domestic tender awards totaled approximately NT$99.6 billion and accounted for approximately 88% of the Company's procurement of property. Among them, the tender awards for selective tendering came to roughly NT$71.8 billion and accounted for approximately 63% of Taipower's total procurement of property. There were 61 contracted suppliers (the tender awards for items that fell under the purview of the localization policy came to approximately NT$34 billion and accounted for approximately 32% of Taipower's total procurement of property.) The tender awards for other types of tenders amounted to approximately NT$41.5 billion which accounted for approximately 37% of Taipower's total procurement of property.

### Process of Screening the List of Selectively Tendered Materials, Equipment and Qualified Suppliers

To improve the effectiveness of management and control, Taipower has adopted the principle of centralized management. Where the utilization of equipment is frequent and numerous units intend to use the said equipment, the overall consideration of supply and demand must be reserved and the application of purchase, procurement, final acceptance, storage, and transportation of equipment should be handled in a unified manner to save costs.

To facilitate the efficient processing of these tenders, Taipower has established a list of qualified material and equipment suppliers, who are screened according to the following process:

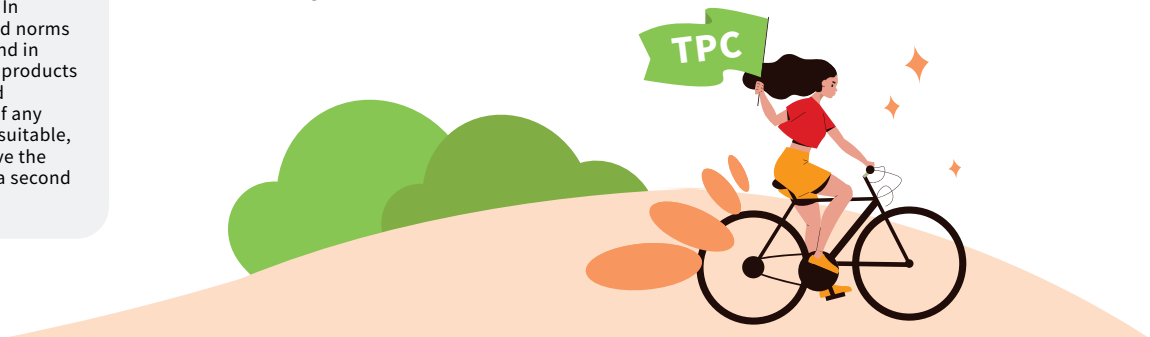



Taipower has established the General Principles of Reviewing Supplier Equipment Manufacturing Capacity in Selective Tendering and Review of Supplier Capability as a supplier selection mechanism. Suppliers wishing to participate in a bidding process must obtain a Certificate of Manufacturing Capacity. When applying for manufacturing capability review, the supplier shall provide the Company with a relevant equipment list, independent inspection report, incoming material inspection, independent inspection form, maintenance plan, and other documents. In addition, the supplier's quality management system must be certified by relevant local professional organizations to ensure its performance capability, manufacturing quality, and safety.

### Bidding Evaluation for Primary Power Generation Equipment Suppliers of Thermal Power Plants

1. Taipower employs a restricted bidding process to recruit technical service consulting firms. In the evaluation criteria titled "vendor's understanding of service matters," Taipower incorporates environmental regulations, aimed at selecting consulting firms that possess comprehensive knowledge of environmental regulations and the latest developments. This facilitates the consideration and inclusion of the latest environmental regulations and environmental impact assessment commitments in the bidding specifications for primary power generation equipment, ensuring compliance by suppliers.

2. Currently, Taipower has established environmental chapters in the bidding specifications for primary power generation equipment procurement projects or associated facility construction projects. It requires contractors to follow construction site management practices and comply with environmental laws and regulations such as air pollution control, water pollution control, waste management, marine pollution control, and environmental impact assessment. The specifications also stipulate that a certain percentage of the contract amount (environmental protection fees) must be allocated exclusively for environmental protection measures. The objective is to minimize the environmental impact during the construction process within the framework of environmental protection regulations.



## Supplier Evaluations and Audits

Taipower conducts supplier re-evaluation based on its Re-evaluation Guidelines of Power Equipment and its Review of Supplier Capability and Management of Qualified Manufacturers policy. Suppliers with Certificates of Manufacturing Capacity must conduct re-assessments before the expiration dates of their validity periods (up to three years) to maintain their qualifications.

During the re-evaluation process, Taipower conducts a comprehensive evaluation of supplier manufacturing capacities, quality management systems, manufacturing equipment, and lists of equipment that require inspection, suppliers of components or raw materials, delivery conditions in the most recent three years, and improvement measures for misusing equipment. Suppliers that meet the requirements are issued Certificates of Manufacturing Capacity. When suppliers fail to meet requirements, they are given a limited period in which they can propose improvement measures. Suppliers that fail to propose improvement measures without valid reasons are required to re-apply for their Certificates of Manufacturing Capacity.

In 2022, Taipower strengthened its auditing of material suppliers. Among 154 qualified suppliers in selective bidding, 28 were re-evaluated which accounted for 18%* (The eligibility period of re-evaluation was three years, and the eligibility cycles of different materials from the same supplier were also different, therefore the re-evaluation was conducted on those who had expired eligibility periods). In addition, the Company conducted inspections during the manufacturing process and on-site audits of suppliers a total of 416 times.

Note: The number of suppliers assessed for risk accounted for 18% of the 28 selective tendering suppliers, which represents 18% of all the total of 154 (144 domestic and 10 international) suppliers.

## Sustainable Supply Chain Goals

### Greater Emphasis on Supplier Governance

Suppliers are crucial partners in ensuring the stable power supply of the Company. In addition to qualities such as product quality, delivery timing, price, and technical capabilities, Taipower will prioritize supplier corporate governance, environmental considerations, and social aspects in the future. Together with its partner suppliers, Taipower aims to construct a more resilient and sustainable supply chain, demonstrating its corporate social responsibility.

### Future Plans

To practice sustainable supply chain management and fulfill its corporate social responsibility, Taipower's procurement specifications will not only include material quality requirements but also place significant importance on evaluating suppliers based on their environmental safety and occupational health, financial practices and corporate governance, as well as their labor conditions. Taipower will establish a list of qualified suppliers and conduct selective bidding to enhance procurement efficiency while aligning with the Company's business strategy and social responsibility. As a pilot project, Taipower has already implemented these measures for industrial gas procurement.

Moving forward, Taipower will conduct planning and implement research strategies for sustainable supply chain management, leveraging experienced institutions or teams. In addition to the existing focus on quality, delivery, cost, and service (QDCS) evaluation systems, Taipower will collaborate to develop supplier codes of conduct, supplier sustainability commitments, supplier ESG evaluations, and practical guidelines. Initially, these measures will be applied to company-level materials and suppliers. Once proven effective, they will gradually expand to other materials and suppliers, ultimately achieving sustainable supply chain management. The research project is expected to be completed in the second quarter of 2024.

## Implementation Plan of Taipower's Anti-corruption Procurement Platform

Taipower has established an anti-corruption platform to improve risk prevention, incorruptibility, public-private cooperation, administrative transparency, national supervision, and other factors that help ensure that procurement projects can be completed on schedule and at the appropriate quality. The anti-corruption platform has established a transparent procurement system that facilitates cross-domain cooperation, ensures compliance and appropriateness of various decisions and operations, avoids disputes, and increases audit frequency. In cases where there are reasonable doubts, these are handled immediately to avoid risk expansion. Throughout the implementation of this plan, Taipower regularly visits relevant units to ensure their compliance in decision-making and operations. The Company also establishes cross-domain communication channels and invites the Prosecutors Office, the Agency Against Corruption, and investigative agencies to participate in procurement processing. Taipower also invites professional institutions, external experts, scholars, and civic groups to participate.

The "2022 Procurement of High Calorific Value Bituminous Coal" Integrity Platform held two business liaison meetings and conducted one educational advocacy event in 2022. The "Offshore Wind Power Phase 2 Project - Wind Farm Equipment Procurement with Installation" Procurement Integrity Platform visited the prosecutor's office, integrity agencies, and police departments three times, held one business liaison meeting, conducted two educational advocacy events, and organized one corporate integrity seminar in 2022. In the future, we will improve the planning and execution of procurement cases by utilizing information disclosure, organizing business liaison meetings, visiting and inviting integrity agencies for mutual visits, and inviting prosecutors to give speeches, in order to prevent undue external interference.

CHAPTER 03

# Provider of Sustainable Power

## Development Vision

A stable supply of electricity is crucial to public livelihood, industry, and economic development. By continuously providing a stable power supply throughout Taiwan, Taipower plays a vital role in the nation's overall economic development. As energy transition continues, the proportion of renewables used will rise. As renewables increase, the unstable nature of their generation will make meeting future electricity demands challenging.

Taipower is eagerly developing diversified energy sources on the supply side. It has prioritized three major areas of development: renewable energy, low-carbon gas, and the renewal of coal-fired power plants with ultra-supercritical (USC) generation units. These measures are expected to stabilize the electric system. Other measures include improving the reliability of power generation, transmission, substations and distribution. Meanwhile, Taipower is continuing to make good use of opportunities in power dispatching and constantly upgrading its thermal power generating units to increase the proportion of gas-fired energy. Taipower will continue to implement its energy transition goals and enhance the Company's operational capabilities and market competitiveness.

## Performance Highlights

- Strengthened the power transmission and substation systems. The total investment in the 7th Transmission and Substation Revision Project will be about NT$236.9 billion (to 2025). By the end of 2022, substation capacity had reached 16,141.18 KVA (93.56%) and 1,824.13 circuit kilometers (96.01%) of lines had been completed.
- In 2022, the total length of underground transmission cable reached 4,702.7 circuit kilometers.
- The gross thermal efficiency of all thermal power plants has increased year on year, from 46.10% in 2021 to 46.26% in 2022.
- In 2022, wind power generated 1,072.2 GWh and solar power generated 402.7 GWh.
- The progress of renewal, expansion and new thermal generating unit projects in 2022 was as follows: the Linkou Plant (100%), Phase 1 of the Tonghsiao Plant (99.87%), the Datan Plant (87.84%), the Hsinta Plant (57.65%), the Taichung Plant (23.27%), the Union Plant (12.12%), Phase 2 of the Tonghsiao Plant (5.87%), the Talin Gas Plant (0.15%).

# Providing Quality Electricity Service

## 3.1.1 A Stable Power Supply and Generation System

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### A Stable Power Supply and Installed Capacity

In recent years, Taiwan's power consumption has repeatedly hit historical highs. Since Taipower is responsible for ensuring a stable power supply, this has meant persistently pushing power development projects and planning to launch new generating units every year. In terms of managing the operation of thermal power generating units, apart from refining various operational maintenance strategies, Taipower has established a licensing system and a retraining mechanism for staff with the goal of ensuring stable daily operations. With regards to Nuclear power plants, the main management measures include analyzing and reviewing operational weaknesses that are identified by each nuclear power plant, strengthening the management of activities during major maintenance periods, implementing equipment improvements and upgrades, and reviewing unplanned incidents that have occurred during the year.

#### Total Amount and Composition of Power Generation from 2020 to 2022

| | 2020 | | 2021 | | 2022 | |
|---|---|---|---|---|---|---|
| | Billion kWh | Percentage | Billion kWh | Percentage | Billion kWh | Percentage |
| Net amount of power generated and purchased | 238.9 | 100.0% | 248.8 | 100.0% | 250.7 | 100.0% |
| Amount of power generated | 183.9 | 77.0% | 189.1 | 76.0% | 188.3 | 75.1% |
| Pumped storage hydro | 3.1 | 1.3% | 3.2 | 1.3% | 3.1 | 1.2% |
| Thermal | 147.0 | 61.5% | 155.2 | 62.4% | 156.0 | 62.2% |
| Nuclear | 30.3 | 12.7% | 26.8 | 10.8% | 22.9 | 9.1% |
| Renewable energy | 3.4 | 1.4% | 3.9 | 1.6% | 6.3 | 2.5% |
| Amount of purchased power | 55.1 | 23.0% | 59.7 | 24.0% | 62.5 | 24.9% |
| Privately-owned thermal | 40.6 | 17.0% | 42.7 | 17.1% | 43.7 | 17.4% |
| Renewable energy | 10.4 | 4.3% | 11.9 | 4.8% | 15.3 | 6.1% |
| Cogeneration | 4.1 | 1.7% | 5.1 | 2.1% | 3.4 | 1.4% |

#### Average Availability Rates for Power Plants from 2020-2022

Unit: %

| Unit | | Energy type | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| Thermal | Steam | Coal | 86.82 | 89.12 | 85.71 |
| | | Oil | 87.01 | 92.74 | 89.67 |
| | | LNG | 95.51 | 82.33 | 94.09 |
| | Combined cycle | LNG | 87.98 | 88.13 | 89.49 |
| Hydro | | Hydro | 96.81 | 96.09 | 95.37 |

#### Average Availability Rates for Nuclear Power Plants from 2020-2022

Unit: %

| Year | NPP1 | | NPP2 | | NPP3 | |
|---|---|---|---|---|---|---|
| | Reactor 1 | Reactor 1 | Reactor 1 | Reactor 1 | Reactor 1 | Reactor 2 |
| 2020 | - | - | 87.29 | 88.81 | 99.36 | 86.71 |
| 2021 | - | - | 50.43(Note 1) | 98.02 | 88.09 | 88.85 |
| 2022 | - | - | - | 88.95 | 87.64 | 99.67 |

Annual availability of nuclear power units = Annual interconnection generation hours/Total annual hours

Note: 1. Reactor 1 of Nuclear Power Plant 2 (NPP2) was originally scheduled to remain shut down from February 25, 2021 until the expiration of its license on December 27, 2021 due to a full fuel pool. However, in order to maximize the supply efficiency of the nuclear fuel before decommissioning, the reactor's life was extended until July 2, 2021 in a decreased power operation mode. It was then shut down for maintenance until the expiration of the operating license on December 27, 2021. The reactor then entered the decommissioning stage.

# Increasing the Reliability of the Power Supply

Taipower has a complete power dispatch and reliability management mechanism. Specific action plans are as follows:

## The Power Dispatch and Reliability Management Mechanism

| | |
|---|---|
| **Regular Review and Analysis** | |
| Execution method | • Conduct regular electromechanical system incident review meetings<br>• Conduct regular power dispatch system incident review meetings |
| Execution status | • Electromechanical system incident review meetings were held each month to review and analyze the causes of electromechanical outages for systems above 161kV and make follow-up improvements.<br>• Power dispatch system incident review meetings were held every two months to ensure the normal operation of energy management system (EMS) related software and hardware as well as peripheral equipment. This helped to maintain the safe and stable operation of power dispatching. |
| **Risk Management Implementation** | |
| Execution method | • Given the impact of different power incidents on power dispatching reliability and stability, power shortages affecting system stability and safety were listed as risk control events. Risk levels were determined according to the degree of impact and measurement standards in different scenarios. Relevant measures were also formulated for tracking and control.<br>• Quarterly follow ups on reviews and execution.<br>• Conducted a general review at the end of the quarter and set future control objectives. |
| Execution status | • On January 10, 2023, a review of the execution and effectiveness of the response to power shortages affecting system stability and safety for the fourth quarter of 2022 was conducted.<br>• On February 13, 2023, a meeting was held to review the execution responses to power shortages affecting system stability and safety in 2022. These meetings also conducted continuous adjustments and set control objectives for 2023. |
| **Personnel Training** | |
| Execution method | • In preparation for the future electricity market transaction mechanism defined in the Electricity Act, regular on-the-job training was carried out to relay concepts of electricity market operations and quotations for business personnel.<br>• Online dispatchers trained and conducted license certification examinations for new dispatchers. Licensed personnel may renew their licenses after completing a certain number of retraining hours every three years. |
| Execution status | • The training center conducted the first Electric System Reactive Power and Voltage Adjustment Seminar. The training targeted on-duty or business-related personnel from the dispatch centers (central, regional, distribution), power plants, IPPs and ultra-high voltage substations with a total of 22 participants.<br>• Dispatchers who passed the examination after completing a training internship can participate in the dispatcher license examination. No dispatcher licenses were issued in 2022 due to the pandemic. Despite this, 3 senior dispatchers and 6 dispatchers were approved for license renewals. |

Taipower actively implements the power supply management mechanisms listed in the table above. This approach helps to ensure a stable power supply throughout Taiwan. Despite this, ensuring reliable power supplies for offshore islands is more challenging because they are not connected to the main island's grid. Therefore, Taipower is proactively assisting the offshore islands in improving their electric systems to ensure offshore users have access to the same electricity quality and services as are available on the main island. For example, the electric system in the Kinmen area has been improved by adopting the group operation model for generators and substations in the area. This resolves problems with overly concentrated units and lines at the Tashan Plant. It also helps to avoid complete blackouts in the area should an electrical system outage occur.

| | | 2020 | | 2021 | | 2022 | |
|---|---|---|---|---|---|---|---|
| | | Target | Performance | Target | Performance | Target | Performance |
| The average duration of outages (minutes / household · year) | Working blackout | 12.253 | 11.696 | 12.213 | 11.732 | 12.176 | 11.298 |
| | Outage blackout | 4.547 | 4.235 | 4.487 | 4.644 | 4.424 | 3.638 |
| | Total | 16.8 | 15.931 | 16.7 | 16.376 (43.516)[1] | 16.6 | 14.936 (91.285)[2] |
| The average number of outages (times / household · year) | Working blackout | 0.064 | 0.059 | 0.064 | 0.059 | 0.064 | 0.057 |
| | Outage blackout | 0.196 | 0.171 | 0.196 | 0.174 | 0.196 | 0.129 |
| | Total | 0.260 | 0.230 | 0.26 | 0.233 (0.864)[1] | 0.26 | 0.185 (0.467)[2] |

Note:
1 Excluding the power outage incidents on May 13 and May 17, the average interruption frequency per household in 2021 was 0.233 (times/household, year), and the average interruption duration per household was 16.376 (minutes/ household, year).
2 Excluding the power outage incident on March 3, the average interruption frequency per household in 2022 was 14.936 (times/household, year), and the average interruption duration per household was 0.185 (minutes/ household, year).

## Line Loss Rate from 2020 to 2022

| 2020 | 2021 | 2022 |
|---|---|---|
| 3.97% | 3.53% | 3.82% |

# Responding to the Nationwide Power Outage of March 3, 2022

At 9:07 a.m. on March 3, 2022, the lock-out trip of a communication bus protection relay at the Hsinta Power Plant activated the protection mechanism for five extra-high voltage (EHV) substations including Longqi and Lubei. Generating Units in southern Taiwan at Dalin, Nanpu, Hsinta, NPP3, Mai-liao, Chiahui and Fong Der were all affected and tripped. This reduced the supply capacity by 10.50 GWh in total – the equivalent of one-third of the electricity demand in Taiwan on that day – and affected about 5.49 million households. The power was fully restored at 9:31 pm.

The incident was caused by the failure of an operator to confirm the insulated gas pressure during the isolation switch test during the environmental shutdown and overhaul of Generator 2 at the Hsinta Power Plant. The error resulted in a short-circuit grounding fault in the switchgear, which triggered subsequent events. Due to the imbalance between supply and demand in the southern region caused by the tripping of the generator, the system automatically disconnected for its own protection. The power system in Taiwan is affected by instantaneous frequency changes, and the imbalance between power supply and demand caused outages in the southern region. Some users in the central and northern regions also experienced power loss due to low-frequency relay actuation.

Taipower has reviewed and responded proactively to the power outage on March 3. In particular, the Company has acted to mitigate problems due to human negligence. Taipower will continue to conduct a comprehensive review and develop improvement measures. In addition to implementing on-site standard operation procedures, reviewing various preventive mechanisms, and completing the interface for construction, Taipower is refining the operations and maintenance mechanisms of its power facilities and working to strengthen personnel risk analysis and management capabilities. It is also working to comprehensively enhance grid resilience so as to avoid the recurrence of similar incidents.

## Facing the Challenge of Natural Disasters

Natural disasters are a significant challenge for Taipower's operations. In terms of internal management, Taipower has a complete disaster prevention and emergency response system, with comprehensive disaster prevention policies and regulations. In addition to all kinds of disaster education and training, random checks are conducted so that all units can effectively and promptly respond to natural disasters and major power supply outages.

In terms of external responses, Taipower's branch offices issue at least one local press release every day before, during, and after each typhoon to reinforce public awareness of disaster prevention and preparation. The Company has also established the Taipower 1911 customer service hotline, a power outage inquiry and notification system on the official website, and an "apply/repair" function on the Taipower mobile application for the public to report blackouts. Branch offices have additionally established real-time communication channels through social media community groups, telephone, fax or e-mail, and other channels based on regional characteristics. This is to ensure comprehensive control and that the power recovery status of users can be confirmed, so that incidents are handled as soon as possible.

### Taipower's Disaster Rescue and Reconstruction Management Policy and Implementation Powers and Responsibilities

| Execution time | Management strategy and refinement | Executive unit |
|---|---|---|
| Twice a year | Every year in January and April, Taipower holds Extraordinary Disaster Prevention and Review Meetings to review the deficiencies and areas for improvement in disaster prevention and response from the previous year. The meetings aim to establish a disaster prevention plan for the current year and confirm the organization and command system for disaster prevention and response. | All branch offices |
| Once a year | Take stock of manpower, vehicles, and equipment data for each regional operational office (including contractors) to facilitate integrated scheduling and utilization of manpower and equipment.<br>Conduct various types of disaster prevention and response promotions, education, and drills to enhance proficiency in disaster prevention and response operations. | Department of Distribution and all branch offices |
| Before typhoons | At the pre-typhoon preparedness meeting, based on the government's forecasted information (projected typhoon paths and intensities), we reviewed certain mountainous areas or outlying islands that may become isolated due to road closures or the suspension of ferry services. Personnel, machinery, and materials are deployed in advance to facilitate prompt repair of power facilities and reduce disaster losses. | Department of Distribution and all branch offices |
| When a disaster occurs | Through the Emergency Response Task Force, the mutual support mechanism is activated in a timely manner, swiftly mobilizing manpower and equipment to handle disaster repair and restoration of electricity. It cooperates with the disaster relief efforts of various levels of government, sets up forward command posts, and provides timely information on disaster situations, repair progress, and instructions for user cooperation. This information is made available for local governments and opinion leaders to reference and take appropriate measures, and provides necessary assistance and shortens the time required for disaster recovery. | All branch offices |
| No warning throughout the year | Enhanced communication and coordination operations are conducted for reporting distribution system disaster situations. Regular training sessions are held for various types of disasters and emergency event alerts, and unannounced drills are implemented to improve the timeliness of disaster notifications. | Department of Distribution |

## Guidelines and planning for future power plant construction, renewal and expansion projects

- The government annually reviews the future electricity supply and demand situation to ensure a stable power supply. The process involves the evaluation of the overall power system, and makes plans for additional power sources based on factors such as electricity demand growth and the decommissioning of existing units.
- Taipower is fulfilling the government's energy transition policy by increasing its use of natural gas, reducing its use of coal, developing green energy, and working to achieve net-zero emissions by 2050. The Company considers a stable power supply an important principle and prerequisite to these measures and is gradually moving towards a low-carbon and low air pollution emissions energy supply system. It plans to gradually reduce coal consumption and carbon emissions by reducing the load on existing subcritical coal-fired units and constructing new gas-fired units, while ensuring system stability with a reliable gas supply for new gas-fired units. Moreover, the feasibility of retaining older equipment for emergency operation is evaluated based on national security considerations.
- Taipower has aligned with the government's policy to expand the use of natural gas for power generation. It is actively promoting the development of new gas-fired power generation projects and purchasing natural gas power from independent power producers (IPP). This is projected to add approximately 18.84 GW of power from gas-fired units between 2022 and 2028.
- To accommodate the impending large-scale integration of solar and wind powered renewable energy, Taipower plans to utilize pumped-storage hydropower as a large-scale energy storage system to enhance system security and stability. The planned sites currently include the Guoming Pumped Storage Hydroelectric Project (350 MW) in the Dajia River and the Shimen Pumped Storage Hydroelectric Project (44 MW). Taipower continues to search for suitable pumped-storage sites across Taiwan for further development.

# Ensuring Nuclear Power Safety

Taipower adheres to the concept of "defense-in-depth" to ensure the safe operation of its nuclear power plants. Taipower aims to:

- Ensure that nuclear power facilities have the highest standard of design, construction, supervision, and quality control in accordance with regulatory mandates. Additionally, geographical considerations are taken into account for each unit's equipment. Potential natural disasters, such as earthquakes, tsunamis, typhoons, tornados and floods, are evaluated in detail to provide "defense-in-depth" thinking that can cope with burst outages.
- Utilize multiple physical barriers that are designed to prevent leakages of fission products from nuclear reactors.
- Employ different and redundant security systems that are well maintained and in operation. These systems must be tested regularly according to regulations to maintain a high degree of readiness to respond to any contingency.

In practice, the Company's approach to "defense-in-depth" incorporates the following four lines of defense.

## Defense-in-Depth

| The 1st Defense (Prevention) | The 2nd Defense (Mitigation) | The 3rd Defense (Emergency Preparedness) | The 4th Defense (Strategy) |
|---|---|---|---|
| Evaluations and prevention are conducted in advance based on various extreme conditions. | Disaster mitigation is executed to prevent the leakage of radioactive materials from nuclear power plants. | If disaster mitigation fails to prevent external leakages of radioactive materials, protective actions will be taken to reduce radiation exposure outside the plant. | Ultimate Response Guidelines (URG) were developed as a basis for decision making and are based on current design benchmarks for earthquake resistance and tsunami prevention at nuclear power plants, emergency operating procedures and severe nuclear outage handling guidelines. |

Taipower has joined the United State-based Nuclear Procurement Issues Corporation (NUPIC) and regularly participates in meetings. This allows the Company to obtain audit information on purchase vendors for each nuclear power plant. This helps ensure the quality and safety of equipment and components. Taipower also abides by the Enforcement Rules of the Nuclear Materials and Radioactive Waste Management Act. The Company submits reports on radioactive waste treatment, storage, and final disposal to the competent authority, along with annual reports on operations, radiation protection, and environmental radiation monitoring. Taipower's management and outage response mechanism for nuclear energy are described in the table below

## Taipower's Nuclear Energy Management and Outage Response Mechanism

| | | |
|---|---|---|
| Routine preparedness | Organize emergency response plan training | • The emergency staff of nuclear power plants and the Nuclear Emergency Preparedness Executive Committee are given regular training according to the expertise of their task forces to maintain outage handling capacity.<br>• Emergency response training includes both general and professional training. The above-mentioned emergency staff undergo general training once every two years and professional training annually. |
| | Organize in- and out-of-plant emergency response plan drills | • In addition to holding an in-plant drill once a year at each nuclear power plant, Taipower coordinates with the central and local governments, military police, medical services and other resources to conduct one nuclear safety drill every year at each operational nuclear power plant. Taipower invites experts and scholars, in addition to representatives from competent authorities, to evaluate the response measures of these drills so that the emergency response plans and actions can be gradually improved.<br>• In 2022, Taipower held the large-scale "Nuclear Safety Drill No. 28" at the Third Nuclear Power Plant (NPP3). The First (NPP1) and Second Nuclear Power Plants (NPP2) also conducted emergency response planning drills in July and November respectively. |
| | Construct and implement emergency preparedness performance indicators | Each nuclear power plant will implement the following three emergency preparedness performance indicators and report on them to the Atomic Energy Council every quarter as part of the control measures taken by the nuclear energy regulatory entity to ensure the preparedness of nuclear power units.<br>1. Drill/drill performance.<br>2. Participation in the drills of the emergency response organization.<br>3. Reliability of the warning and notification system. |
| Response operations in case of outages | Take emergency measures | • When a nuclear outage occurs, the nuclear power plant will perform unit rescue operations in accordance with the provisions of the emergency response operating procedures of the plant.<br>• If the outage cannot be effectively controlled and may affect the people or environment outside the plant, the relevant government units shall activate the National Nuclear Emergency Response Center, the Nuclear Radiation Monitoring and Dose Assessment Center, the Regional Nuclear Emergency Response Center, and the Nuclear Emergency Support Center, as per the Nuclear Emergency Response Act. These entities will jointly perform various disaster relief operations outside the plant where the outage occurred to ensure the safety and well-being of the public. |
| Post outage recovery operations | Damage assessment and recovery measures | • After the cause of a nuclear outage has been eliminated and the National Nuclear Emergency Response Center has confirmed that all emergency response measures have been completed, the emergency response organization's mandate will be lifted.<br>• After receiving notification from the Nuclear Emergency Recovery Committee, Taipower will carry out recovery operations such as facility damage assessments and recovery according to the task division for each unit.<br>• Taipower is responsible for the recovery of the units within the plant. Accordingly, it has developed and established disaster recovery plans and operating procedures. The emergency control team leader for the plant will command an in-plant restoration effort that carries out recovery operations based on the plant's situation. |

# 3.1.2 A Robust Transmission and Distribution System

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In response to the planned energy transition, Taipower has vigorously promoted renewable energy. However, due to geographical limitations, solar and wind power generation are mostly concentrated in the central and southern regions of Taiwan. Moreover, as the nation's high-tech industry continues to develop, the power demand of the country's Science Parks is increasing, creating a trend towards concentration in power supply and load centers. Faced with such arduous challenges, Taipower's transmission and distribution system will need to effectively and reliably deliver the power generated by plants in various places to the distribution system and ultra-high voltage (UHV) users. To accomplish this, Taipower has rolled out projects such as Phase 1 of the Offshore Wind Power grid reinforcement, a UHV substation expansion at the Southern Taiwan Science Park, and a Baoshan UHV substation construction project that strengthens grid power integration capabilities and introduces static synchronous compensation equipment that improves regional voltage control. The projects are expected to provide sufficient, high-quality, safe, stable, and reliable power to expedite the development of the nation's high-tech industry and enhance international competitiveness.

## Improving the Accessibility of Power

In order to comply with the Electricity Act and exercise social responsibility by maintaining the public's rights and interests through a stable power supply, Taipower has established 24 branch offices, 265 service centers, and 2 customer service centers in Taiwan. Additional power supply facilities are installed to increase the availability of power supply in cooperation with local construction and applications. The Company also regularly convenes Timely Power Supply Review Meetings in response to individual applications for electricity and to continuously improve the accessibility, stability, and reliability of power services and ensure the right of equal access to required power services.

Currently, only a few remote areas have no electricity supply. This is typically due to limited access that inhibits the movement of construction equipment and engineering vehicles to the sites and makes the placement of poles difficult. Additionally, setting up electricity in some remote areas may have an impact on the local environment and natural landscape. With the exception of these remote areas, the national power supply penetration rate has reached 100%.

## Strengthening Power Transmission and the Substation System

In response to economic growth, Taipower continues to strengthen the overall power grid through power transmission and substation projects, reinforcement of transmission capacity for the main line system, and optimization of power supply capacity for ultra-high voltage, large-scale customers. The Company is also working to complete construction projects as scheduled while maintaining quality.

## Strengthening the Infrastructure of the Power Grid

The grid is a connective hub between the power generator and the customer. A sound power grid can effectively reduce the possibility of power outages and maintain the quality of the power supply. Over the years, Taipower has built a dense network around the country to ensure that people are able to conveniently access and use electricity. Regular maintenance of related facilities is an important part of maintaining a stable power supply. Taipower will continue to promote plans that increase the power grid's resilience, replace old facilities and lines in order to reduce the line loss rate year by year, and to maintain the high-quality supply of electricity.

Taipower's current uses the System Average Interruption Duration Index (SAIDI) and the System Average Interruption Frequency Index (SAIFI) as performance indicators for power supply reliability. In March 2022, the 303 power outage incidents affected the power supply to 5.529 million households and caused the SAIDI score to increase to 91.285 minutes/household, and the SAIFI score to increase to 0.467 times/household. However, if this incident is excluded, the SAIDI score was 14.936 minutes/household, and the SAIFI score was 0.185 times/household.

Additionally, as intermittent renewable power, which may affect system stability, is added to the grid in greater quantities, Taipower is devoted to grid-connection dispatching and strategy research. As such, the Company has built a generation information consolidation platform and other related systems to help it actively respond to future challenges.

In consideration of expected global climate changes, the unstable nature of renewables which are likely to cause an imbalance between supply and demand, and the aging of existing power transmission and distribution facilities, the entire system of power generation, transmission and distribution should continue to undertake various prevention and system improvement measures. Consequently, Taipower will constantly strengthen line maintenance and equipment improvements to reduce outages and to ensure power supply quality.

# Increasing the Reliability of Power Distribution

To reduce the cost of generation and increase power supply capacity, the distribution and sales system utilizes a target value for the distribution line loss rate that is allocated by the Department of System Operations. Branch offices are instructed to find improvements for lines and for anti-distortion of electricity measures to reduce network losses. Additionally, in consideration of the distribution system's adaptability and wheeling capabilities in the event of outages, Taipower has formulated distribution system planning guides and established management targets to reduce feeders with currents exceeding 300A.

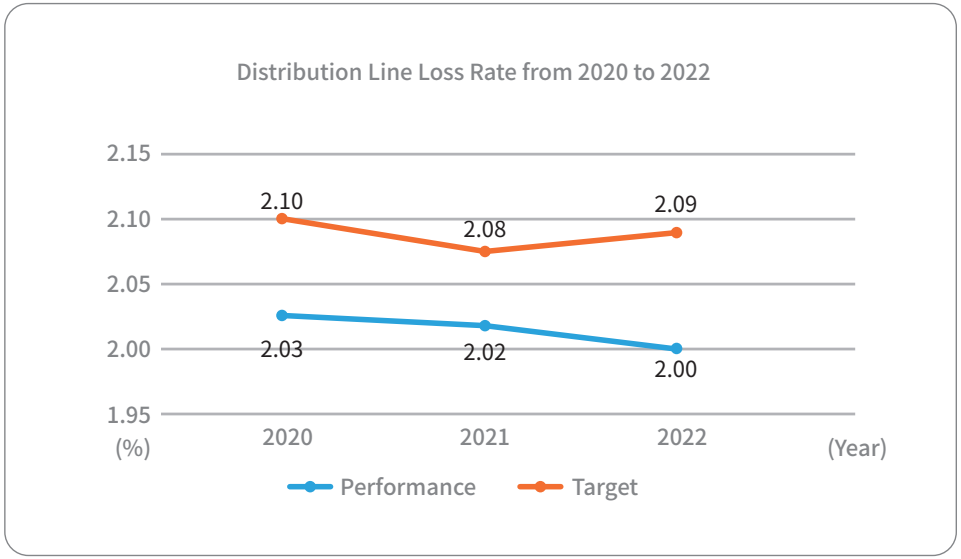
All branch offices and the Department of Distribution regularly conduct high voltage outage review meetings on assessments and improvements in power supply reliability. They review the average outage performance of the distribution system, the causes of major outages, and formulate improved countermeasures to determine the best improvement strategy for each outage situation. The Company also conducts yearly reviews of possible risk factors that affect the stability and reliability of the power supply. These reviews include risk management controls for the following year. Implementation performance is then tracked and reviewed regularly. In addition, Taipower regularly organizes on-the-job education and training for maintenance personnel and dispatchers to advance their professional skills and strengthen maintenance capabilities

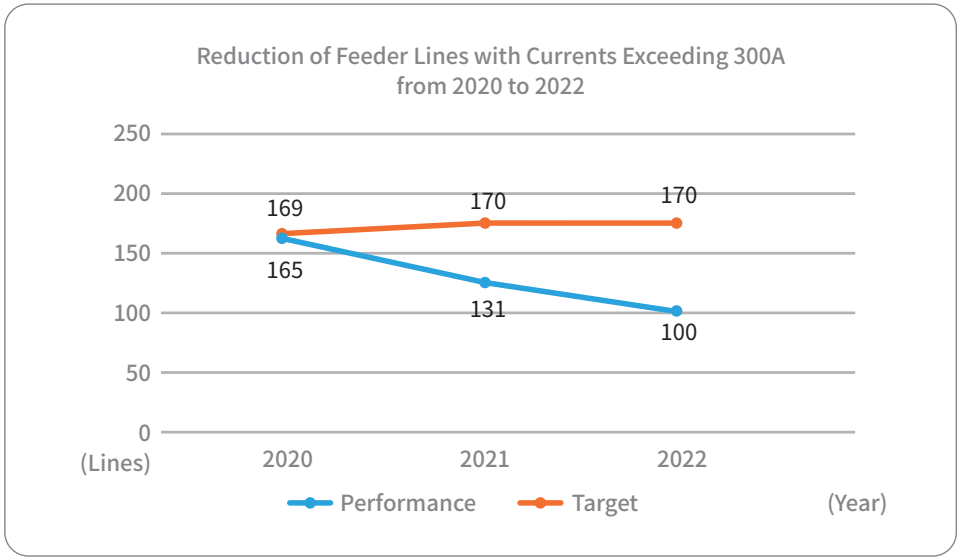
Taipower is working to strengthen its audit operations by evaluating and examining equipment operation periodically, and by supervising each branch's outage prevention and improvement plans to reduce the possibility of human negligence and improper operation.

As Taiwan moves towards energy transition and a new generation of power supply systems, Taipower has accelerated the automation of its distribution feeders. This not only helps to improve the quality of the power supply but also enables fault detection. Through the remote control of on-site automatic line switches, outage areas can be isolated promptly to reduce the scale of power failures. At present, a feeder automation system has been implemented for industrial, vital metropolitan, and remote areas that are difficult to repair, with a penetration rate of about 81.57%. In the future, Taipower will continue to push forward and raise the target value for feeder construction, and is expecting to achieve full feeder automation by 2025.

Distribution Feeder Automation Installations from 2020 to 2022

| Performance | 2020 | 2021 | 2022 |
|---|---|---|---|
| Feeder Automations (Number) | 7,815 lines | 7,969 lines | 8,384 lines |
| Switch Automations (Number) | 1,304 units | 1,422 units | 2,180 units |



# 3.2 Planning for New Sources of Energy

## 3.2.1 Planning for New Sources of Energy

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### The Power Transition Responds to Policy and Public Opinion

Demand for electricity is growing at the same time as a number of large generating units are being decommissioned. In consequence, Taipower has adopted a strategy that is in line with the government's energy transition policy by reducing coal, increasing gas, and developing green and nuclear-free energy.

This entails promoting the development of renewables and actively planning new low-carbon, gas-fired units while improving environmental protection equipment at existing coal-fired units to reduce air pollution emissions. Through these strategies, Taipower will ensure a stable power supply and meet the 2025 energy ratio target. The development direction of Taipower's energy transition plan is as follows:

### Prioritize the Development of Renewables and Create a Friendly, Grid-Connected Environment

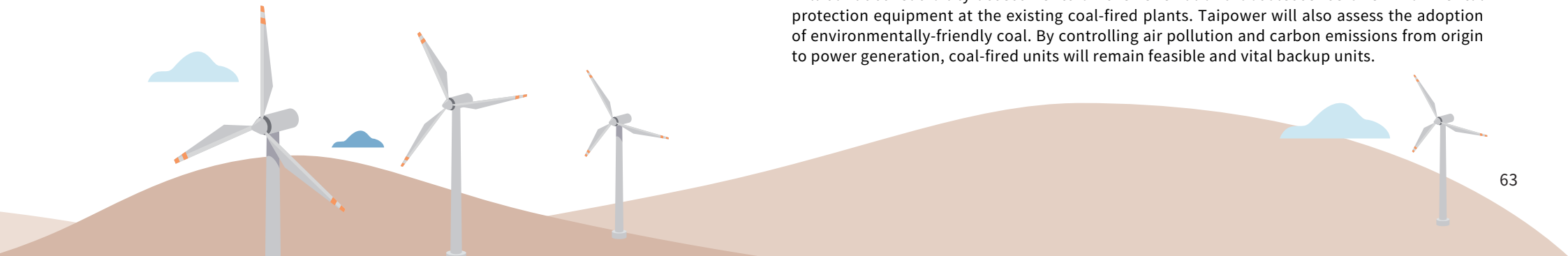
Taipower has vigorously worked to provide the impetus for the establishment of renewables, such as offshore and onshore wind, solar, geothermal, and small-scale and micro-hydropower. However, to maximize the development of renewables, both active development and joint development with private operators are necessary. For this reason, Taipower has continued to strengthening grid construction, creating a friendly, grid-connected environment for private applications, and collaborating with the private sector to fully stimulate the development of renewables.

### Actively Promote Gas-fired Generation Projects and Build Natural Gas Receiving Terminals

Gas-fired units produce less carbon and are cleaner than coal-fired units. Therefore, Taipower has committed to renewing and expanding the number and scale of gas-fired generation plants. Projects include the Tonghsiao renewal, the Datan expansion, the Hsinta renewal, new construction at Taichung, and renewal at Hsieh-ho. To ensure the stability of the natural gas supply for power plants and national energy security, Taipower has considered regional balance and the integration of ports and plants in determining its planning direction. The Company pushed forward the construction of its own natural gas receiving terminals in the Taichung and Keelung Ports (Hsieh-ho), while CPC Corporation is building a third natural gas receiving terminal. Through the joint efforts of the two companies, it is hoped that the construction of natural gas unloading facilities can be expanded, power dispatch flexibility and supply stability can be increased, and the goal of ensuring a friendly environment by reducing air pollution and greenhouse gas (GHG) emissions can be achieved while maintaining energy supply security and the overall power supply economy.

### Coal-fired Units Serve as Vital Backups

International energy policy has tended to pursue diversified energy ratios. In Taiwan, 97.4% of domestic energy depends on imports, and the power system is an independent grid. To ensure a stable power supply, energy security, and diversification, it is necessary to maintain some coal-fired generation. At the same time, Taipower is aware of the impact of coal-fired generation on air pollution and greenhouse gas emissions. To ensure a sufficient power supply, Taipower will conduct feasibility assessments on the renewal and obsolescence of environmental protection equipment at the existing coal-fired plants. Taipower will also assess the adoption of environmentally-friendly coal. By controlling air pollution and carbon emissions from origin to power generation, coal-fired units will remain feasible and vital backup units.



# Short, Medium, and Long-Term Plans for Energy Transition

In accordance with the government's energy policy, Taipower moved towards low-carbon power and renewable development while maintaining an actual reserve capacity of 12.2% in the Taipower system in 2022. The overall generation structure was 43.4% gas-fired, 34.8% coal-fired, 9.1% nuclear energy, 1.4% fuel oil, 8.6% renewable, and 2.6% from other power generation sources (including pumped storage and cogeneration). The proportion of Taipower's gas-fired generation first exceeded that of coal-fired generation in 2019. As gas-fired generation projects are successively commercialized, the 2025 target of 50% gas-fired generation will be achieved.

## Short-Term Actions

Since Taiwan is small and densely populated, land for power plants and lines is difficult to obtain. With the prevalence of the not-in-my-backyard (NIMBY) sentiment and concerns over greenhouse gas emissions attracting intense attention from the general public, the promotion of plant construction has been greatly hindered and takes a long time. Additionally, some of the existing nuclear power plants have been shut down prematurely, causing power supply shortages and making it difficult to plan the addition of conventional thermal power sources to replace them in the short term. To reduce the risk of power shortages, the following response measures were proposed:

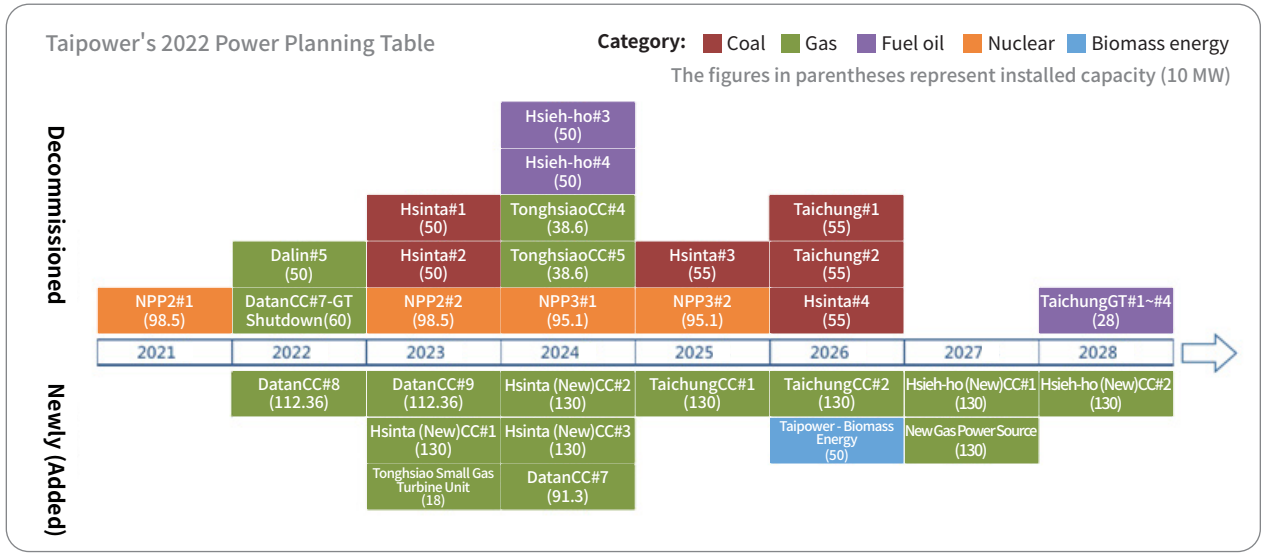
- Strengthen various demand-side management measures to depress peak power demand.
- Review the feasibility of using aging units as emergency backups.
- Ensure the stable operation of existing units and that the construction of new power generation units remains on schedule.

## Medium-Term Measures

Taipower continues to push forward with replacing its old plants with new thermal power plants. To facilitate the balance of power supply in Taiwan, improve generation efficiency, and work in conjunction with the government's low-carbon sustainability policy, Taipower has implemented renewal and expansion projects in the northern, central, and southern regions. At present, the renewal and expansion projects include wind, solar, thermal, and hydropower generation.

## Long-Term Power Development

Due to growing power consumption and the successive decommissioning of various units, Taipower has planned its long-term power development projects until 2028 with the goal of meeting electricity needs and remaining aligned with the government's energy transition policy and various environmental requirements. The plan is shown in the figure below:




Note: The decommissioning and addition of thermal and nuclear power units by Taipower between 2021 and 2028 is based on the "National Power Resources Supply and Demand Report for the Year 2021" by the Ministry of Economic Affairs.

# 3.2.2 Renewable Development

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## Promoting Renewable Energy

In terms of stimulating renewable development, Taipower has adopted friendly grid connection, demonstration and leadership, and system stability as its three main strategies.

(I) Friendly grid connection: Taipower will strengthen grid infrastructure, provide sufficient feeder capacity, boost the growth of renewable capacity, and assist privately built renewable generators with connecting to the grid smoothly.

(II) Demonstration and leadership: In addition to continuing to invest in renewable developments such as solar, onshore and offshore wind power, Taipower will participate in advanced high-tech energy demonstration projects. The Company will take the initiative to cooperate with industry, government, and academia in development, and then lead the private sector by promoting renewable investment through media publicity, education, and skill development.

(III) System stability: Despite the intermittent nature of renewable generation, Taipower is maintaining system stability and security while raising the penetration rate of renewables through technologies such as smart generation and dispatching, demand-side management, and energy storage facilities.

As the scale of green power production increases, so will the demand for grid connections. Taipower is laying the foundation to meet this need as part of its energy transition policy. In 2021, it finalized Phase 1 of the Green Energy Project and is scheduled to develop a renewable generation system with a total installed capacity of 160 MW between 2022 and 2024. The system will include solar photovoltaic, onshore wind power, geothermal power generation, and other energy types. Regarding the current status of renewable development, solar and wind power are the main focuses of work. In 2022, wind power generation reached 1072.2 GWh and solar photovoltaic generation reached 402.7 GWh.

### Renewables Generation Status

| | Deployments | Installed Capacity (MW) | Generation in 2022 (GWh) | Number of Households Accommodated |
|---|---|---|---|---|
| Wind Power | 25 sites<br>192 units | 415.24 | 1,072.2 | 298,000 |
| Solar | 54 sites | 287.45 | 402.7 | 112,000 |

Note: According to Taipower's open data statistics, the average monthly power consumption for a typical residential user is 300 kwh and the estimated annual power consumption is about 3,600 kwh.

In response to government policies, Taipower will continue to work on raising the proportion of renewable energy and researching and developing potential renewable sources. Through these actions, the Company hopes to achieve lower carbon emissions and more sustainable electricity for users in Taiwan.

### Government and Taipower Renewable Development Targets

| | Government's Target | | Taipower's Target | |
|---|---|---|---|---|
| Development Timeline | 2025 | | 2025 | |
| Item of Promotion | Capacity (MW) | Power Generation (billion kWh) | Capacity (MW) | Power Generation (billion kWh) |
| Hydropower | 2,122 | 5 | 1,825 | 3.52~4.8 |
| Onshore Wind Power | 886 | 2.2 | 408.2 | 1.08~1.15 |
| Offshore Wind Power | 5,617 | 12.3 | 403.7 | 1.38~1.59 |
| Solar Photovoltaic | 20,000 | 22.8 | 469.1 | 0.58~0.66 |
| Geothermal Power Generation | 20 | 0.102 | 1.4 | 0.009~0.01 |
| Fuel Cells | 0.7 | 0.0009 | - | - |
| Biomass Energy | 778 | 4.1 | - | - |
| Total | 29,423.7 | 46.5009 | 3,107.4 | 6.57~8.21 |

Note: The government targets are based on the "Overall Strategy of Green Energy Implementation" briefing by the Bureau of Energy, Ministry of Economic Affairs on July 11, 2021.

# The Current Status of Renewable Energy

Taipower will continue to play a leading role in the renewable power industry. In addition to hydropower generation, which has a century of history, the Company has also developed a complete plan for wind and solar power in recent years. Taipower is also investing in research and development for emerging fields such as geothermal and biomass energy. The current development status of renewables promoted by Taipower is as follows:

## Current Status of Renewable Energy

| | |
|---|---|
| **Hydropower** | To comply with the government's renewable energy policies and continue developing sustainable and stable conventional hydroelectric power, there are currently plans for a number of small-scale hydroelectric projects at various sites. These projects include the Jingshan Small Hydropower Project at the Liyutan Reservoir, the Hushan Small Hydropower Project, the ChiChi Nanan 2 Small Hydropower Project, and the First Phases of other small hydropower projects across Taiwan. The total installed capacity of these projects will reach 26.011 MW. Of the projects, the Jingshan Small Hydropower Project at the Liyu Lake Reservoir began commercial operations in September 2022. The remaining projects are scheduled to gradually begin commercial operations between 2023 and 2024. |
| **Wind power** | Since 2000, Taipower has been pursuing wind power development. By the end of 2020, the Company had completed the Jhongtun Wind Power Demonstration Project, Phases 1 to 5 of the Wind Power Generation Project, Penghu's Huxi Wind Power Project, and Kinmen's Jinsha Wind Power Project. There are currently 18 wind fields and 171 wind turbines in operation with a total installed capacity of approximately 306 MW. Phase 1 of the Offshore Wind Power Project is deploying 21 offshore wind power generators in the open sea off Fangyuan Township with a total installed capacity of about 109.2 MW, and an annual power generation capacity of 362 GWh. The project began commercial operations on December 30, 2021. In addition to continuing to develop land-based wind power, Taipower is also expanding wind power in offshore areas. In accordance with the government's plan to promote offshore wind power, Taipower will pursue ongoing planning and development in this area. It is expected that land-based wind power will reach 370MW of generation capacity in 2025. Along with offshore wind power this will help achieve the development capacity target of 403.7 MW. |
| **Solar power** | Phase 1 of the Solar Power Project was implemented in 2008. Since that time, a large number of solar photovoltaic systems have been built and, by the end of 2022, approximately 287 MW of solar PV installations have been completed. This includes the Tainan Salt Fields Solar PV Project, which is the largest solar PV project in Taiwan with a capacity of 150 MW. In 2020, the planning for the Green Energy Phase I project was initiated, aiming to add an additional 110 MW of solar PV capacity within the three-year period from 2022 to 2024. |
| **Geothermal power generation** | In cooperation with CPC, Taipower is undertaking the Yilan Renze Geothermal Generation Project with a capacity of 0.84MW. It is expected to be operating in 2023. |
| **Biomass power generation** | As Taiwan transitions to net-zero emissions, there is an urgent need to increase the number reliable and stable low-carbon energy sources. Internationally, wood pellets, as a carbon-neutral fuel, have been used with coal-fired power units for many years. The relevant technologies are mature and have already been commercialized. In consideration of the successful cases of international coal-fired power plants being transformed into biomass power plants, Taipower has formulated a plan to retrofit its decommissioned coal-fired units into low-carbon biomass units.<br><br>Taipower plans to retrofit Hsinta's existing coal-fired Unit 1 into a biomass power unit after its decommissioning. The estimated capacity of the retrofit is expected to reach 500MW, with a planned target of generating 3,000 GWh of renewable energy annually. |

## The Current Status of Renewable Energy Grid-Connections

Taipower is cooperating with the government to promote the development of renewable energy. While ensuring the safe operation of the grid, Taipower has adjusted its grid connection strategy with reference to technology and the latest international development trends. It has also considered financial operating conditions that meet the demands of renewable grid-connection expansion. The number of applications for various types of solar power plants and the corresponding accumulation of capacity are as follows (as of April 19, 2023):

### Accumulated Number of Cases and Installed Capacity of Various Types of Solar Power

| Case Status | | Cases (Number) | Capacity (MW) |
|---|---|---|---|
| Accepted Cases | Under review but not yet approved (A) | 4,963 | 10,161.57 |
| | Approved but currently without a signed contract (B) | 6,447 | 41,225.21 |
| | A contract has been signed but not currently connected to the grid (C) | 57,436 | 14,242.72 |
| | Subtotal (=A+B+C) | 68,846 | 65,629.51 |
| Grid-Connected Cases | | 56,078 | 10,539.23 |
| Official Power Purchase Cases | | 51,010 | 8,352.61 |

## Committed to Renewable Energy Efficiency

To improve the efficiency of renewable energy power generation, Taipower conducts regular preventative maintenance inspections to reduce unit failure rates. The Company also selects components that use materials with low-carbon footprints to reduce its environmental impact. By strengthening the maintenance of ventilation and air-conditioning equipment in renewable energy power plants and by installing energy-saving control equipment, the power consumption of plants has been reduced. At present, Taipower's onshore plants have set a future target of achieving a basic availability rate of 92.5%. In the future, Taipower will enhance its technical management capabilities and refine its wind energy forecasting system to reduce its failure rate. Meanwhile, through the establishment of a big data analysis system for wind plants, the Company will track the health status of its wind turbines, conduct fault prediction diagnosis, and optimize maintenance schedules. Taipower will also strengthen its management and maintenance of essential component inventories. For solar power, the appropriateness of night power consumption in the photovoltaic field is checked to avoid unnecessary energy consumption and elevate the overall power generated by facilities.

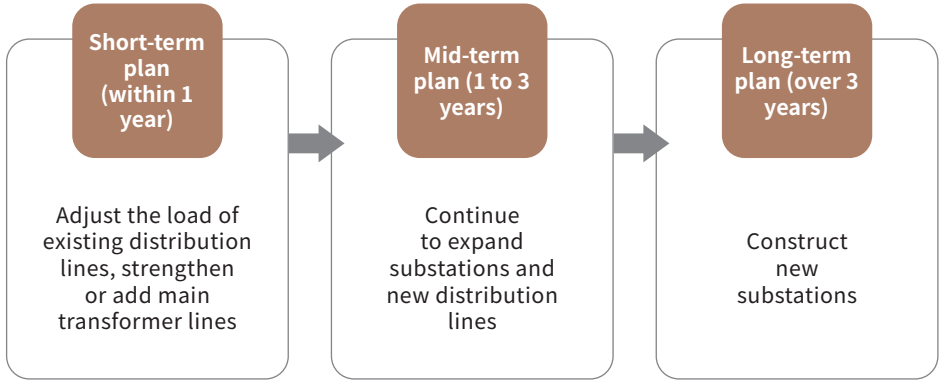
### Average Availability Rates of Renewable Energy from 2020 to 2022

| | 2020 | 2021 | 2022 |
|---|---|---|---|
| Availability rate of wind power (%) | 93.03 | 92.61 | 92.05 |
| Capacity factor of solar power (%) | 16.02 | 16.44 | 16.16 |

Note:Annual Wind Power Availability Rate = Unit Generating Hours (Including Standby Hours) /Annual Number of Hours
Solar Power Capacity Factor = Annual Power Generation of Units / Device Capacity * Year-Round Hours

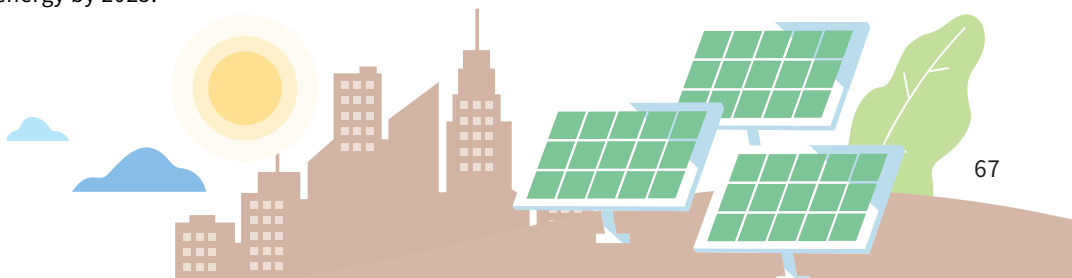
## Countermeasures to the Renewable Energy Challenge

Since government policy has placed a strong emphasis on solar photovoltaic power, Taipower must meet the demand for large-capacity, ground-based, solar photovoltaic grid connections as soon as possible. Branch offices located in the grid-connected hot zones actively visit local governments and solar photovoltaic installation operators. The offices guide installation operators to integrate with the grid through a centralized deployment method to avoid wasting Taipower's investment. Meanwhile, Taipower has continued to both implement its distribution-grade power grid reinforcement project that will enable increased renewable grid-connections and to promote short, medium, and long-term model plans:




Taipower is cooperating with the Ministry of Economic Affairs to plan a capacity allocation mechanism for joint booster stations. This will allow the Company to maximize its utilization of limited power transmission resources. To date, Taipower has formulated capacity allocation guidelines and operating procedures. In addition, Taipower has planned specific solar photovoltaic areas so it can appropriately allocate resources to developing joint booster stations with the capacity to accelerate renewable grid-connections.

To facilitate easy accessibility to information, Taipower established a renewable application progress query system so that the public can make immediate inquiries regarding the status of project applications. There is also a distribution-grade renewable capacity query system that guides developers that are searching for sites to build solar photovoltaics in areas where the grid-connecting capacity is still abundant. As Taipower is actively promoting wind, solar, geothermal, and small hydro renewable energy development projects, it is necessary for the Company to provide a friendly, grid-connection environment for private industry that is seeking to pursue green energy power generation. These steps are facilitating Taipower's move towards actualizing the government's goal of 20% renewable energy by 2025.



CHAPTER 04

# Leader of Smart Grid Development

## Development Vision

Technology is changing our world at an astonishing pace. The wave of artificial intelligence (AI), rapid changes in information and communications technology (ICT), breakthroughs and innovations of big data, blockchain, and cloud technology have all overturned the business models of the past and revolutionized many industrial applications. Taipower is committed to using research and innovation to propel the development of low-carbon electric power. The Company actively invests in smart grid deployment, introduces new technologies, improves its management efficiency, and increases its operational effectiveness. It has also applied itself to meeting the important infrastructural demands of renewable energy.

Taipower is in alignment with the government's policies and plans. In the short term, the Company is focused on enhancing operational flexibility, developing a stable power supply network with a high proportion of renewable energy, and strengthening its flexible dispatching capabilities for grid supply, demand, and outages. In the medium term (by 2025), the Company will be focused on reinforcing grid resilience and establishing a safe and highly adaptable grid that can respond to climate change. In the long term (by 2030), Taipower will have implemented reforms in the electricity industry, increased the prevalence of low-carbon energy, devoted itself to the development of a safe and reliable grid, and propelled open and transparent information and fair market transactions.

## Performance Highlights

- By the end of 2022, there had been more than 2.108 million AMI installations encapsulating 81% of the nation's power use information. It is estimated that 3 million AMI smart meters will be deployed by 2024.
- In 2022, the real-time monitorable capacity of renewables reached 4.26GW.
- The deployment of 100 kilometers of optical cables, 42 sets of fiber optic communication systems, 720 communication circuits, and 590 sets of routers was completed in 2022.

# 4.1 Smart Grid General Planning

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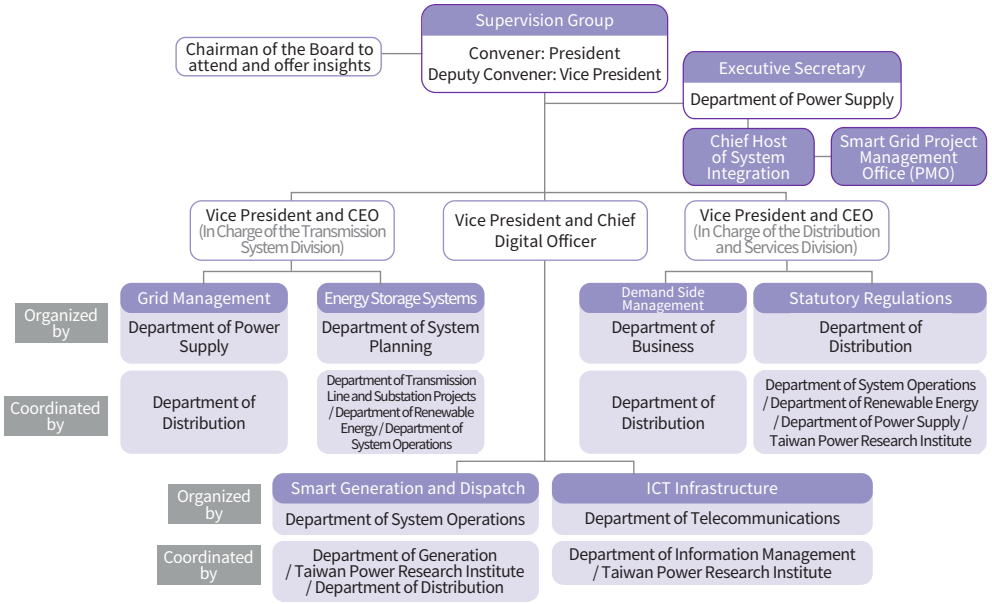
Smart grids are vital to driving energy transition, leading industrial transformation and new economic development. Taipower is proactively reducing the impact of renewable energy generation's intermittency, enhancing grid resilience, and strengthening and consolidating power transmission and distribution systems. Additionally, tthe Company is committed to improving disaster prevention and troubleshooting capabilities while increasing the system's supply and demand performance, incorporating load management methods and enhancing user participation opportunities through progressively building a stable and effective smart grid.

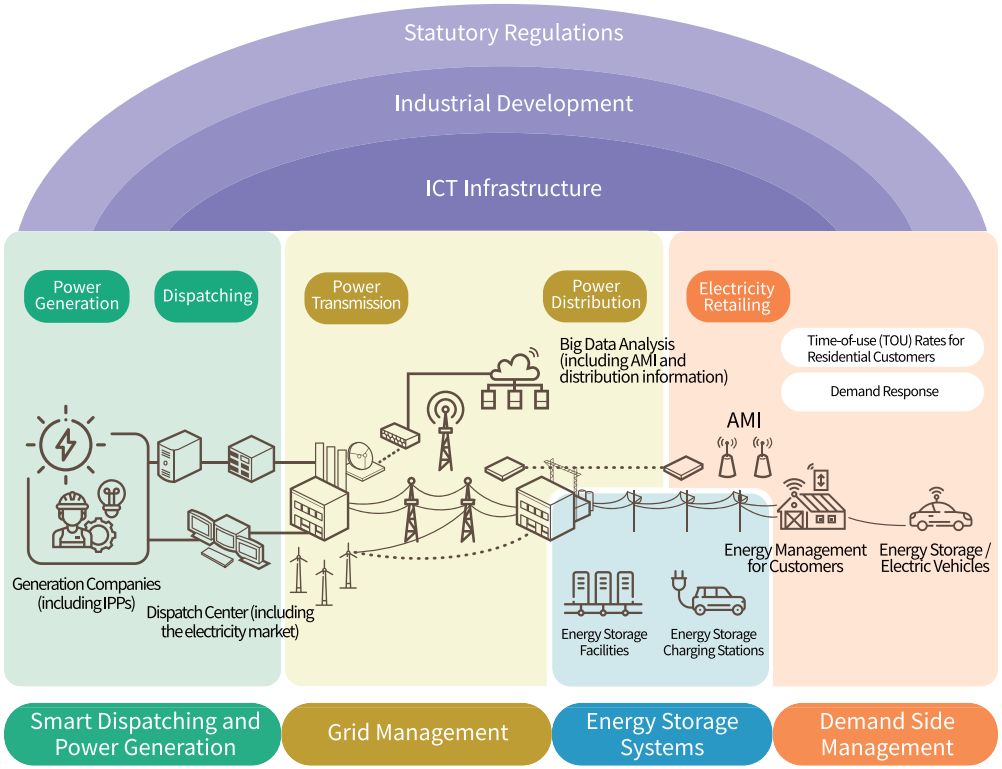
In developing the smart grid, the priority objectives are: (1) responding to the challenges of renewable energy grid connections, (2) strengthening the resilience of existing grids to enhance power supply quality in the face of extreme climate, and (3) encouraging user participation in energy conservation to improve power system operating efficiency. In response to the broader Smart Grid General Plan, Taipower formed an internal Smart Grid Task Force with the Company's president as convener. Regular meetings with relevant units are held to review projects, execution status, and future planning directions.

## Smart Grid Task Force




## Smart Grid Action Plan

On March 27, 2020, Taipower began to carry out smart grid construction in accordance with The Smart Grid Master Plan as approved and amended by the Executive Yuan's Bureau of Energy. The plan is oriented towards problem-solving and system integration, and is divided into 7 key strategic areas, 21 specific practices, and 14 checkpoint objectives. Taipower is mainly responsible for five areas, 17 specific practices, and 13 checkpoint targets. The Company continuously implements and reviews its performance in these areas to strengthen its energy management and grid resilience.



## The Smart Grid General Planning Framework

| Key Strategic Areas (7 items) | Specific Practices (21 items) |
|---|---|
| Smart dispatching and power generation | · Establish a renewable energy generation monitoring system<br>· Establish an energy trading platform<br>· Establish a big data damage monitoring system for the boiler tubes of coal-fired units<br>· Undertake ancillary service demand research |
| Grid management | · Apply and promote transmission system data in planning, operations, and maintenance<br>· Apply and promote feeder automation system data |
| Energy storage systems | · Construct an energy storage system at a Taipower site<br>· Establish an ancillary service procurement mechanism |
| Demand side management | · Establish a low voltage Automated Meter Infrastructure (AMI)<br>· Apply AMI data<br>· Review electricity price structures and run trials on dynamic prices<br>· Review and run trials on various demand response schemes |
| ICT infrastructure | · Enhance security of the smart grid information program<br>· Enact a smart grid data application plan<br>· Establish an upgrade plan for backbone/regional fiber optics communication systems<br>· Introduce an electrical IoT communication system to the plan |
| Industrial development | · Expand product and system services (Industrial Development Bureau)<br>· Drive enterprises to participate in the electricity market (Industrial Development Bureau) |
| Statutory regulations | · Review current electricity-related regulations (Bureau of Standards, Metrology and Inspection)<br>· Refine renewable generation system interconnection technology (Taipower)<br>· Develop national standards for smart grids and establish an equipment testing platform (Bureau of Standards, Metrology and Inspection) |

## Smart Grid Performance in 2022

Taipower experienced several major achievements this year within the five fields under its purview. They are described as follows:

### Smart dispatching and power generation

The Company consolidated existing renewable energy generation and established an information management platform, created platforms for power market trading and coal-fired unit big data monitoring, and introduced a Distribution-level Renewable Energy Advanced Management System (DREAMS). The real-time monitoring capacity of renewable energy (GW) reached 4.26 GW in 2022.

### Grid management

Plan, operate, and maintain transmission system data, and consolidate information to strengthen the management of power transmission and distribution assets. In 2022, the average failure time of transmission system equipment was 0.373 hours/year.

### Energy storage system

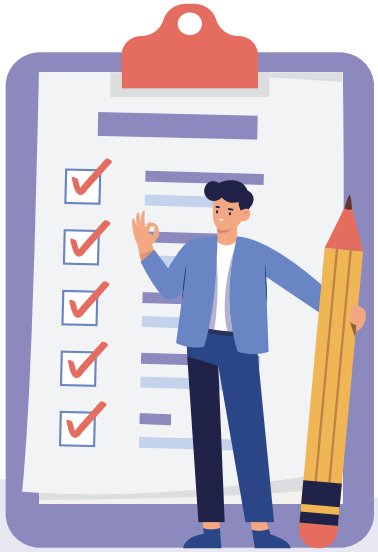
The capacity of energy storage systems reached 150.8 MW.

### Demand side management

Taipower is targeting potential power-saving users in its deployment of smart meters. By the end of 2022, a total of 2.108 million high-voltage AMIs had been installed.

### ICT infrastructure

Completed the installation of 100 kilometers of optical cables, 42 optical fiber communication systems providing 720 communication circuits, and installed 590 sets of routers in 2022.



## Smart Grid Performance and Target

| Review Objectives | 2022 Target | | 2022 Performance | 2025 Target (Approved Version) |
|---|---|---|---|---|
| 1. Real-time monitorable capacity of renewables (GW) | 7 GW | | 4.26 GW (Wind power 1.52 GW; Solar photovoltaics 2.74 GW) | 16.5 GW |
| 2. Accuracy of renewable forecasts (Day-ahead / hour-ahead error rate %) | Wind power | 13% / 6.5% | 8.78% / 4.8% | 10% / 5% |
| | Solar photovoltaics | 12% / 6% | 5.00% / 3.42% | 10% / 5% |
| 3. Ancillary service reserve (MW) | Regulation reserve | 1,000 MW | 1,000 MW | 1,300 MW |
| | Real-time reserve | 1,100 MW | 1,149 MW | 1,100 MW |
| | Supplemental reserve | 1,100 MW | 1,193 MW | 1,100 MW |
| 4. Number of electrical and mechanical accidents (Times / year) | 16 | | 8 | 15 |
| 5. Equivalent Unavailability Factor (EUF) of coal-fired power plants (Total hours of equiva lent tube rupture outage) | Under 1.35% (Under 118 hours / unit / year) | | 0.09% (7.5 hours / unit / year) | 1.2% (105 hours / unit / year) |
| 6. Average time for transmission system equipment failure (Hours / year) | 1.44 | | 0.373 | 1.42 |
| 7. The ratio (%) of power recovery outages for downstream automated feeders (within five minutes) | 35% | | 49% | 70% |
| 8. Capacity of energy storage systems (MW) | 102 MW | | 150.8 MW | 590 MW[Note] |
| 9. AMI smart meter infrastructure (cumulative number of households) | 2 million households | | 2.108 million households | 3 million households (by 2024) |
| 10. AMI user power use data available online for inquiry (hours) | Within five hours | | Within five hours | Within four hours (Two hours for TOU customers) |
| 11. Participation in demand response scheme (GW) | 2.6 GW | | 2.77 GW | 2.8 GW |
| 12. Bandwidth improvement of backbone / regional fiber optics system (Gbps) | 100Gbps backbone network optimization | | ✓Completed on-site installation of 590 sets of IP-MPLS system area network (10Gbps) routers.<br>✓Completed the draft plan for the next-generation optical transport network (OTN) system. | Regional 10Gbps (Complete in 2023) |
| 13. Introduction of IDS information security protection | Promote experimental sites (8 domains) | | Building completed on 8 domains | Complete all dispatch centers (32 domains) |

Note: According to the "National Power Resource Supply and Demand Report for the Year 2022" published by the Bureau of Energy in July 2023, Taipower has set a target to install 1000MW of energy storage batteries by 2025.

### The Smart Grid Index (SGI)

The Singapore Smart Grid Index (SGI) is an international assessment of smart grid development. It evaluates the progress of power companies in implementing smart grid initiatives based on seven main themes: customer empowerment and satisfaction, cybersecurity, renewable energy, integration of distributed energy resources, power reliability, data analysis and monitoring, and control. The research covers the Asia-Pacific region, Europe, and the Americas.

The report surveyed a total of 94 power companies from 39 countries worldwide. Enedis, a subsidiary of the French electricity holding group EDF, achieved the highest score of 98.2 and secured the top position. Taipower and UK Power Networks (UKPN) tied for second place with scores of 94.6. Taipower has consistently maintained its position on the list, outperforming other well-known Asian power companies from Japan and South Korea.

**2022 BENCHMARKING RESULTS**

| Utility | Country/ Market | Score |
|---|---|---|
| Enedis | FRA | 98.2 |
| TaiPower ★ | TWN | 94.6 |
| UKPN | GBR | 94.6 |
| ConEd | USA | 92.9 |
| WPD | GBR | 92.9 |
| CitiPower | AUS | 91.1 |
| DEWA | ARE | 89.3 |
| SP Energy Networks | GAR | 89.3 |
| SDGE | USA | 87.5 |
| FPL | USA | 85.7 |

# 4.2 Smart Grid Application – A Vehicle-to-Grid Bi-directional Charging System



## Taipower Partnered with Gogoro to Build the World's First Electric Scooter V2G Battery Exchange Station

As a result of the trends of energy transition, working to achieve net-zero-carbon emissions, and the increasingly widespread adoption of electric vehicles, the effective conversion of substantial electricity demand into power supply poses a significant challenge. To meet this challenge, Taipower, in addition to actively pursuing the development of renewable energy sources, is exploring innovative approaches beyond the conventional paradigm of large-scale power plant construction. By leveraging emerging technologies, Taipower aims to introduce diverse power sources. As part of this effort, Taipower is collaborated with Gogoro, a prominent electric scooter manufacturer, to establish the world's first electric scooter battery swapping station featuring Vehicle-to-Grid (V2G) functionality. This pioneering initiative expands upon the internationally acclaimed battery swapping business model by incorporating the added capability of bidirectional power transmission. Consequently, it not only facilitates the creation of a decentralized energy storage virtual power plant but also fosters enhanced grid stability and cultivates novel business models for electricity trading, thus fostering a mutually beneficial future.

Unlike the current battery swapping stations that only support one-way charging, the V2G battery swapping station has the capability of bidirectional charging and discharging. It also has a power capacity of 60 kWh, which can provide electricity for an average household's needs for 4 to 5 days. With the integration of an energy management system, it can intelligently schedule charging, turning the distributed battery swapping stations into decentralized energy storage stations that can also feed electricity back to the grid. As of November 28, 2022, Gogoro has deployed a total of 12,292 battery swapping cabinets across Taiwan, with a total system battery capacity of 1.59 GWh (including the battery swapping stations and batteries on electric scooters). This amount of electricity is sufficient to power the entire city of Taipei for 53 minutes.

At the demonstration site of Taipower's V2G technology, the Energy Management System (EMS) has integrated V2G battery swapping stations/charging piles, small-scale green energy/storage units, and controllable loads. The system has successfully completed functional verification related to V2G technology. Currently, the demonstration site is conducting tests with a schedule of charging from 8 a.m. to 12 p.m. and discharging from 4 p.m. to 8 p.m. This will provide understanding on whether there is an incentive for business operators to feed electricity back to the grid under different electricity pricing schemes. It also allows for the calculation of energy consumption during the charging and discharging process. The results show that from January 1, 2022 to November 18, 2022, a total of 10,452 kWh of electricity has been fed back to the grid, indicating that there is an incentive to attract business operators to feed electricity back to the grid.

In addition to focusing on system design to reduce electricity loss, ongoing research endeavors also involve leveraging the advanced capabilities of the Gogoro Network, such as its big data analytics, artificial intelligence (AI), and machine learning. By harnessing these technologies, participants aim to enhance the intelligent management of batteries, and ultimate achieve grid balance. The ultimate goal is to transform the smart battery swapping platform into an indispensable energy storage facility within the power grid.

## Future Research Development and Prospects

In response to the government's energy transition and the transformation of the power industry ecosystem, as well as to achieve the phase goal of net-zero transformation by 2025, Taipower is making changes to both generation forms and fuel types. Simultaneously, the Company is decommissioning and replacing old units with high-efficiency and environmentally friendly equipment such as advanced ultra-supercritical units to improve power generation efficiency and reduce air pollutant emissions.

Furthermore, the power generation, grid, and user consumption patterns are shifting from the traditional centralized model to a decentralized model where distributed generation facilities are combined with energy storage systems to form microgrid structures. User demand response is coordinated through neighboring microgrids, while the overall power supply stability is balanced through a large-scale transmission network. This approach aims to simultaneously meet electricity demand and grid reliability, reducing the probability of grid accidents.

Taipower's research and development efforts focus on promoting new technologies, addressing operational issues, and dealing with significant company and government decisions. The "6-3-1 Research and Development Investment Portfolio" is used to plan and formulate research and development directions. The Future Power Technology Forecasting Program is utilized to identify key technological developments that enhance grid resilience, ensure stable power supply, drive energy transition, and facilitate corporate transformation. The development of high and low voltage systems, energy storage, and other technological plans are designed to meet future operational development trends, align with electricity market demands, achieve a sustainable balance in society, the economy, ecology, and environment, and to create new value in the development of innovative technologies for the enterprise.

CHAPTER 05

# Provider of Services for Smart Living


## Development Vision

With the goal of serving as Taiwan's provider of services for smart living, Taipower is working to make power services smarter and immediately accessible by introducing new 5G and AIoT technologies and equipment to meet user needs. At present, Taipower is pursuing both demand response and energy conservation as key elements of demand side management. Demand response analyzes power supply data through smart meter deployment, so the electricity consumption of users can be better understood. This makes the match between power supply and demand more immediate, and effectively guides customers to use electricity through the time-of-use rates. Energy conservation efforts are principally aimed at avoiding the unnecessary waste of electricity. Taipower has implemented power-saving incentive measures and built multiple information transmission channels so that the public can participate in the work of energy conservation and carbon reduction. By creating an atmosphere of power saving, we hope to drive the collective effect of power saving for all people, so that the suppression of peak load, energy saving and power saving will become a national movement and achieve a win-win situation for the power industry, customers and the environment.

Every year, Taipower continues to promote and refine its various demand response measures. In line with its deployment of smart meters, the Company will develop diverse demand response solutions to help reduce net nighttime loads and combine the automatic demand response solutions of smart home appliances and energy management systems with real-time prices that dynamically reflect the power supply situation and encourage users to manage electricity consumption more flexibly. Demand response uses monthly operation planning, day-ahead economic scheduling, same-day economic dispatch, and less than 15 minutes and other diversified ways of providing flexibility to adjust power system dispatching. As efforts continue, the demand response participation target is expected to reach 3.0GW by 2030.

## Performance Highlights

- Implemented Time-of-Use (TOU) rates to stimulate the management of public power consumption, and cumulatively suppressing the peak load by 4.16 GW in 2022
- Promoted demand bidding and bolstered user participation to suppress peak loads and implemented demand-response load management measures on the highest load days throughout 2022 and effectively reducing peak loads by 1.15 GW
- Provided communities and associations with power-saving advocacy services. A total of 1,502 sessions were held in 2022, attracting 200,000 participants
- Taipower's Power-Saving Service Team visited 4,456 customers in 2022, with an estimated power saving of 103.24 GWh
- In 2022, Taipower's 1911 customer service hotline received more than 1.705 million calls. The proportion of calls that were answered within 20 seconds was 97.88%
- In 2022, a total of 5,434 cases were received through the user suggestion box and 4,981 dedicated services were provided for corporate customers

# 5.1 Smart Electricity Services

## 5.1.1 Demand Side Management Measures

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In recent years, demand for electricity in Taiwan has been growing. Coupled with the difficulty of setting up new power generation units and climatic anomalies, this has led to an increasingly tight supply of electricity. According to Article 47, paragraph 4 of the Electricity Act, the Electricity Retailing Enterprise shall draft an annual incentive program that encourages and assists users to save electricity. The plan will be submitted to the electricity industry regulatory authority for review.

### Demand-Based Bidding

"Demand-Based bidding" refers to the practice of allowing users to sell back the electricity they save to Taipower during periods of high system load. Users bid their desired price, and Taipower determines the winning bidder based on the lowest bid. If the winning bidder successfully reduces their electricity consumption during the designated period, they are eligible for a reduction in their electricity bill. This measure empowers users by allowing them to set their own price, stimulating their potential for reducing electricity usage. It helps improve the system load profile, thereby delaying the need for new power generation facilities and reducing the risk of potential power shortages. In the future, Taipower plans to provide more real-time power consumption information through smart meters, and to refine demand response scheme designs. For example, the Company will coordinate the increasing number of renewable energy grid-connections to adjust periods for users to suppress power consumption. This will provide more flexible resources for the power system. Taipower will also be reviewing and piloting a variety of demand response plans.

### Time-of-Use Rates

The Time-of-Use (TOU) rates set different electricity prices for peak and off-peak periods. This reflects the power supply costs in different periods and guides users to reduce or shift peak power consumption to off-peak periods. Taipower has now used TOU rates for more than 40 years since they were first employed in 1979. At present, there are a total of 14 TOU rates for all kinds of customers. Among them, TOU rates have been fully applied to high-voltage users since 1989, while low-voltage users are free to choose to participate or not.

| Power Consumption Category | Total Customers (Households) | TOU Customers (Households) | Ratio (%) |
|---|---|---|---|
| Meter-rated lighting for non-businesses | 13,373,135 | 63,472 | 0.47 |
| Meter-rated lighting for businesses | 1,040,266 | 127,306 | 12.24 |
| Low-voltage electricity | 306,781 | 38,049 | 12.40 |
| High-voltage electricity | 24,854 | 24,854 | 100.00 |
| Ultra-high-voltage electricity | 673 | 673 | 100.00 |
| Total | 14,745,709 | 254,354 | 1.72[Note] |

Note: If only potential customers (i.e., those using >700 kWh per month for residential and >1100 kWh per month for small stores) are considered, time tariff accounts for about 15% of the total number of customers.

Note: With the exception of contracted light and contracted power (which are billed on a capacity basis without seasonality), the rest of the electricity tariff is applied seasonally. The proportion of users is 99%

### Description of Electricity Type

In line with the deployment and application of smart meters, Taipower introduced Residential and Commercial Simple Time-of-Use (TOU) Pricing in 2016. In May 2021, the Company further launched Standard Three-Tiered TOU Pricing for Lighting and Three-Tiered TOU Pricing for Low-Voltage Electricity to provide users with multiple options. In May 2022, Taipower introduced Electric Vehicle Charging and Swapping Facility Pricing to cater to the growing demand for electric vehicles. Together, these pricing plans offer users a diverse range of choices.

Additionally, with the increasing generation of renewable energy, there have been changes in peak and off-peak hours within the power system. To accommodate this, Taipower has adjusted the peak and off-peak periods for time-of-use pricing. These were officially implemented in 2023.

| Supply Voltage | Category | | Scope of Application | Example of Application |
|---|---|---|---|---|
| Low voltage | Contracted light and electricity | | Lights, small appliances, and alarms for outdoor public facilities | Public street lights, alarms |
| | Meter-rated lighting | Electricity for non-businesses | The total capacity of electricity used for residential purposes or for lights, small appliances, and electric power in non-productive premises other than residences is less than 100 kw | Residences |
| | | Electricity for businesses | | Small-sized stores |
| | Low-voltage electricity | | For lights, small appliances, and electric power in production or non-production premises with a contracted capacity of more than 1kw but less than 100kw. In cases where the power supply is 380V with no technical difficulties, the capacity can be expanded to 499 kw | Medium-sized organizations, schools, supermarkets, medium-sized shopping malls, small and medium-sized factories, electric vehicle charging and swapping facilities |
| High voltage and above | High-voltage electricity | | For lights, small appliances, and electric power in production or non-production premises with a contracted capacity of more than 100kw | Large-sized factories, organizations, schools, banks, department stores, and electric vehicle charging and swapping facilities |
| | Ultra-high voltage electricity | | | Mega factories, MRT systems, airports |

## Demand Side Management Measures

Taipower focuses on demand-side management, with demand response and energy conservation as its two main driving directions. The goal is to create an energy-saving atmosphere, promote demand response, and encourage energy-saving practices among the general population. By generating a collective drive for energy conservation, the aim is to reduce peak loads and promote energy efficiency as a nationwide movement. This will drive changes in societal behavior, and encourage the active participation of the entire population in energy conservation and in carbon reduction efforts.


| Measure | | Description | Applicable customers | Results |
|---|---|---|---|---|
| TOU Rates | Use of TOU rates since 1979 | Reflects the cost of electricity during different periods. Encourages off-peak electricity use to reduce energy consumption during peak hours. | Optional for meter-rated lighting and low-voltage customers; applicable to all high-voltage customers | The cumulatively suppressed peak load reached 4.16GWh in 2022 |
| | Launched Simplified Residential / Commercial TOU rates in 2016 | Provides more diverse rates for residential/commercial customers. Price signals are used to guide users to reduce electricity consumption during peak hours, thereby achieving the goal of reducing peak load. | Residential, small shops and low-voltage customers | |
| | Added new three-stage TOU rates for standard type and low-voltage meter-rated lighting in 2021 | | | |
| Demand Response Load Management Measures | Implemented Air Conditioner Duty Cycling Load Control Measures in 1991 (Ended on December 31, 2022) | Central air-conditioning systems are paused for 15 minutes in every 60 minutes of operation. Packaged air conditioning systems are paused for eight minutes with 22 minutes of operation to suppress peak loads. | Non-productive customers (e.g., office buildings, schools) | The 2022 peak load day (July 22) exceeded the low peak load by 1.15 GW |
| | Implemented Power Consumption Reduction Measures in 1987 | Provides reduced rates as incentives to encourage customers to reduce electricity consumption during peak hours or to shift to off-peak hours, to reduce system peak loads. | Either (super) high-voltage customers with more than 100 kW of dedicated capacity as specified in their contracts (could include factories and educational institutions or schools) | |
| | Implemented Demand-Based Bidding Measures in 2015 | Through user-defined feedback pricing, more autonomy is given to customers to reach their power-consumption mitigation potential and improve system loads. This reduces the demand for new power development and minimizes the risk of power shortages | Users that are frequently above high-voltage use levels | |
| | Implemented new Demand-Based Bidding Measures – a Joint Solution - in 2017 | Allows customers to apply for Demand-Based Bidding in groups | Users that are frequently above high-voltage use levels | |
| | Implemented emergency response measures and pact-guarantees in 2021 | In line with load reduction in cases of emergency, the system improved demand-side resilience | Users that are frequently above high-voltage use levels | |
| | Implemented flexible nighttime reductions from 2022 | Offers flexible suppression options for different hours during nighttime peak periods to encourage users to reduce power consumption. | Users that are frequently above high-voltage use levels | |
| Power-Saving Service Team | | Monthly visits to high-voltage users. Teams use high-voltage AMI data analysis and simple equipment diagnostic questionnaires (air-conditioning equipment, motors, lighting equipment, etc.) that help users grasp power consumption, inventory power saving potential, and promote Demand Response Measures to maintain a stable power supply. | Users that are frequently above high-voltage use levels | Taipower's Power-Saving Service Team visited 4,456 users in 2022, with an estimated power saving potential of 103.24GWh |
| Community Energy Saving Campaigns | | Provides free power-saving advocacy services for communities and associations. Taipower uses assemblies to promote power-saving, share energy-saving related knowledge and experiences. The Company advocates proper power-saving techniques, the use of high-efficiency energy-saving products (e.g., LED lighting), and provides electricity improvement recommendations for public facilities. | Local communities and associations | A total of 1,502 seminars were organized in 2022, with approximately 200,000 participants |

## 5.1.2 Power Saving Performance

In order to encourage energy conservation in practice, Taipower has employed power-saving incentives since July 2008. The Company continues to introduce new measures to maintain customer motivation and prompt additional power-saving over the long term. In order to increase user interaction and the effectiveness of voluntary power saving, a registration mechanism was introduced in 2018. Customers who sign up through the website, customer service hotline, or at a service counter will receive a reward of $0.6 per kWh of electricity saved, with a minimum bonus of $84 per period (2 months). The same year, a Power-Saving Reward Points mobile application was launched. This allows users to collect points by participating in various energy-saving puzzle activities on the app. Points may be redeemed for prizes or used to participate in sweepstakes. The goal is to promote power-saving among the public and to create a power-saving culture and habits. Taipower will continue to organize power-saving promotional activities that convey power-saving concepts through innovative and amusing approaches.

### Power Savings Reward Performance in 2022

| Year | Amount of saved electricity (Billions of kWh) | Reward amount for saving electricity (NT$100 million) | Carbon dioxide emission reduction (10,000 metric tons) | Equivalent number of Daan Forest Parks (for CO2 absorption capacity) in one year |
|---|---|---|---|---|
| 2020 | 1.19 | 10.3 | 61 | 1,558 |
| 2021 | 1.49 | 11.9 | 76 | 1,948 |
| 2022 | 2.31 | 17.0 | 117 | 3,016 |

Note:
1. Calculated based on the 2021 electricity emission coefficient of 0.509 kg $CO_2$e/kWh announced by the Bureau of Energy, Ministry of Economic Affairs in November 2022 and the 2020 Energy Bureau report on Daan Forest Park's absorption of 389 metric tons of $CO_2$ each year.
2. The performance of power-saving rewards is derived from the statistical data of customers who have logged in and completed power-saving reward activities (4.22 million customers in 2020, 4.34 million customers in 2021, and 4.32 million customers in 2022).
3. The calculation of electricity consumption reduction for the current year is based on the previous year, which is also the base year.

## 5.1.3 Digital Transformation 3-3

Taipower has formulated a clear development blueprint for digital transformation, focusing on four key areas: platform construction, data governance, talent cultivation, and innovative applications. By the end of 2021, two major infrastructure projects – the island-wide fiber-optic communication system and the big data platform – had been completed, establishing a solid foundation for Taipower's future digital transformation. Taipower will continue to dedicate effort to driving digital transformation. Through top-down strategic planning and bottom-up innovation inspirations, it aims to stimulate innovative reforms within different units. A consensus among Taipower employees on promoting digital transformation has been consolidated. Taipower aspires to become a driving force in the energy technology industry as Taiwan's power sector moves towards liberalization.

### The Construction of a Smart Grid

After the proportional increase in renewable energy generation, there has been a significant system load discrepancy due to the integration of intermittent renewable energy into the grid. The success of this integration requires a more flexible grid and the ability to stabilize the power supply quality through flexible scheduling. Taipower utilizes advanced technologies such as 5G, AI, IoT, and blockchain to integrate distributed energy resources while pursuing power system optimization. Through the digital integration of power resources, Taipower aims to create a digital energy internet with a smart grid at its core.

Taipower's smart grid is developing in three stages. The first is Smart Grid 1.0 and focused on infrastructure development. The second, Smart Grid 2.0, emphasizes practical operational models, and will ultimately lead the third stage, or Smart Grid 3.0, when the energy market opens up and the efficient integration of energy is achieved thereby enabling widespread applications. Currently, Taiwan is in the second stage of smart grid implementation, which emphasizes ensuring the stable operation of the power system, enhancing power supply quality, and encouraging user participation in energy conservation.

Taipower also utilizes AI and big data analytics to perform predictive maintenance and renewable energy generation forecasting. For thermal power units, preventive maintenance applications have already been implemented to achieve operational optimization and cost savings. For wind and solar photovoltaic energy, correlation predictive models can be established between power generation and sunlight data, providing a forecast for wind and solar power generation over the next 48 hours. This information assists with system dispatching and unit generation scheduling.

## Strengthening Communication Infrastructure

To support Taipower's digital transformation and leverage digital innovation technologies that drive smart operations, Taipower is actively enhancing its communication infrastructure by constructing an Ultra-High-Speed IP Fiber-optic Communication System to meet the communication and transmission bandwidth requirements for future applications such as the smart grid, 5G, AI, and IoT. The system will also enhance the reliability of the communication system. The core network construction for Phase 1 was completed on November 20, 2020, and the construction of Phase 2 for the relay backbone network was completed on December 10, 2021. The construction of Phase 3 for the access network was reported for inspection on December 5, 2022, and the Company is currently working diligently on the inspection and acceptance of the Phase 3 access network. Work has also begun on the construction of the Phase 4 synchronous clock source system.

To ensure a stable power grid and a reliable power supply, Taipower actively strengthened the communication systems at power plants, ultra-high-voltage substations, primary substations, secondary substations, distribution substations, and service centers in 2022. This includes laying 100 kilometers of optical cables, setting up 42 sets of fiber-optic communication systems, providing 720 communication circuits, installing 590 access routers for protection relay, dispatching line and feeder automation systems, and facilitating the operation, monitoring, protection, load balancing, and other related operations of the entire power grid.

In response to the waves of 5G, AI, and IoT technology development, Taipower will continue to establish relevant 5G application services. These include implementing vertical applications in the power field and deploying wireless communication for power terminal devices. Taipower will continuously review and plan for the optimal deployment to improve operational efficiency and effectively utilize power usage.

## An Introduction to 5G Service Applications

Taipower has identified a number of projects that can utilize 5G technology to offer application services. In collaboration with the Kaohsiung Asian New Bay Area 5G AIoT Innovation Park project, the a 5G AIoT Promotion Office was established at the Southern Power Plant in 2021 to conduct verification of power applications related to 5G AIoT. In January 2022, a 5G AIoT Promotion Team was formed internally, and through brainstorming and identifying actual needs within various units a Real-time Collaboration System for Switchyards in Southern Power Plants was proposed. The system aims to enhance operational safety and logistics collaboration using 5G AIoT technology.

On June 28, 2022, a matchmaking briefing was held, with the participation and guidance of the Ministry of Economic Affairs' Asia Silicon Valley 5G AIoT Project Office and the Kaohsiung City Government. The Real-time Collaboration System for Switchyards in Southern Power Plants project was launched. It subsequently underwent public review in January 2023 and was opened to bidding from February 2 to 13, 2023. The initiative aims to facilitate the implementation of 5G AIoT technology and establish its vertical application in the power industry.

## Mobile App Development

Taipower has combined mobile digital technology with AMI smart meter big data applications to launch the Taiwan Power App, which provides functions such as electricity bill inquiry and payment, service applications, electricity management, visualized electricity consumption charts, power outage reporting, and more. This app aims to make electricity usage more convenient for the public. Taipower has also introduced a Power Instant App that allows users to earn points by participating in energy-saving and educational activities. These points can be redeemed for prizes or entry into lucky draws. The app serves to promote key concepts in energy conservation among the public and to foster a culture of habitually saving electricity.

Furthermore, to promote intelligent occupational safety and health, Taipower has developed a Smart Occupational Safety Management App. The main features of the app include reporting work starts/finishes, clocking in/location tracking, and message notifications. It enables the more effective management of contractors by allowing for real-time monitoring of their personnel, activities, timing, locations, and products. This encourages contractors to be self-aware and comply with occupational safety regulations, leading to the more effective management of contractors.

To enhance the efficiency of employee work, communication, and data sharing, Taipower has also implemented a Taipower Cloud Drive (iCloud) App. The app provides a platform for employees and subcontractors to exchange data within and outside the network while ensuring security and convenience.

# 5.2 Customer Service and Management

## 5.2.1 Diverse Channels for Engagement and Communication

3-3

Taipower places great emphasis on issues of concern to the general public. Through diverse channels, the Company maintains bilateral communication with its customers and improves service quality by following customer suggestions. In addition, Taipower facilitates customer inclusion by attempting to resolve all service hindrances caused by language, culture, and literacy-related issues. Taipower's customer services are now available in Mandarin Chinese, Taiwanese, Hakka, and English to cater to customers' power service needs in the language of their preference.

### Taipower's Official Website

In order to increase public awareness of issues affecting the electricity industry, Taipower has disclosed 32 items of information on its official website under six categories. These include Management, Power Generation Information, Power Supply and Demand, Customer Information, Environmental Information, and Engineering Information. These disclosures allow the public to browse online and gain a greater understanding of the actual operation of the company.

Taipower's Official Website

### The Taipower Fan Page on Facebook

The Taipower Fan Page on Facebook currently has over 250,000 followers and has had more than 40 million views as of 2022. The themes of the posts include electricity knowledge, power saving, power safety, convenience measures, activities, etc. In addition, Taipower hopes that through this visual approach the public will recognize its efforts in stabilizing the power supply and reducing coal and emissions at the Taichung Thermal Power Plant even as power consumption hit new highs in 2021. Taipower wishes to improve the effectiveness of its communications through social network sharing. The content of posts has been actively quoted by major media platforms. In 2022, it generated 88,557 online responses, including 4,000 press citations and 18,641 Facebook shares.

TheTaipowerFan Page on Facebook

### Taipower TV - YouTube Channel


Taipower TV - YouTube Channel

Taipower TV was established on May 1, 2013. The channel's planning, filming, editing post-production, uploading and marketing are conducted entirely in-house to create internet videos tailored for different target audiences. As of 2022, the channel had accumulated 2.4 million views on YouTube. The main focus of the content is to promote Taipower's stable supply of power and net-zero initiatives. Other topics include the causes of regional blackouts, projects to enhance grid resilience, energy storage at the Tainan Salt fields, the Songhu Substation, the Taiwan-Penghu Submarine Cable, the offshore wind power, power trading platform, green energy development, and various convenience and energy-saving measures. The content is presented in diverse styles to allow for greater communication effectiveness. Additionally, important meetings, forums, and press conferences organized by Taipower are released to the public in real-time through this platform.

# User Communication and Management

Taipower has formulated Guidelines for Handling Customer Petitions that safeguard the rights and interests of its customers by ensuring that their suggestions or appeals receive fair and reasonable resolutions and remedies in a timely manner. The Company's commitment to this enhances the quality of services provided by the company and builds a positive image. Users are encouraged to express their opinions on various business measures, service attitudes, public interests, or the protection of rights and interests through diverse communication channels provided by the Company.

## District Service Offices

Taipower has established a closely-linked service network across Taiwan that offers over-the-counter applications for various power and consultation services. These offices are responsible for the construction and maintenance of power supply lines within their service areas and for accommodating customer needs with speedy and convenient responses. They are also responsible for the establishment of direct communication and the maintenance of good interactions with customers.

Each year, Taipower holds a seminar with the Taiwan Electrical Engineering and Industrial Association to facilitate two-way communication and consensus-building with contractors in the electrical engineering industry. The seminar helps address electricity application issues for the public and businesses while also promoting Taipower's important business initiatives. The seminar for the year 2022 was successfully held on November 10, 2022, at the Taipower Hualien District Office.

## Feedback Channels

Taipower has established the 1911 customer service hotline, an online service counter, and the Taipower e-Counter app to meet various user service needs through multiple channels.

| Customer Feedback Channels | | |
|---|---|---|
| Customer feedback mailbox | Customer Service Hotline | Enterprise Dedicated Service |
| A customer feedback mailbox was established on the corporate website to provide a smooth and effective feedback channel for the immediate processing of customer opinions, thereby improving service quality and satisfying customer demands. | The hotline provides 24/7 services all year round, including electricity billing and business inquiries, acceptance of electricity applications, and interactions about the repair of power supply line equipment to improve service satisfaction. | In order to reinforce customer-oriented services, Taipower provides dedicated visitation services to group enterprises and corporate customers using high-voltages (above 1,000 kw), national trade associations with high power consumption, science parks, and service windows in industrial zones under the Ministry of Economic Affairs. These facilitate the maintenance of good communication channels with customers. |
| The customer suggestion mailbox received 5,434 messages in 2022. | In 2022, more than 1.705 million calls were answered, and 97.88% of calls were answered within 20 seconds. | In 2022, there were a total of 4,981 visitations performed for customers. |

## Customer Satisfaction

In 2022, Taipower conducted an opinion survey of its general, medium and large customers. The scope of the survey included quality of service, Taipower's corporate image, customer feedback, and overall customer satisfaction. The survey for the year 2022 was conducted from October 6 to December 9 of that year. Over the past few years, customer satisfaction has consistently remained above 90%, indicating that Taipower's various service efforts have been recognized and appreciated by users.

| 2022 Survey Objectives, Period and Areas | | |
|---|---|---|
| Survey objectives | Period | Survey facet |
| 1. General users: low-voltage users who have had business contact with Taipower in the past year.<br>2. Medium and large users: users with a contracted capacity of more than 100 kW. | October 6 - December 9, 2022. | 1. Service quality.<br>2. Corporate image of the company.<br>3. Feedback from customers.<br>4. Overall customer satisfaction. |

| Customer Satisfaction Scores | | | |
|---|---|---|---|
| Year | 2020 | 2021 | 2022 |
| Score | 95.7 | 93.0 | 95.1 |

Electricity supply is critical to the national economy and security, and as such, Taipower has continuously worked to improve power supply and capacity by adding new power sources and enhancing maintenance. The Company has also actively promoted measures aimed at energy conservation and refined its demand response load management to suppress power consumption.

Every month, Taipower replies to dissatisfied customers that have expressed concerns through the comment box. This entails reviews and improvements along with supervisor assistance in providing suggestions and disseminating information across units within Taipower. In the future, Taipower will continue to handle customer service-related businesses in accordance with the Ministry of Economic Affairs' Implementation Plan for Improving Service Efficiency, and will strengthen its communication with customers to make service delivery even better.

# 5.2.2 Guarding Information Security

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## Product Liability and Personal Information Protection

Taipower's various tariffs are set in accordance with relevant government laws and policies. The processing of customer billing information and the cutting off of electricity due to overdue bills are therefore managed in compliance with the Personal Information Protection Act and the Electricity Act. Taipower also conducts annual reviews of all necessary fields in its personal information files and systems, and revises relevant business rules. As for the confidentiality of customer-related data, Taipower has formulated mechanisms and operational methods that accommodate different targets. Each unit of The Company follows the operating regulations in handling information to ensure the security of customers' personal information throughout the course of business execution. To prevent service personnel at local offices from inadvertently disclosing user's personal information in violation of relevant regulations, while also considering the need for convenient services, specific procedures have been established for verifying the identities of applicants and inspecting identification documents when users or their authorized representatives inquire (or print) electricity usage information through channels such as in-person visits, phone calls (or faxes), or online platforms. This ensures compliance with legal requirements and protects user privacy. For critical databases, Taipower has established a database activity monitoring system. The system inspects the database and protects it through real-time monitoring and event analysis. Monthly reports of exception records are generated and sent to the maintenance department for review. In 2022, the results of the quarterly reviews were normal, and there were no violations of regulations due to the provision and use of products and services.

## Information Security Plan

Information and Communication Infrastructure is one of the areas of concern as Taipower develops a smart grid. To enhance data quality, improve analysis and application, and ensure the security of information systems and program-controlled systems, Taipower has formulated a Cyber Security Policy and set up a Cyber Security Steering Committee for management.

In line with the government's policy on dedicated manpower for cybersecurity, a plan has been developed to adjust the cybersecurity workforce to specialized positions. The principle of upward concentration has been adopted, with specialized personnel centralized in the supervisory department. This aims to achieve the goals of having dedicated cybersecurity personnel and conducting training for field protection.

The company is strengthening its information and communication security responsibility management mechanisms and promoting key performance indicators (KPIs) for information and communication security to enhance the effectiveness of cybersecurity governance.

### Cyber Security Policy

| | |
|---|---|
| 1 | Information assets and critical information infrastructures shall be regularly inventoried, classified, and graded, and risk assessments shall be conducted for critical information assets and critical information infrastructures so that appropriate protective measures can be implemented accordingly. |
| 2 | The collection, processing, and utilization of personal information shall comply with the provisions of the Personal Information Protection Act. |
| 3 | Unit supervisors shall pay close attention to the identification and control of confidential and sensitive information. They shall be responsible for supervising, executing, and auditing the compliance of cyber security policies, relevant laws and regulations, and operational specifications. They shall also ensure their implementation in the routine operations of each unit and employees' daily work. |
| 4 | It is necessary to have complete notification and contingency measures for cyber security incidents and to conduct regular information security drills to ensure continuous business operations. |
| 5 | All employees shall be fully aware of the purpose of the cyber security policy and their responsibilities under it. |
| 6 | The effectiveness of the information security management system shall be reviewed regularly. |
| 7 | The cyber security policy and related operational specifications shall be revised appropriately according to business changes, information technology developments, and risk assessment results. |

### Information Management Performance Indicators and Achievements

| Management Dimension | Management Performance Indicators | 2022 Achievements |
|---|---|---|
| Information Security | · Information security policy documents approved and released by management shall be communicated to all employees<br>· Assets shall be classified<br>· Vulnerability assessments will be conducted on host computers quarterly and improvement records will be tracked<br>· The use of information and communication products from Mainland China is prohibited to reduce information security risks<br>· Vulnerabilities shall be patched and updated regularly<br>· The core information and communication system shall conduct a business continuity drill once a year<br>· Social engineering drills shall be conducted twice a year<br>· All core information and communication systems shall undergo a penetration test once a year<br>· In the event of an information security incident, the Cyber Security Incident Notification and Response Management Procedures shall be followed | After review, the results for 2022 were normal, and there were no violations of laws or regulations |
| Customer Privacy Information | · The Director and Deputy Director of the unit or interdepartmental organization shall be designated as responsible for advancing information security matters, through measure such as examining whether the handling of operational records is consistent with the relevant regulations of the Establishment Guidelines for the Security and Maintenance of the Personal Information Files Team<br>· Personal information shall be inventoried in accordance with the Security and Maintenance Plan for the Personal Information Files and Personal Information Processing Methods after Business Termination<br>· The content of cyber security requirements in the outsourcing contract shall include the Personal Information Protection Act, a definition of the rights and responsibilities of both parties, the right to audit manufacturers, security controls, and other legal requirements<br>· Personnel with access to confidential or sensitive information shall be decentralized and rotated<br>· The identification codes, access codes and permissions of transferred, departed or retired personnel shall be canceled immediately<br>· Confidential information shall be handled in physical isolation | After review, the results for 2022 were normal, and there were no violations of laws or regulations |

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-efficienct 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

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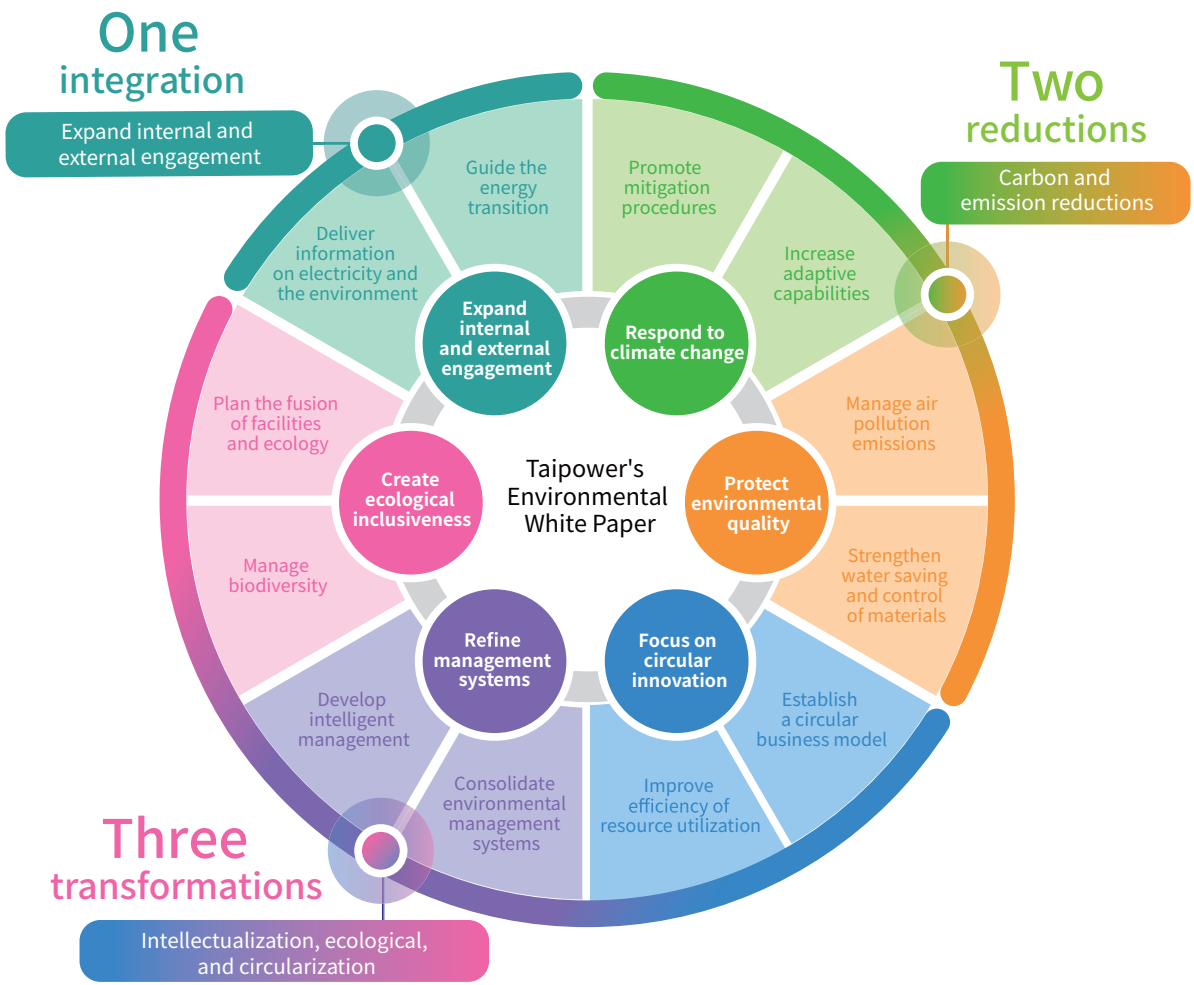
As the electric power industry pursues operations, it must consider energy quality, safety, and environmental sustainability. Taipower's corporate mission is to ensure a stable supply of electricity for the diversified development of society in a cost-effective and environmentally-friendly manner. The 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.

## 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.

## 6.1.2 Developing High-efficiency Thermal Power Generation

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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 replace with new-type combined-cycle gas-fired units that have better generation efficiency. |

## Sulfur Hexafluoride ($SF_6$) Reduction

Sulfur hexafluoride ($SF_6$) 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 $SF_6$ maintenance management procedures. Relevant units carry out $SF_6$ reclamation and purification work as part of procedures for overhauling substation equipment. After the equipment is overhauled, the purified $SF_6$ is backfilled into equipment to reduce greenhouse gas emissions. This allows for the recycling of $SF_6$, 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

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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

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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 Affair's 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

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## 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 fontanels 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

| Concentration (Note) / 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 ($NO_x$), and sulfur oxides ($SO_x$) 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 |
| PM Particulate Matter | • Install highly efficient electrostatic precipitators (EP) with a dust removal efficiency of 99.8%<br>• Build dust-proof grids around coal yards and configure regular sprinkler systems<br>• Use closed facilities for the transportation and unloading of coal, and frequently compact coal piles and clean roads<br>• Utilize chemical agents to stabilize the surface of coal piles in long-term storage, and implement the planting of windbreaks. |
| NOx Nitrogen Oxides | • Install low $NO_x$ burners (LNB) and selective catalytic reduction (SCR) equipment |
| SOx Sulfur Oxides | • 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 ($NO_x$) | 203 | 188 | 169 |
| Sulfur Oxides ($SO_x$) | 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. | 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.<br>2. Sulfur oxides combined with a limestone slurry produce desulfurized gypsum ($CaSO_4 + 2H_2O$) 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<br>Wind Power<br>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. |

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 |

## Waste Management System

Taipower established a By-Product Resource Utilization Steering Committee to develop strategies and response plans for maximizing utilization through cross-unit cooperation. The committees' responsibilities include developing and implementing coal ash and gypsum removal strategies, reviewing the current coal ash bidding specifications for power plants, making applications for green marks for fly ash and gypsum products, and planning related incentive mechanisms that enhance the utilization rate of fly ash concrete at all units. For nuclear energy-related waste, Taipower has completed short, medium, and long-term planning schemes in accordance with its responsibilities for the treatment, storage, and disposal of high and low-level radioactive waste.

### 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 cooperated 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:

### 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.

### 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 serviceification 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.

## 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.

Retirement of concrete poles

Artificial Fish Reef

## 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.

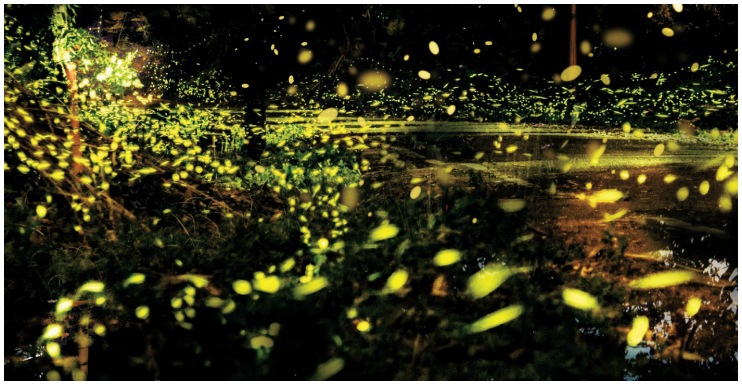
# 6.4.2 Creating Ecological Inclusiveness

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.

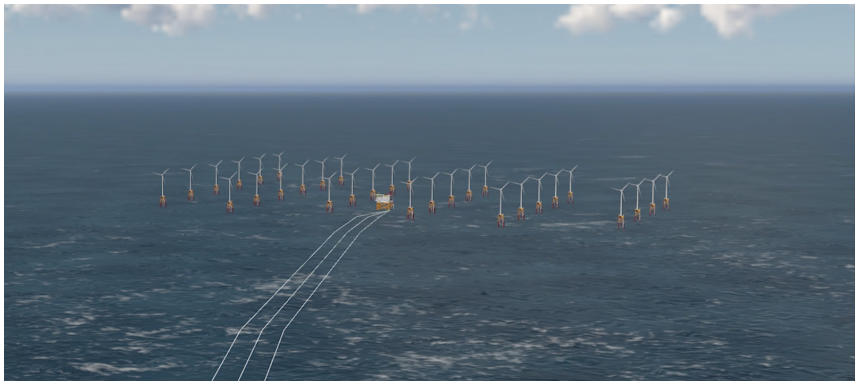


## The Linkou Plant – Lily Ecology Restoration

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 and emotional chord with local residents.

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

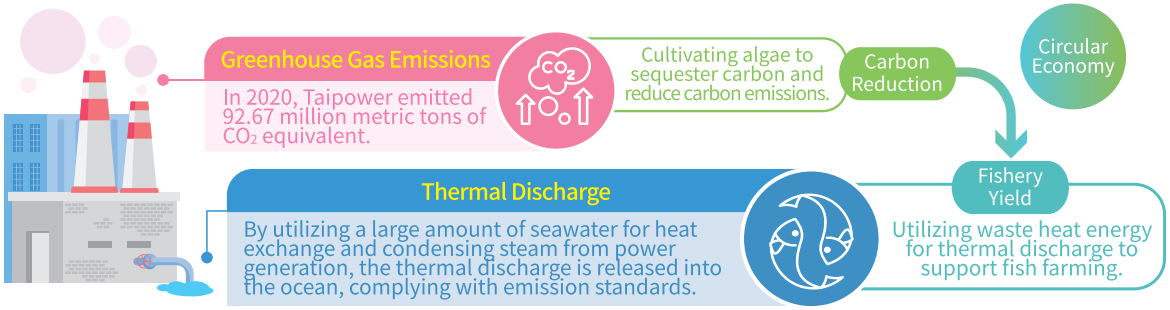
Taipower carries out fish fry releases in the adjacent seas near thermal power plants and offshore wind farms. A total of six releases were held in 2022, including activities in the waters near the Taichung, Datan, Linkou, Hsinta, and Tunghsiao plants, as well as at offshore wind facilities. A total 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.

### Greenhouse Gas and Utilization of Thermal Discharge Water Resources




## 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.

CHAPTER 07

# Practitioner of Corporate Social

## Development Vision

Taipower conducts operations in every corner of Taiwan. The Company interacts with internal and external stakeholders through multiple channels and continually strengthens its partnerships within society to allow for joint growth and prosperity. In addition to its core power industry operations, Taipower promotes green science education, cultural asset preservation and revitalization, and community care as it cultivates a brand image that reflects is role as a practitioner of corporate social responsibility. Talent development is the cornerstone of sustainably developed companies. So, in addition to continuously improving its talent management policies for recruitment, training and development, utilization and retention, Taipower has introduced new technologies and action plans that enhance training and occupational health and safety measures. The Company also continuously strengthens its protection of employee and contractor rights to create healthy and happy workplaces.

Taipower is committed to communicating with stakeholders and discloses necessary information under the principles of openness and transparency to meet the expectations of those stakeholders. Taipower also approaches social welfare through development and promotion of culture, art, sports, and other essential elements of Taiwanese society. While coping with organizational transformation, Taipower has continuously invested in personnel development and training and provided its staff with career development resources and comprehensive remuneration and retirement care. In terms of industrial safety, Taipower will continue to improve occupational safety management as it pursue the goal of zero occupational safety incidents and creates a friendly, safe, and happy workplace for employees.

## Performance Highlights

- In 2022, the total number of participants in educational training reached 80,822.
- In 2022, the total number of participants in health and safety training reached 44,942.
- In 2022, 821 health and safety-related seminars were held for contractors, with a total of 29,074 attendees.
- In 2022, 99.3% of all employees were covered by the collective bargaining agreement.
- In 2022, approximately NT$1,045.27 million was donated to community projects.
- In 2022, more than NT$0.7 million was invested in artwork leases, exhibitions and performances.

# 7.1 Personnel Management and Development

## 7.1.1 Human Rights and Inclusion

2-23

Taipower is committed to supporting and adhering to internationally recognized human rights standards, such as those outlined in the United Nations Universal Declaration of Human Rights, the UN Global Compact, and International Labor Organization conventions. These standards are incorporated into its operational activities. As an important public utility, Taipower must respect and protect the human rights of all stakeholders, including its employees, and strive to prevent any potential human rights violations.

Taipower's stakeholders are diverse and encompass various groups with different human rights concerns. For example, employees of Taipower may be particularly concerned about human rights issues in the workplace, such as occupational health and safety and labor rights protection. Alternatively, customers may be more concerned about the protection of their personal data and privacy rights.

Taipower has developed a human rights policy that is publicly available on its official website. In terms of practical implementation, Taipower has established comprehensive employee welfare systems and occupational health and safety management systems to ensure the health and safety of its employees. In the future, human rights initiatives will be gradually expanded as the Company works to incorporate the expectations of suppliers, customers, and other business partners and related issues found throughout the value chain.

### Employee Human Rights Policy

Taipower is committed to safeguarding the human rights and related interests of its internal employees. Taipower firmly believes that every employee should receive fair and humane treatment and respect. Its actions in this regard include protecting the human rights of internal employees in the workplace, ensuring equal treatment and rights for all internal employees, establishing a friendly working environment, providing a safe and healthy workplace, respecting employees' freedom of association, promoting labor-management harmony, and protecting employees' personal information.

In 2022, Taipower held a total of 49 labor-management meetings and briefings. Additionally, the Company included childcare for children under the age of three as a reason for granting leave without pay. For employees with children under 3 years old, Taipower implemented measures such as reducing working time by one hour, thus exceeding the requirements of Article 19 of the Gender Equality in Employment Act. Furthermore, the Taipower Welfare Committee for Employees, a foundation, provides childcare subsidies for employees with children under 6 years old. These measures help the Company create a family-friendly environment in the workplace. In addition, to promote public childcare services in line with national policies, Taipower has established early childhood education and care centers in seven regions in northern, central, and southern Taiwan, providing care for children aged 2 to 6.

To fulfill its commitment to respecting the human rights of internal employees, Taipower has taken concrete actions by formulating relevant regulations and measures that help create a safe, equal, non-discriminatory, and harassment-free working environment for all. The specific policies are as follows:

**The actions related to the internal employee human rights policy within Taipower include:**

#### Protecting the human rights of internal staff in the workplace

The Company strictly abides by relevant government regulations, such as the Labor Standards Act, Employment Services Act, Gender Equality in Employment Act, and Rights of Persons with Disabilities Act. It prohibits actions that violate human rights, including bullying, discrimination, child labor, and sexual harassment. Employment practices ensure that employees are not treated differently based on race, social class, language, conscience or belief, religion, political affiliation, birthplace, gender, sexual orientation, age, marital status, appearance, physical or mental disabilities, zodiac sign, blood type, or union membership status. We promote fairness in employment, compensation, benefits, training, performance evaluation, and promotional opportunities to provide an equal working environment.

#### Equalization of rights and benefits for internal staff in the workplace

The personnel compensation standards of the Company are based on the Employment Fee and Salary Management Guidelines for Agencies under the Ministry of Economic Affairs and the Basic Principles for the Authorization of Employee Benefits in Public Enterprises. For employees with similar job responsibilities or value, equal pay is provided. Units and/or colleagues that demonstrate outstanding performance or put in extra effort are rewarded in a timely manner, and the benefits of the Company's operations are shared among them.

We also ensure fairness in personnel evaluations and promotional opportunities, and provide relevant mechanisms for appeals. Discrimination based on gender, sexual orientation, or any other illegitimate reasons is strictly prohibited, and our main consideration is to match people's talents with suitable positions.

#### Establishment of a friendly working environment for internal employees

Working hours for employees are determined by the work rules and collective agreements, which are adjusted according to changes in laws and regulations. With the approval of the labor union, working hours may be extended for operational needs, in accordance with the provisions of the Labor Standards Act, with overtime pay or compensatory leave provided.

#### Providing a healthy and safe workplace for internal staff

The Company has established a sexual harassment complaint hotline and mailbox, and regularly issues sexual harassment prevention and awareness e-newsletters to demonstrate its determination to exercise a zero-tolerance stance on such incidents. In addition, the "Together We Care" Employee Assistance Program (EAP) system has been implemented to assist employees in resolving work-related and mental health issues.

The Company follows the Gender Equality in Employment Act, Sexual Harassment Prevention Act, Guidelines for Complaints, Investigations, and Disciplinary Measures for Workplace Sexual Harassment Prevention, and Sexual Harassment Prevention Guidelines to establish measures for preventing and handling sexual harassment. All employees are required to sign a written declaration against sexual harassment annually. We have set up a dedicated hotline and email for sexual harassment complaints. Training and workshops are conducted to raise awareness, and we regularly issue newsletters on sexual harassment prevention. We communicate with all units to emphasize the importance of prevention and to ask them to take relevant actions. We also have a "Heart-to-Heart" employee assistance programs that supports employees facing work-related challenges and emotional issues by promoting a caring workplace culture.

## Respect for Freedom of Association of Internal Staff

The Company respects the rights of employees to organize and join various clubs and organizations. In accordance with the Implementation Measures for Labor Education, Taipower further supports the establishment of various labor education classes by employees. These advocate lifelong learning and encourage cross-unit and cross-departmental exchanges among employees that can lead to the sharing of company information, individual life experiences, and self-improvement knowledge. Financial assistance is also provided to support these initiatives.

## Actions to Promote Internal Harmony between Employees and Workers

The Company provides diverse communication channels and relevant proposal mechanisms for employees, such as difficulty complaints, employee proposals, an anti-corruption mailbox, appeals for performance evaluations and disciplinary actions, reporting of unlawful actions that affect job duties, grassroots and new employee communication forums, and more. These avenues allow employees to freely express their opinions.

Taipower adheres to labor laws and regulations, including the Labor Union Act, Collective Agreement Act, and the Regulations for Implementing Labor-Management Meetings to support employees in organizing and joining labor unions and in exercising their labor rights. Through collective bargaining and regular labor-management meetings, an open communication environment has been established to foster a harmonious win-win approach to labor-management relations.

## Protection of the Personal Data of Internal Staff

In accordance with the Personal Data Protection Act, the Enforcement Rules of the Personal Data Protection Act, and the Management Measures for the Security Maintenance of Personal Data Files in the Electricity and Public Natural Gas Industries, the Company has established guidelines and procedures related to personal data. It has also set up a Personal Data File Security Maintenance Management Team to ensure that the collection, processing, and utilization of personal data complies with legal regulations, thereby safeguarding the rights of employees to the security of their personal data.

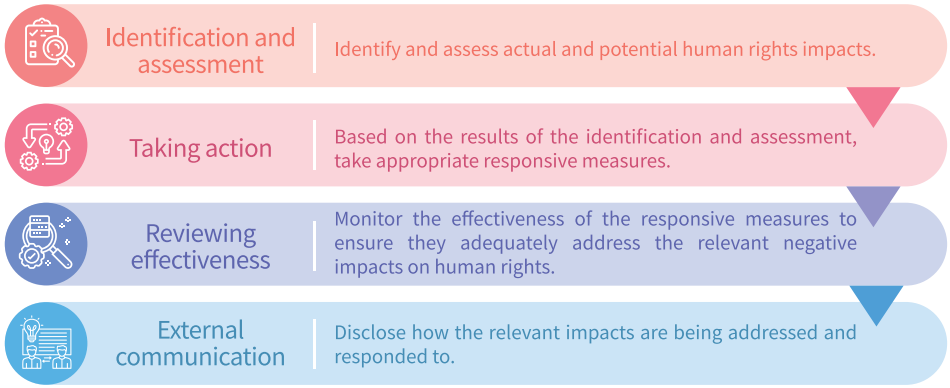
# Actions related to the human rights of outsourced workers

## Actions to safeguard the labor rights and interests of outsourced contract workers

The Company's labor service procurement and contracting adhere to regulations such as the Labor Standards Act, Engineering Association guidelines, and contract templates provided by the Ministry of Labor. In consideration of the need to protect the rights and interests of outsourced labor, relevant measures have been developed. Protective actions are taken at several points including within the procurement contracts signed between Taipower and Contractors. For instance, Taipower utilizes a standard contract template for labor service contracting that adheres to relevant standards and outlines the consequences of illegal statements and actions on the part of the parties. Additionally, high-quality contacts are required between the Contractor and hired laborers. These contracts are available through the Ministry of Labor. In the event of a violation, a punitive penalty is imposed. Frequently, this involves the withholding payment to the Contractor and instead making payment to the hired laborer whose rights have been impeded.

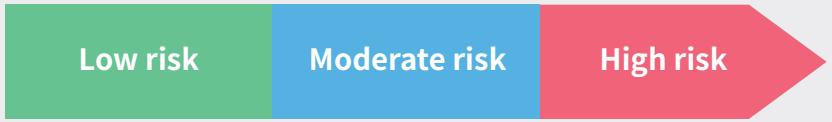
# Human Rights Due Diligence

Taipower conducted a preliminary human rights assessment and risk identification in 2022. In the future, the Company will refer to international human rights conventions such as the United Nations Guiding Principles on Business and Human Rights as it carries out comprehensive human rights due diligence. The process is as follows:



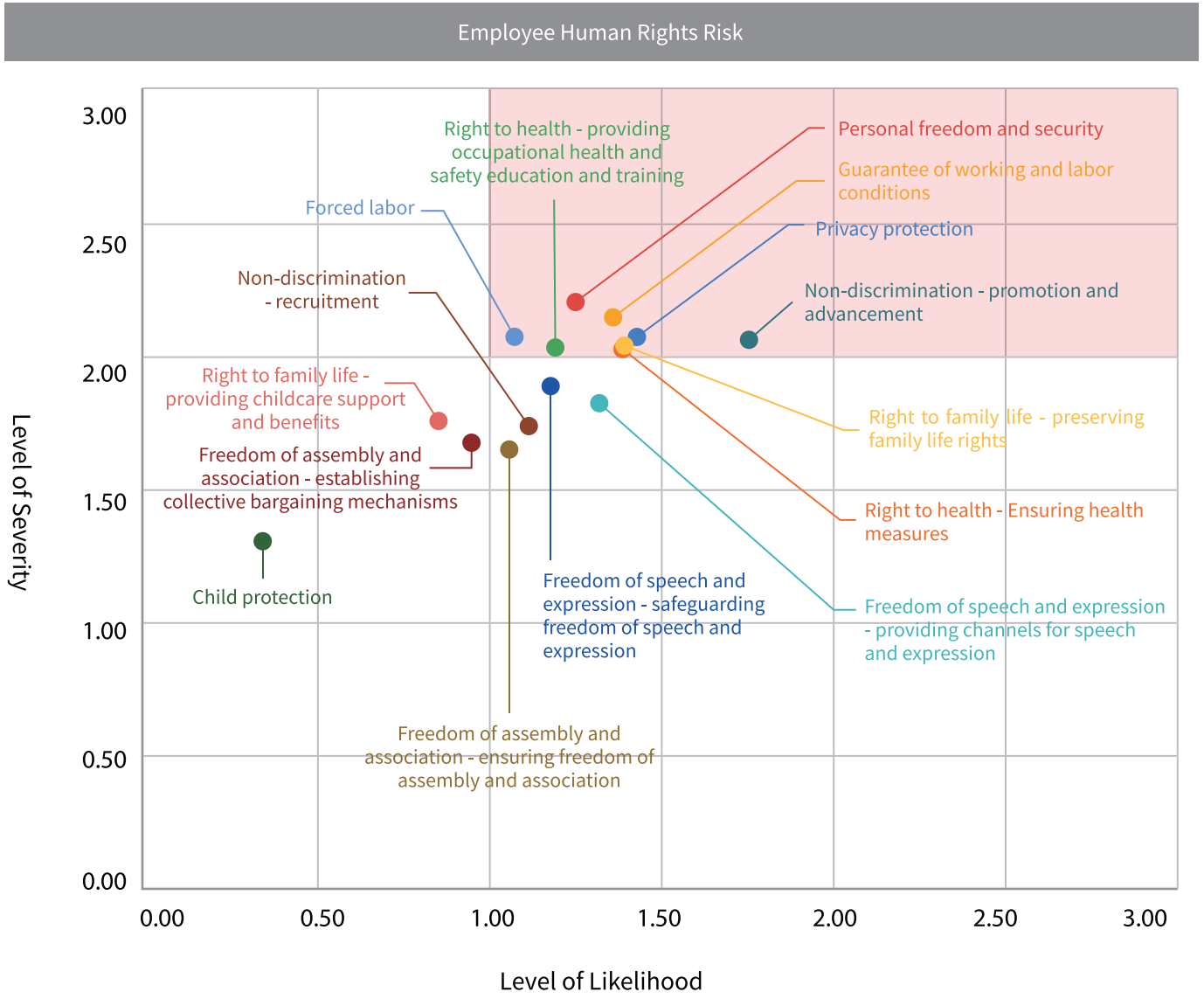

## Identification and Assessment

Taipower referenced international human rights guidelines, domestic laws and regulations, as well as benchmarking reports from leading companies in compiling human rights-related risk issues. These issues were evaluated and included in the human rights risk assessment questionnaire. The questionnaire assessed the "likelihood" and "severity" of each human rights risk issue. Likelihood was scored as follows: 0 points = unlikely to occur, 1 point = low likelihood (1% - 30%), 2 points = moderate likelihood (31% - 60%), 3 points = high likelihood (above 61%). Severity was scored as follows: 0 points = no impact, 1 point = not severe, 2 points = severe, 3 points = extremely severe. Based on the survey results, a Human Rights Risk Matrix was generated, and the human rights risks were categorized into three levels according to the following criteria:




**High risk: Likelihood score of 1 or higher and severity score of 2 or higher**
**Moderate risk: Likelihood score of 1 or higher and severity score below 2**
**Low risk: Likelihood score below 1**

In 2022, the questionnaire was distributed to Taipower employees, and a total of 72 responses were collected. The assessment results are as follows:




| Risk Level | Rank | Risk Issues |
|---|---|---|
| High Risk | 1 | Non-discrimination - promotion and advancement |
| | 2 | Privacy protection |
| | 3 | Guarantee of working and labor conditions |
| | 4 | Right to family life - preserving family life rights |
| | 5 | Right to health - Ensuring health measures |
| | 6 | Personal freedom and security |
| | 7 | Right to health - providing occupational health and safety education and training |
| | 8 | Forced labor |
| Medium Risk | 9 | Freedom of speech and expression - providing channels for speech and expression |
| | 10 | Freedom of speech and expression - safeguarding freedom of speech and expression |
| | 11 | Non-discrimination - recruitment |
| | 12 | Freedom of assembly and association - ensuring freedom of assembly and association |
| Low Risk | 13 | Freedom of assembly and association - establishing collective bargaining mechanisms |
| | 14 | Right to family life - Providing childcare support and benefits |
| | 15 | Child protection |

Taipower will further investigate and analyze high-risk human rights issues and propose countermeasures.

# 7.1.2 Human Resource Management Strategies and Structures

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## Human Resource Strategies

Taipower faces a wide range of business challenges. These include its energy transition, the need for low-carbon sustainability, and the impending development of a smart grid. Facing these issues will require the Company to develop a talent pool that can meet the needs of future developments while maintaining a stable power supply. Taipower is achieving this by reviewing the core technical skills of employees then filling talent gaps by recruiting the necessary electricity specialists through diversified pathways. The Company also employs various training systems and measures that allow it to pass on electrical technology knowledge and experience, and to enhance the professional and cross-disciplinary skills of its employees. As the green economy has risen to prominence in the digital era, Taipower has utilized both internal and external training resources to strengthen its renewable energy talent. The Company has now developed the talent necessary for business development and promotion to ensure that it can effectively achieve its goals for recruitment, training and development, along with the utilization and retention of human resources. This approach allows the Company to resolve a wide range of human resources challenges. The relevant strategies are as follows:

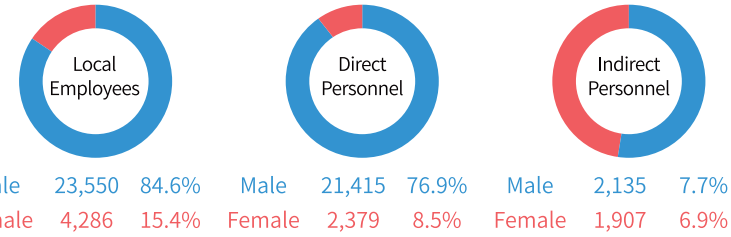
| Taipower's Human Resources Recruitment, Training and Development, Utilization and Retention Strategies | |
|---|---|
|  | · Balanced and rational human resource planning and systematic appointments.<br>· Diversified personnel recruitment to satisfy human resource demands; increased recruitment channels, including examinations for staff, contract staff, PhD-level employees; scholarships for undergraduate, graduate, vocational and high school students; vocational and industrial-school cooperation programs. |
|  | · Fortified essential techniques in each division and promoted core operations.<br>· Developed innovative cultivation modes to improve effectiveness in organizational learning.<br>· Promoted company-wide (all business divisions) succession plans for supervisors and to build up the talent pool.<br>· Utilized online resources to promote lifelong learning.<br>· Strengthened the rationality of allocation, development and application of human resources. |
|  | · Effective distribution and management of personnel appointment budgets.<br>· Improved the personnel system to make human resource deployment flexible and effective.<br>· Implemented job duty rotations and performance evaluations.<br>· Made good use of statistical analysis to provide a supervisory decision-making reference.<br>· Strengthened the effectiveness of the human resources departments of the business divisions.<br>· Conducted internal promotion interviews and provided internal promotion channels to promote outstanding employees. |
|  | · Provided employees with public health insurance, subsidies for medical expenses incurred for injuries incurred when executing job duties and health checkups through welfare policies.<br>· Established labor education courses and implemented recreational activities so that employees could adjust their lifestyles for the sake of their physical and mental wellbeing. |

## Structure of Human Resources

### Employment Categories

All Taipower employees are full-time. The Company has not hired any temporary, part-time or foreign employees and no employees receive non-guaranteed hours.

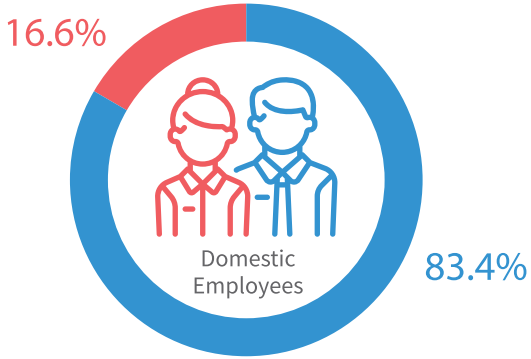
The Total Number of Employees and the Ratio of Male/Female Employees from 2020 to 2022




Note:

1. Data acquisition is based on the payroll dated to December 2022
2. Direct employees are personnel who fall under the categories of technical, sales and marketing employees at onsite departments. Indirect employees are personnel responsible for administrative support, including document processing, business affairs, general affairs, and accounting, etc.
3. Decimal points have been rounded
4. Total employees = direct personnel + indirect personnel
5. Taipower employees are all located in Taiwan, and no employees are located abroad

## Statistics by Employee Category in 2022

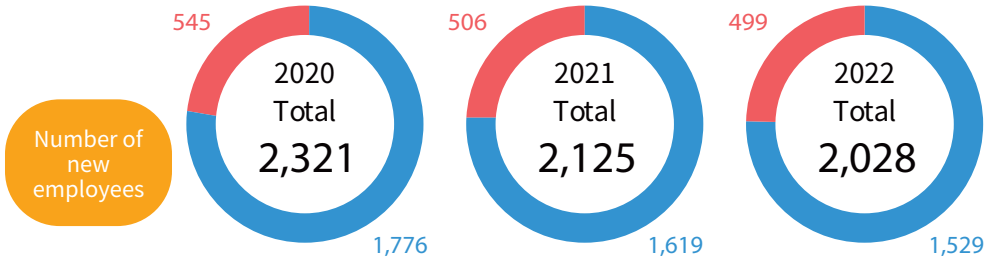



| Employee Category | Male | | Female | | Total | |
|---|---|---|---|---|---|---|
| | Number of employees | Ratio (%) | Number of employees | Ratio (%) | Number of employees | Ratio (%) |
| Permanent Employees | 23,416 | 83.4% | 4,663 | 16.6% | 28,079 | 100% |
| Temporary Employees | 0 | 0% | 0 | 0% | 0 | 0% |
| Full-Time Employees | 23,416 | 83.4% | 4,663 | 16.6% | 28,079 | 100% |
| Part-Time Employees | 0 | 0% | 0 | 0% | 0 | 0% |
| Employees Without Guaranteed Hours | 0 | 0% | 0 | 0% | 0 | 0% |

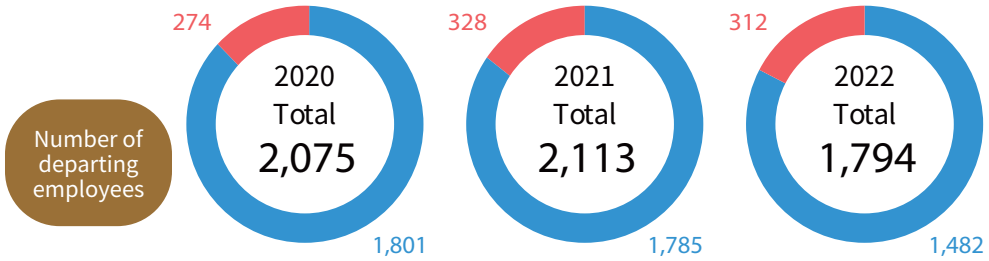
Notes:

1. Permanent employees do not sign fixed-term contracts. As long as the substance of their work is continuous, the employee may continue to work unless he or she is laid off or voluntarily resigns. Severance pay is available and the employer is required to contribute to labor pension funds.
2. Temporary employees only sign fixed-term contracts in exceptional circumstances. Positions include temporary, short-term, seasonal, or specific work. Upon the expiration of the contract, the employee must leave and cannot continue to work unless the employer is willing to renew the contract. No severance pay is available, but the employer is required to contribute to labor pension funds.
3. Full-time employees: According to Article 30, Paragraph 1 of Taiwan's Labor Standards Act, regular working hours must not exceed 40 hours a week and eight hours a day.
4. Part-time employees: Employees whose working hours do not meet the conditions of full-time employees (40 hours a week and eight hours a day) are considered part-time employees. The legal rights of part-time employees are the same as those of full-time employees, except that basic wages and holidays can be reduced and are proportional to their working hours.
5. Employees without guaranteed hours: Taiwan's Labor Standards Act has not yet defined non-guaranteed hours employees. Here, they are defined as contract-based workers for whom the employer does not guarantee minimum working hours. Elsewhere, these employees are said to be part of the "gig-economy." These workers were original defined as free, part-time workers who performed work on a short-term basis and received a lump sum payment, such as the delivery personnel working through a sharing economy platform.
6. Data is current as of December 2022.

## Number, Age, and Gender Distribution of Employee Recruitments/Resignations




| | Male | Female | Male | Female | Male | Female |
|---|---|---|---|---|---|---|
| Under 30 | 1,236 | 318 | 1,148 | 295 | 1,034 | 262 |
| 31-50 | 524 | 222 | 451 | 207 | 482 | 235 |
| Over 51 | 16 | 5 | 20 | 4 | 13 | 2 |

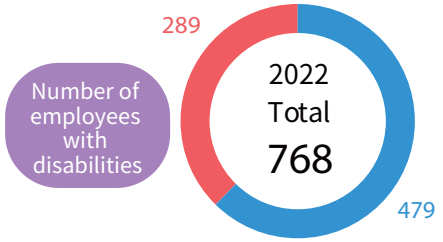



| | Male | Female | Male | Female | Male | Female |
|---|---|---|---|---|---|---|
| Under 30 | 172 | 47 | 244 | 44 | 278 | 48 |
| 31-50 | 126 | 112 | 160 | 152 | 213 | 156 |
| Over 51 | 1,503 | 115 | 1,381 | 132 | 991 | 108 |

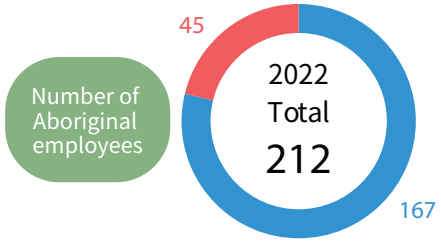
Note:

1. The number of departing employees includes both those on extended leave without pay and retirees.
2. The statistics for each year represent the number of recruits and employee resignations from January to December of the current year.

## Diversified employee numbers, age and gender distribution




| | Male | Female |
|---|---|---|
| Under 30 | 64 | 45 |
| 31-50 | 207 | 137 |
| Over 51 | 208 | 107 |




| | Male | Female |
|---|---|---|
| Under 30 | 38 | 18 |
| 31-50 | 98 | 25 |
| Over 51 | 31 | 2 |

## Outsourced Workforce

As of the end of December 2022, Taipower's outsourced workforce included both service and labor contractors. In 2022, there were 1,128 outsourced workers working in jobs connected to cleaning, document processing, telephone operations, driving and other services.

Note:

1. The number of outsourced workers does not include the workload package (where workload package refers to the outsourcing or procurement of labor work, technical services, equipment operation, and equipment maintenance or other services through means other than labor and service manpower outsourcing.)
2. The 2022 outsourced manpower data has been taken from the report "Labor Contracting Situation in the Fourth Quarter of 2022".

## Workers who are not employee

| Non-employed employees | Number of people (persons) | Contractual relationship | Type of work |
|---|---|---|---|
| Volunteers | 309 | None, retired Taipower staff (in volunteer roles) | Sports advocacy volunteers (cheering for Taipower's sports teams) and offering guidance at branch office service counters. |

# 7.1.3 Personnel Training and Assessment

## Human Resource Training

In order to ensure that personnel promotions in each department are conducted in accordance with principles of fairness, justice, and transparency, each unit should establish a Selection Review Committee as stipulated and follow the Notice for Personnel Promotion Selection Review in Each Department set by Taipower.

The professional nature of work at Taipower has made it necessary for the Company to respond to changes in the internal and external environment by effectively cultivating future talent. Therefore, Taipower has built a complete talent training system and continuously improves that system. The Company's human resources offer both technical and science-based training. The talent pool is continuously developed and strengthened as shown in the table below:

**Taipower Training Statistics**

| Training Type | Training Subject | | Number of Participants (in 2022) |
|---|---|---|---|
| Development Training | New dispatch personnel orientation training | | 0 |
| | Fundamental development training | | 408 |
| | Total | | 408 |
| On-the-Job Training | Professional training | Organized by the Training Institute | 9,041 |
| | | Organized by other units | 75,763 |
| | | External training | 4,026 |
| | Total | | 88,830 |
| Manager Training | On-the-job training for managers | | 904 |
| | Skill cultivation for managers | | 898 |
| | Total | | 1,802 |
| Cooperative Education | Recommendations for graduate school | | 3 |
| | Total | | 3 |
| Total | | | 91,043 |

Note: Due to the COVID-19 pandemic, the new dispatch personnel orientation training was cancelled to avoid the risk of cluster infection. It was replaced by a new personnel training session on the Taipower E-Learning platform.

## Employee Performance and Evaluation Policy

Taipower follows the relevant regulations in conducting employee performance evaluations. Supervisors at each level evaluate the performance of their subordinates in seven major categories, determine the evaluation results and award performance bonuses within a prescribed period. Taipower will continue to use and establish performance-based reward mechanisms that reward units or employees for excellent performance or dedication to work. Taipower hopes to enhance employee commitment and performance while improving operational performance and a sense of honor within teams. The main implementation strategies for employee performance evaluations and performance-based reward mechanisms are as follows.

### Employee Performance Evaluation Policy

**Employee Performance Evaluation**

- Full-time employees of Taipower who meet specific conditions
- Supervisor on all levels shall perform evaluations on the seven major categories of professional ability, work performance, teamwork, work attitude, moral integrity, management skill, and leadership skill

**Performance Management by the Responsible Units**

- Reasonably distribute bonuses based on employee contributions and performance
- 40% of the total performance bonus is allocated as each unit's efficiency bonus and is distributed according to the performance grades of the responsible units

**Instant Reward Mechanism**

- 2% of the total performance bonus is allocated to business unit heads as distributable bonuses
- 50% of incentive bonuses are given as immediate rewards as determined by the Chairman, President, and Vice Presidents
- 50% of incentive bonuses are allocated and distributed by unit supervisors according to various reward procedures and principles

## Female and male employee pay ratio

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Taipower's salary and bonus are determined based on the position level and are not differentiated by gender or other factors. In 2022, the salary ratio between males and females was 1.5:1.39:1 compared to the local average salary. The gender pay ratio is compared based on the same position and level, with a ratio of approximately 1:1 for general employees and 1:1 for management positions.

### Gender Salary Ratio Compared to Local Average Salary


Note: Since the Directorate-General of Budget, Accounting and Statistics releases the salary statistics for the previous year in December, the ratio of Taipower's salary to the local average salary in 2022 was calculated based on the 2021 statistics from the Directorate-General of Budget, Accounting and Statistics.

## Employee Compensation Policy

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Taipower's salary and compensation system is based on the Personnel Expenses and Salary Management Guidelines for Enterprises under the Ministry of Economic Affairs. It determines salaries based on job position levels and provides allowances for factors such as region, job hazards, and scarcity, to encourage employees to actively engage in their work according to the company's business needs. The salary and benefits for internal employees of Taipower, as well as the work rules, are reported to and approved by the Board of Directors. Promotion, attendance-related regulations, and measures to protect employee personal information are determined by the General Manager and must be followed by employees at all levels. The bonus system follows the relevant regulations, such as the Implementation Guidelines for Performance Bonuses in Enterprises under the Ministry of Economic Affairs. The amount of the bonus is calculated based on policy factors reviewed by the Evaluation Council for Performance Bonuses in Enterprises under the Ministry of Economic Affairs and approved by the Board of Directors. The performance evaluation of the Taipower Board of Directors is conducted in accordance with the Operational Guidelines for Independent Directors in Enterprises under the Ministry of Economic Affairs and the Management Guidelines for the Appointment of Directors, Supervisors, and Other Important Positions in Citizen-Owned Enterprises and Foundations under the Ministry of Economic Affairs and Its Subordinate Agencies. At the end of year, individual directors conduct self-evaluations following the established procedures and provide them to the Ministry of Economic Affairs as a reference for assessment and nomination purposes.

### Annual Total Compensation Ratio

| Year | 2021 | 2022 |
|---|---|---|
| Highest-level individual annual total compensation (in NTD) | 3,054,035 | 2,680,014 |
| Percentage increase in total compensation for the highest-level individual | -0.05% | -12.25% |
| Annual total compensation for all other employees (in NTD) | 30,506,083,958 | 30,949,872,881 |
| Median percentage increase in total compensation for all other employees | 2.90% | 5.96% |

Note:

1. The highest-level individual in 2021 was the Chairman, while the highest-level individual in 2022 was the General Manager. On March 8, 2022, Taipower underwent a transition of the Chairman and General Manager positions between the outgoing and incoming individuals. The incoming Chairman's position was temporarily filled by a Deputy Minister from the Ministry of Economic Affairs and was consequently unpaid. The incoming General Manager was promoted from the position of Deputy General Manager, resulting in a significant reduction in the total annual remuneration for the highest-paid employee.
2. Compensation includes monthly salary, work-related benefits, and performance bonuses.

# 7.2 A Sound Working Environment

## 7.2.1 Occupational Health and Safety

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In addition to cultivating outstanding talent, maintaining occupational safety is key to sustainable talent management. To prevent occupational safety incidents and reduce the impact of the suspension of unit operations on power stability, Taipower has established an improved occupational safety strategy within its Sustainable Development Plan. Taipower also set 2030 goals as a demonstration of its resolve to implement a safe and healthy workplace.

### Occupational Health and Safety Management System

Taipower has formulated relevant guidelines for occupational health and safety management with regards to training and advocacy, inspection and supervision, operational safety, protective gear management, fire safety, traffic safety, health management, accident handling, rewards and punishments, and contractor management. The guidelines help the Company achieve its health and safety policies and goals, prevent occupational incidents, and ensure the health and safety of all colleagues.

### Dimensions of Occupational Safety Management Bases and Practices

Taipower has established the key points and measures for occupational safety and health management to prevent and mitigate significant negative occupational safety and health impacts, as well as related hazards and risks directly related to the organization's operations, products or services.

| Dimension | Management Method | Management Bases/Practices |
|---|---|---|
| Regulatory | Training | Procedures for Training and Utilizing Occupational Health and Safety Personnel from Affiliated Units |
| | Auditing and supervising | Management Enforcement of Procedures through Inspections by Supervisors at All Levels |
| | Operational safety | Enforcement Procedures for Operational Safety Standards |
| | | Enforcement Procedures for Consultative Organizations in Joint Operations |
| | Personal protective equipment management | Management Procedures for Personal Protective Health and Safety Equipment |
| | Incident handling | Occupational Safety Accident Handling Procedures |
| | | Guidelines for Assisting Employees in Handling Industrial Incidents |
| | Rewards and punishments | Procedures for Punishment of Health and Safety Regulation Violations |
| | | Procedures for Rewarding Excellent Health and Safety Performance |
| | Contractor management | Procedures for Health and Safety Counseling |
| | | Procedures for Penalizing Contractor Violations of Contractual Health and Safety Requirements |
| | | Procedures for Additional Training on Contractual Health and Safety Requirements following Contractor Violations |
| Onsite Execution | Before job task starts | Industrial Safety Communications and Hazard Notifications |
| | | Pre-work Training Workshops |
| | | Review Lists for Operating Personnel |
| | During job progress | Health and Safety Check-ins for Operating Personnel |
| | | Executing TBM-KY and Making Records |
| | | Implementing Automatic Inspections |
| | | Auditing Health and Safety Measures |
| | Operational equipment and machinery inspection | Regular Inspections and Confirmations of Machinery |
| | | Dedicated Notebooks or Files for Inspection Records |
| | | Building Coordination and Control Mechanisms |

Taipower has established Occupational Safety Accident Handling Guidelines. If incidents occur involving employees or contractors, Taipower will report the accident within one hour in accordance with regulations by submitting an accident report. The company shall also send personnel to conduct accident investigations and project reviews. The Company shall then pursue situation improvements, and deploy preventive countermeasures in parallel at each unit to prevent similar incidents. Furthermore, the Company shall compile statistical analysis reports for occupational safety management in each unit. When a severe occupational incident affects employees or contractors, it should be reported to the local labor inspection agency within eight hours in accordance with regulations.

Taipower has also formulated Instant Report Procedures for Various Disasters and Emergencies to enable government authorities and Company supervisors at all levels to immediately access relevant information through various communication tools after the occurrence of a disaster so that relevant units can be promptly directed to handle and mitigate damage.

In addition, according to Article 18, Paragraph 2 of the Occupational Safety and Health Act, when workers believe that they are experiencing working conditions that may cause injury or illness, they may terminate work of their own accord and withdraw to safe locations, without endangering the safety of others workers, and immediately report to their direct supervisors.

## The Organization of Occupational Health and Safety

According to Article 11 of the Regulations Governing Occupational Health and Safety, Taipower's Occupational Health and Safety Committee shall have at least seven committee members. The membership of the committee includes the President (who is ex-officio member) and those specified in paragraph 5 (as labor representatives), the President shall appoint the following personnel in accordance with actual needs:

- Occupational health and safety personnel
- The directors, supervisors, and leadership of all units
- Engineering technicians responsible for occupational health and safety
- Medical staff engaged in labor health services
- Labor representatives

**The percentage of workers (whose work or workplace are subject to organizational control) in a formal health and safety committee composed of labor and management**

| Total Number of Health and Safety Committee Members | Number of Labor Representatives in the Committee | Percentage of Labor Representatives in the Committee |
|---|---|---|
| 32 | 14 | 43.8% |

According to Article 12 of the Regulations Governing Occupational Health and Safety, the committee is responsible for deliberating, coordinating, advocating and making recommendations on health and safety issues. It is legally obligated to hold at least one meeting every three months to handle the following matters:

- Make recommendations on occupational health and safety policies proposed by the employer.
- Coordinate and propose occupational health and safety management plans.
- Deliberate on the implementation of health and safety education and training.
- Review the operating environment monitoring plans, results, and measures adopted.
- Deliberate on health management, occupational disease prevention, and health promotion matters.
- Review each health and safety proposal.
- Review the automatic inspections and health and safety audits of business units.
- Review the preventive measures for machinery, equipment, or raw and hazardous materials.
- Review occupational injury investigation reports.
- Evaluate the performance of on-site health and safety management.
- Deliberate on the health and safety management matters of contractor businesses.
- Other related occupational health and safety management matters.

## The Occupational Health and Safety Management System

According to Article 12-2 of the Occupational Safety and Health Management Regulations, if the number of workers in the first category of business is 200 or more, the employer shall establish an occupational safety and health management system suitable for the business unit in accordance with the national standard CNS 45001 or above. Taipower has established an Occupational Health and Safety Management System in accordance with regulations. The Company completed CNS 45001 certification for 47 units in 2020 (including the headquarters), all of which have adopted the Plan-Do-Check-Act (PDCA) circular management model on a continuous basis.

The Occupational Health and Safety Management System above covers all workers in all workplaces, including employees, contract laborers, volunteers (including self-employed workers) at hydrothermal power plants, nuclear power plants, branches, power supply district operation offices, engineering units, and other units.

## Risk Assessment and Control

Taipower has conducted hazard identification and risk assessments for its employees. The Company has also placed controls on unacceptable risk items. In addition to annual reviews and evaluations, risk assessments will be adjusted and updated, and procedures for necessary control measures shall be determined in the event of non-routine circumstances such as:

1. When there are changes or additions to the operating procedures.
2. When there are changes to the working environment.
3. In the event of occupational accidents.
4. When there are changes to the infrastructure, equipment, or raw materials provided by the organization or other units in the workplace.

With regard to hazard identification and risk assessment, the competent department of each system shall stipulate the enforcement rules of health and safety for contractors, and all subordinate units shall cooperate. To enhance occupational safety management for the delivery of contracted projects, the Taipower Risk Assessment Guidelines on Occupational Safety for the Delivery of Contracted Projects have been established to guide contractors in implementing self-management. Each unit and contractor shall submit occupational safety management and risk assessment reports for the construction process prior to the start of construction. In addition, if there are changes in construction personnel, site environment, construction methods, or the use of machinery, the risk assessment and hazard identification must be re-processed to ensure changes are managed. Experts and scholars may be invited to review the risk assessment reports as necessary.

The department responsible for establishing the occupational safety and health management system has conducted hazard identification and risk assessment for its employees. They have identified and classified potential hazards related to various work activities in the workplace and implemented controls for unacceptable risk items. Regarding contractors, before commencing work, each department should request a report from the contractor's employer or the person responsible for the workplace, which includes their occupational safety management measures (including risk assessment). Additionally, if there are changes in construction personnel, site environment, construction methods, or equipment usage, a reevaluation of the risk assessment and hazard identification is required. Implementing change management measures is essential, and if necessary, experts and scholars may be invited to review the risk assessment report submitted.

Each on-site supervisor or team leader in Taipower implements the guidelines of safety operation standards and conducts regular or irregular training on relevant operational procedures and precautions. They also conduct demonstration drills, such as emergency response training for power plant fires, hydrogen leaks, and more. Additionally, each department in Taipower organizes emergency handling drills according to the guidelines for occupational safety accident handling, aimed at enhancing emergency response capabilities. These drills include exercises simulating accident scenarios and response measures in nuclear power plants, electric shocks and falling accidents, among others. In 2022, Taipower held approximately 160 disaster prevention and emergency response drills, involving around 12,000 participants in total. Additional statutory training related to occupational safety and health, such as training for occupational safety and health administrators and various operation supervisors, as well as "Zero Accident Campaign" and "Interactive Hazard Identification Training," were conducted at training institutes and external training organizations. In 2022, there were over 381 sessions of statutory occupational safety and health-related training, with approximately 44,942 participants.

Furthermore, to enhance communication and coordination on safety and health matters with contractors, each unit holds safety and health consultation meetings (briefings or coordination meetings) before commencing various contracted projects involving engineering work or goods and services with an engineering nature. Regular or irregular joint operation agreement organizations are also convened. These meetings involve relevant personnel from the department, representatives from other departments of the Company involved in joint operations, workplace supervisors of contractors and subcontractors, and occupational safety personnel. The purpose is to communicate and coordinate on work-related matters. Additionally, depending on the safety and health performance of contractors, each unit organizes occupational safety and health education training or seminars for the staff of contractors, and invites relevant personnel from the contractors to participate in an effort to assist the contractors in enhancing their safety knowledge and abilities. In 2022, Taipower held approximately 821 safety and health promotion meetings with contractors, with around 29,074 participants in total.

## Employee Rights and Benefits

Taipower actively promotes employee rights and welfare measures in accordance with legal regulations to ensure and enhance employee welfare. Through diverse welfare policies and measures, Taipower aims to improve and safeguard employee welfare. In the future, Taipower will continue to enhance its welfare policies through various healthcare measures and enrich employee travel and self-improvement activities. It will collaborate with relevant units such as the Taiwan Power Union and the Welfare Committee of the Taiwan Power Foundation to organize cross-regional recreational activities that further enhance and ensure employee welfare.

To meet the childcare needs of the new generation of employees and comply with policies, Taipower has established Workplace Mutual Aid and Childcare Service Centers in seven locations (15 classes), including the Transmission and Distribution Engineering Department. These centers provide care for children aged 2 to 6, prioritizing the children and grandchildren of Taipower employees. This concrete action supports employees' desires for marriage, children, and child-rearing and creates a family-friendly environment in the workplace. It also contributes to a positive corporate image. In the future, Taipower will continue to plan and establish more Workplace Mutual Aid and Childcare Service Centers in response to policies and the childcare needs of employees.

## Health and Mental Care

Taipower recognizes that employee physical and mental well-being, coupled with excellent technical skills, are essential to achieving its primary goal of a stable power supply. Therefore, Taipower places great importance on the physical and mental health of its employees. In December 1988, Taipower followed the model of "Teacher Chang's Voluntary Service" and established the "Heart to Heart" program internally. This program involves assigning "Employee Assistance Officers" in each unit and establishing external professional resources (contracted assistants and organizations) to implement an Employee Assistance Program (EAP). The program aims to assist in cultivating the employees' "soft power" at the spiritual level. In addition to organizing activities such as lectures, book clubs, and grassroots forums, Taipower also provides each employee with up to eight hours of funded counseling referral service per year. The Employee Assistance Program is designed to address work-related, personal, and emotional difficulties or problems faced by employees, with the goal of stabilizing organizational operations and enhancing company performance.

To minimize the impact of employees taking parental leave without pay, Taipower has established Measures for Handling the Quota of Maternity/Paternity Leaves with Salary Retention and aligned them with the schedule for recruiting new employees. Following the concept of "advance replenishment," the project quotas are reserved in advance to reduce the impact of employees taking maternity / paternity leave.

### Key Employee Benefits and Care

| | |
|---|---|
| Diversified Career Development Resources | · Provide comprehensive training resources<br>· Ensure that employees acquire the competencies required for their careers |
| Salary Guarantee | · Transparent salary system<br>· Comprehensive performance incentive system |
| Retirement Care | · Establishing a comprehensive retirement care system and placing relevant rights and interests on a dedicated website, as well as organizing farewell activities for retirees to help them adapt to retired life in a timely manner. |
| Multiple Protections | · Provision of public health insurance<br>· Medical subsidies for work-related injuries<br>· Health Screening<br>· Recreational Programs |

In the future, Taipower will continue to enhance its welfare policies by implementing diverse health care measures and enriching employee self-improvement through activities like employee trips and empowerment programs. It will collaborate with relevant organizations, such as the Taiwan Power Union and the General and Branch Committees of the Taipower Employees' Welfare Committee, to organize recreational activities across different regions and cities, aiming to enhance and safeguard employee welfare.

## Occupational Health Services

In addition to occupational hazards in the workplace, workers also face health hazards such as work pressure, excessive working hours, problems associated with shift-work and psychological stress. In response to the increasing number of emerging occupational diseases such as musculoskeletal disorders, Taipower has formulated an ergonomic prevention plan, a maternal health protection plan, an abnormal workload-triggered disorders prevention plan, and an unlawful infringement in the workplace prevention plan. Using labor health risk assessments, physical and health examination data management, and high-risk work assessments and management along with other health services required by the Regulations Governing Labor Health Protection, Taipower formulated a labor health service program to assist with occupational injury and disease prevention and with the maintenance of physical and mental health.

To promote the labor health service system and protect workers' welfare, Regulations Governing the Labor Health Protection require business entities that employ 50 or more workers and have more than 50 laborers involved in tasks with special health hazards to employ or contract medical personnel that conduct on-site health management, occupational disease prevention, and other health protection matters. As of December 2022, 69 units of the Company had arranged for contracting physicians to provide on-site health services. Another 69 units have put in place paramedics (full-time: 49 units, contracting: 20 units). The medical personnel of these on-site health services assist the Company in the analysis and evaluation of health examination results, proper work assignments, high-risk labor evaluations and case management, maternal health protection, work-related disease prevention, etc. They also assist in implementing business promotions for things like labor health protection and health management to create a friendly workplace environment.

Taipower provides monthly health consultation and health promotion activities, including health lectures, influenza vaccinations, cancer screenings, and physical fitness tests. In 2022, approximately 1,039 health consultations and health promotional activities were conducted. Additionally, employees can receive 8 hours of free psychological counseling and guidance per year through the Heart-to-Heart program to alleviate work-related stress and enhance quality of life.

Taipower provides occupational safety and health information to employees through various gatherings, platforms (such as webpages, emails, employee discussion forums, posters, and banners), and other channels. Employees can contribute to occupational safety and health management by submitting suggestions and improvement ideas through the employee proposal system, occupational safety and health committee meetings, email correspondence, departmental meetings (including workshops), written feedback, or occupational safety and health care platforms. This two-way communication approach allows for employee participation in the development, implementation, and evaluation of the occupational safety and health system.

# Strategy for Occupational Safety Performance and Refinement

In 2022, Taipower workers that experienced work-related injuries or diseases were mainly affected by falling objects, electrification, contact with high or low temperatures, stabbing, cutting, and scratching. Taipower's Occupational Health and safety Management System incorporates Hazard Identification and Risk and Opportunity Assessment Procedures to reduce risks through measures such as elimination, substitution, engineering controls, labeling/warnings, management controls, use of personal protective gear, etc. These measures are adjusted or updated, when necessary, through meetings and discussions that determine compulsory control measures, and other refinements or improvements.

## Statistics on Serious Work-Related Injuries in 2022

| Worker Category | | Employees | | | Construction Contractors |
|---|---|---|---|---|---|
| Gender | | Male | Female | Total | Total |
| Total number of work hours | | 48,723,598 | 9,280,685 | 58,004,283 | 43,303,373 |
| Deaths caused by occupational injuries | Number of people | 0 | 0 | 0 | 1 |
| | Rate | 0 | 0 | 0 | 0.005 |
| Severe occupational injuries (Excluding deaths) | Number of people | 7 | 0 | 7 | 13 |
| | Rate | 0.029 | 0 | 0.024 | 0.060 |
| Recordable occupational injuries | Number of people | 7 | 0 | 7 | 14 |
| | Rate | 0.029 | 0 | 0.024 | 0.065 |
| False alarms | Number of people | 9 | 0 | 9 | 5 |
| | Rate | 0.037 | 0 | 0.031 | 0.023 |

Note:
1. Employee: Includes both dispatched and employed personnel
2. Contractor: Includes both contractor labor and self-employed workers
3. Total working hours: The total working hours of male and female employees at Taipower are calculated based on the overall total working hours according to the male to female ratio of Taipower employees
4. Rate of death caused by occupational injury = (Number of deaths caused by occupational injury/Total hours worked) × 200,000 (refers to the rate per 100 employees based on 40 working hours per week for 50 weeks per year)
5. A severe occupational injury is defined as an occupational injury that results in death or an injury that prevents a worker from returning to a pre-injury state of health within six months. This year, construction contractors didn't compile total person-work hours according to gender, so the data is unavailable. The statistical methods for this item will be improved in the future
6. Rate of severe occupational injury (excluding deaths) = (Severe occupational injuries/Total hours worked) × 200,000
7. Rate of recordable occupational injuries = (Number of recordable occupational injuries/Total hours worked) × 200,000
8. False alarms refer to accidents related to or occurring in the course of work that cause no loss and do not involve casualties.

## Analysis and Statistics of Occupational Injuries in 2022

| Type of worker | Total | Contact with high or low temperatures | Falls | Electric shocks | Collapses | Stabbing, cutting, scratching | Struck | Trip |
|---|---|---|---|---|---|---|---|---|
| Employees | 7 cases (7 individuals disabled) | 3 cases (3 individuals disabled) | 1 case (1 individual disabled) | 2 cases (2 individuals disabled) | 0 cases | 1 case (1 individual disabled) | 0 cases | 0 cases |
| | Injury rate by accident category | 43% | 7% | 29% | 0% | 7% | 0% | 0% |
| Contractors | 10 cases (1 death, 13 individuals disabled) | 4 cases (5 individuals disabled) | 2 cases (1 death, 1 individual disabled) | 0 cases | 1 case (4 individuals disabled) | 0 cases | 1 case (1 individual disabled) | 2 cases (2 individuals disabled) |
| | Injury rate by accident category | 36% | 14% | 0% | 29% | 0% | 7% | 14% |

Note:
1. Disaster type injury rate = Number of casualties of the specific disaster type/Number of casualties of the entire year x 100%
2. The occupational injury data of Taipower employees does not include non-commuting traffic accidents that affected 16 people

In the event of false alarm involving a Taipower employee or contractor, the department head or head of the host department at the site where the incident occurred shall serve as a convener and form a "Unit Investigation Team" that includes the occupational safety department and the Taiwan Power Labor Union Branch to take charge of the investigation. If necessary, the Department of Civil Service Ethics of the unit may be invited to conduct a joint investigation. The unit where the incident occurred shall submit an Occupational Safety Accident Report within three working days from the day after the incident occurred. In cases of extraordinary circumstances, a preliminary report may be submitted and later supplemented with relevant information.

## Strategy for Future Refinement

Taipower's occupational injuries in the past ten years can be divided into three major categories: contact with high temperatures, electric shocks, and falls. Further investigation suggest that most injuries are caused by a series of factors: not executing or implementing risk assessments, workers not following procedures during tasks or lacking crisis awareness, a failure to implement the three basic tenets of occupational safety on-site, changes in management, failure to comply with standard operating procedures when working, failure to use protective equipment, lack of horizontal contact, and failure to properly control entry and exit of personnel, etc. The improvements Taipower aims to make are as follows:

### Future Improvement Strategies and Methods for Occupational Safety

**Strengthen the system**
- Amending management procedures for punishment mechanisms
- Promoting collective punishment for supervisors
- Adding to and amending safety construction procedures

**Increase the level of punishment**
- Violator re-education
- Increasing the upper limit of first-time penalties
- Progressively increasing fines

**Manage procurement**
- Using the most advantageous bids or the lowest bids that pass the selection standard for procurement, while increasing the weight of the industrial safety assessment in selection
- Risk assessment reports will be submitted during bidding processes

**Remove those who violate the rules**
- Onsite workers may temporarily suspend construction in the event of hazards and may withdraw to a safe location to ensure safety
- Elimination mechanism for personnel violating the rules
- Elimination mechanism for vendors violating the rules

**Implement training and education**
- Pre-service training and drills
- Implementing qualification training
- Advocacy
- Organizing awareness campaigns
- Organizing virtual reality (VR) simulation training for preventing falls.

**Implement controls**
- Engineering safety early warning system tracking management
- Auditing supporting manpower
- Handling review mechanisms
- Strengthening industrial security checks
- Enhancing management for construction during holidays
- Change management
- Entry and exit controls for key personnel (e.g., personnel responsible for worksites and occupational safety personnel)
- Strengthening the management of personal protective equipment and machinery facilities

**Occupational safety care platform**
- Provide a platform for employees of each unit to report errors found in construction projects

**Disaster prevention technology**
- The introduction of a mobile real-time image system (CCTV) and AI recognition

**Third-party auditing**
- Blind spots identified through the third-party inspection mechanism and external occupational health and safety experts are given priority in inspection

In addition to continuing the current occupational safety and health management measures, the following key areas of improvement in occupational safety and health management will be a focus in the future:

### Enhance the importance of hazard identification training

Establish training on scoring criteria for interactive hazard identification in Each Department to ensure that both employees and contractors are receiving effective interactive hazard identification training. Interactive hazard identification training will be included in the annual performance indicators of each business department.

### Utilize innovative technologies

#### Introduce AI recognition in CCTV

In addition to supervising each department's use of mobile CCTV for on-site safety monitoring, AI image recognition systems will be introduced. The systems will proactively detect deficiencies and issue alerts, achieving intelligent safety monitoring. In 2022, the recognition of operational personnel's safety attire has been achieved. The goal is to achieve "comprehensive AI image recognition" by 2023.

#### Expand the use of Virtual Reality (VR) fall prevention training

Utilize VR to present visuals and auditory sensations similar to actual situations, allowing personnel to experience falls in a safe environment and enhance the effectiveness of learning. In 2022, VR training courses have been continuously implemented in training programs, with a total of 8 sessions conducted.

#### A third-party audit mechanism

Priority is placed on affiliates or locations that have had either a higher frequency of occupational accidents in the past 5 years or potential occupational safety and health risks. Through third-party audits by external occupational safety and health experts, internal risk areas or blind spots that are not easily detected can be identified, and safety and health management measures can be strengthened. A total of 46 sessions were conducted in 2022.

# 7.2.2 Labor-Management Communication and Collective Bargaining

2-30

Taipower attaches great importance to the voices and needs of all its professional partners. The Company provides channels for expressing diverse opinions, and actively responds to relevant suggestions to continuously create a labor-management environment that makes employees feel satisfied and builds trust in the Company.

## Communication Performance

| Communication Channels | 2022 Performance |
|---|---|
| Labor-management conferences | Taipower holds regular labor-management conferences to foster effective communication. There were seven labor-management conferences held at company and sub-system levels; interaction and communication between labor and management took place in the meetings. |
| Keynote speeches | Taipower held five keynote speeches for high-ranking supervisors to encourage continuous communication with employees about the Company's policies; interaction and communication between labor and management took place in the meetings. |
| Training | Various training courses are provided for employees on an ongoing basis so that staff can acquire vocational skills and communicate with the Company. |
| Intranet websites | In order to strengthen internal communications and website management, Taipower has amended and announced management operational guidelines on its website and message board. If employees have doubts or experience misunderstandings about the Company's policies or regulations within the online discussion area, the unit in charge can immediately resolve the doubts of the employees. |

## Negotiations on Collective Agreements

In 2013, Taipower signed a collective agreement with the Power Labor Union. In response to the revision of the Labor Standards Act and other changes, the Company's labor and management reviewed and revised the relevant provisions of the original collective agreement, amended and renewed the new agreement in March 2021. This agreement is periodically discussed at ongoing collective agreement meetings. A total of nine meetings were held in 2022 to propose additional provisions for the chapters on benefits, training, and health and safety.

Number and Ratio of Employees Covered by the Collective Agreement

| Item | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Total employees | 27,606 | 27,836 | 27,860 | 28,079 |
| Number of employees in the union (people) | 26,866 | 27,654 | 27,639 | 27,878 |
| Number of employees in the union (%) | 97.3% | 99.3% | 99.2% | 99.3% |

Note: The provisions of the Company's collective agreement on labor conditions offer protection to all employees and are handled in accordance with government decrees, through superior authorities, and in alignment with relevant regulations at the Company.

## Performance and Implementation of the Grievance System

Taipower's Guidelines for Processing Matters of Grievance Concerning Working Personnel help deal with issues that cannot be resolved through the Company's administrative system. The guidelines cover the following:

1. Employees who must adjust their job duties or be transferred to other departments, units, or regions due to personal or family reasons.
2. Employees who have been going through major changes or crises with their families and require the Company's involvement.
3. Employees who are not satisfied with the Company's systems and measures, or those who have filed complaints regarding contracting or oversight of construction projects, financial and procurement matters, or hand-over inspections.
4. Investigations and handling of other complaints.

Grievances and complaints filed by employees are handled by the Personnel Difficulty and Grievance Processing Team of the employee's unit. If the team is unable to handle the case or if the outcome is not acceptable to the employee involved, he or she may file an appeal with the Personnel Difficulties and Matters of Grievance Processing Committee.

# 7.3 Promoting Social Co-prosperity

Taipower is committed to combining social resources to fulfill its social responsibilities. The Company holds to and shares the business principles of integrity, care, service, and growth. Consequently, it actively encourages employees to participate in volunteer and community service activities to enhance Taipower's corporate image. Throughout 2022, Taipower organized various public welfare activities that reached a total of 48,000 individuals.

Taipower uses a Volunteer Service Team system. At the corporate level, the Team Leader, Deputy Team Leader, and Executive Director roles are filled by the Chairman, President, and Vice President of the Secretariat. The heads and deputies of each unit serve as team leaders and deputy team leaders in their respective volunteer service teams and elect their own executive directors. Volunteer activities mainly focus on four major themes: energy conservation and carbon reduction services, community services, social and humanistic care, and environmental protection. The units organize suitable events based on local needs. The volunteer teams from each unit submit performance reports to the Secretariat on their volunteer services of the first (January to June) and the second (July to December) halves of the year. Reports are submitted before the end of July each year and before the end of January in the following year.

## Cultural Contributions

The Company actively seeks to promote an appreciation of its social responsibilities and sustainable development philosophy. Through combining the history of Taiwan's electrical industry development with education, Taipower brings diversity into society and promotes the use of value-added knowledge. The Company established a working group on Cultural Heritage Preservation. It also pursues Operation and Maintenance Projects that conduct a full inventory of the company's cultural assets and to help preserve the Company's non-building cultural heritage. The Vice President of Strategy and Administration serves as the convener of meetings on important cultural heritage preservation, operations, and maintenance to promote preservation, research, and communication with society. Taipower adopted the strategies of research-before-education, phased development, and continuous adjustment for its reviews of different cultural and historical data themes. The Company inspects, preserves, and displays the resulting cultural and historical data to promote resource sharing and revitalization and to fulfill its corporate social responsibility.

## Localization and Revitalization

The preservation of cultural assets is a bridge that links the past to future changes. As such, Taipower continues to maintain and repair cultural assets, recreate historical sites that illustrate the development of the electric power industry, and encourage the industry to connect its cultural and historical archives with social resources. The Company also promotes co-prosperity with local communities and helps the general public rediscover the culture of Taipower. Integrating awareness of the historical development of the local electric power industry with the economic, social, and humanistic interactions that link local communities and organizations will help strengthen local identities. Taipower has established local cultural archive exhibitions that are available to the general public through a reservation system. This provides local communities with educational arenas and museums that activate the promotion, inheritance and deepening of local knowledge.

### Inventory of Cultural Assets

Taipower continues to conduct the inventory and preservation of cultural assets. In 2022, the inventory focused on the theme of the "Lanyang Power Plant," resulting in the identification of 633 drawings related to hydroelectric power generation during the Japanese colonial period.

### Publication of Literary and Historical Monographs

To date, Taipower has published 13 series and 19 volumes of books. These books are distributed to public libraries in various towns and cities, as well as to cultural institutions for preservation, research, and reference purposes. The relevant books are also made available for purchase online through platforms such as Books.com.tw, Sanmin Bookstore, and Wunan Bookstore.

## Planning for the Power Industry Cultural Trail

The execution process of the Taipower's Cultural Path Planning and Survey Research Project for the Power Industry involved 2 consultations with experts and scholars, 1 cross-unit workshop, 1 focus group discussion, 2 field workshops, and 1 event to presentation results. The research process inventoried Taiwan's hydroelectric power system and selected four potential cultural paths related to "hydroelectric power generation." These paths connect and interpret physical routes with historical context or suggest narrative-based visiting routes. The selected paths include the Xindian River Basin, Dajia River Basin, Laonong River Basin, and Mugu River Basin. The project systematically promotes the preservation and revitalization of Taipower's cultural assets, and serves as a driving force for the sustainable preservation and management of the power industry's heritage. The research outcomes have been fruitful.

On the day of the results presentation event, various state-owned enterprises from different countries were invited to share their experiences in implementing cultural paths. The event included showcasing achievement records through video presentations and hosting panel discussions with experts and scholars from the industrial, governmental, and academic sectors. In addition to being open to the public by registration, various units within the Company's strategic administration system, as well as power generation departments like those at the Dajia River Power Plant and Guishan Power Plant, were also invited to participate and contribute to the research projects.

The total actual expenditure for the aforementioned cultural asset inventory, book compilation, and cultural path planning survey research project amounted to approximately NT$8.9 million.

## Design Innovation in Electronic Literature

To convey Taipower's efforts in promoting cultural heritage preservation and share the history of Taiwan's power development, precious historical artifacts, and stories of the power industry among the public, we continue to collaborate with internal and external teams. Through various types of curations, we showcase power cultural assets and Taipower's progressive power intelligence. In 2022, we collaborated with the National Taiwan Museum to organize the special exhibition "Island · Power Life – The Era of Taiwan's Power." Unlike previous exhibitions, this one was planned as a permanent display, conveying the close connection between electricity, the land and life from the past to the present and into the future. Additionally, the exhibit explores the combination of applying product design with power industry cultural themes. For instance, in 2022, the Company collaborated with the artist Liao Guo Cheng and Elephant Design to create a calendar uses a 45-degree, semi-three-dimensional illustration style that is combined with surreal fantasy space. This showcased over 75 years of Taipower's rich cultural assets and extended the visual concept to desk calendars, notebooks, and electricity bill envelopes. By innovatively integrating power industry cultural heritage with design, we transformed it into creative and engaging promotional materials filled with historical significance and charm.

## Professional Electricity Curation

Since 2017, Taipower has been organizing power-themed exhibitions and continuously translating power-related cultural assets into various forms of design. In 2022, Taipower was invited to collaborate with the National Taiwan Museum, the oldest history museum in Taiwan, to co-organize the "Island · Power Life - The Era of Taiwan Power" exhibition. The exhibition was planned as a permanent display for long-term interaction with the public. It was held from December 6, 2022, to April 7, 2024, on the 2nd floor of the South Gate Building of the National Taiwan Museum. The exhibition features four major themes and showcases over 60 exhibits and more than 160 precious images from Taipower, the National Taiwan Museum, the National Museum of Taiwan History, and the National Museum of Science and Technology. Among them, Taipower is exhibiting Taiwan's first electric meter, which is over a hundred years old. Additionally, 14 historical electric meters were combined to create an interactive art installation that bridges different time periods. Through the perspective of ordinary people, the exhibition narrated the electricity consumption experience of the Taiwanese people, presenting the historical connection between "power" and the land in Taiwan's development.


▲ The Opening Ceremony of the Exhibition "Island · Power Life - The Era of Taiwan Power"

The opening ceremony of the exhibition "Island · Power Life - The Era of Taiwan Power" was held on December 5, 2022, at the South Gate Pavilion of the National Taiwan Museum. The ceremony was jointly officiated by Mr. Tseng Wen-sheng, the Acting Chairman of Taipower, Mr. Hong Shih-yu, the Director of the National Taiwan Museum, and Mr. Lee Lien-chuan, the Deputy Minister of the Ministry of Culture. This collaboration between Taipower and the oldest museum in Taiwan, the National Taiwan Museum, marks a significant step forward in Taipower's engagement through power industry exhibitions. Taipower aims to use its expertise in the power field to not only document the development of Taiwan's power industry but also to share the historical life context of this land with the general public.

## Investment in Cultural and Art Activities

From 2020 to 2022, Taipower invested in art bank painting rental activities and performances to provide steady support and encouragement to young Taiwanese artists and performers. Through these professional exhibitions, the overall artistic and cultural atmosphere of the office space has improved and staff have been subtly influenced and transformed from the inside out. The exhibits are also accessible to the general public.

Statistics on Painting Rentals and Exhibition Activities

| | Year | 2020 | 2021 | 2022 |
|---|---|---|---|---|
| Painting Rentals | Number of items | 74 | 72 | 84 |
| | Amount (NT$) | 351,471 | 467,248 | 545,575 |
| Art Gallery | Number of exhibitions | 6 | 2 | 0 |
| | Amount (NT$) | 48,033 | 25,000 | 0 |
| Exhibitions and Activities in the Grand Hall | Number of exhibitions | 14 | 13 | 14 |
| | Amount (NT$) | 60,000 | 109,000 | 206,797 |

Taipower initiated planning of the Taiwan Power Industry Cultural Pathway in 2022. In 2023, the Company will continue by starting the Xindian River Basin Power Cultural Pathway. We will coordinate with relevant local power attractions and design thematic walking tours/small trips that highlight local cultural characteristics. The goal is to invite the public to explore the historical texture of their local industry and the power industry's development, thereby enhancing their understanding of the historical and cultural significance of the power industry. We hope that through these tours, Taipower can promote the integration of the power industry with local resources, and in so doing not only boost local economies but also preserving and revitalizing local cultural resources, thereby shaping and strengthening the Company's brand image and understanding of the Power Industry's Cultural Journey.

In 2023, the Volunteer Team from Taipower's Headquarters will organize a series of public welfare activities under the theme of "Company-wide Public Welfare Initiatives." These activities include art and cultural tours (the Taiwan Lantern Festival in February, the Baolaiyan Light Festival from March to May), caring for vulnerable groups (the donation of supplies for the Hungry Ghost Festival in September), and sports events (Taipower's Cheerleading volunteers). The goal for the year is to carry out more than four public welfare events.

## TPCreative: A Circular Economic Brand

TPCreative is organized around the concept of circular economies and works to develop cultural and creative products that incorporate Taipower elements from reclaimed and decommissioned materials that are produced in the process of power generation. TPCreative draws people closer to the Company through commodity sales and enhances the Company's corporate image. TPCreative achieved the follow in 2022:

1. Taipower Creative held a pop-up exhibition titled "Flash Power" at Eslite's Xinyi Store. The exhibition showcased and sold various products such as Taipower heating pads, storage trays, and landscape badges made from retired electrical boxes. The exhibition highlighted the brand's concept of recycling materials and giving them a new life in daily use.

2. With the relocation of the 2022 Taiwan Cultural and Creative Industries Expo to the Kaohsiung Exhibition Center, Taipower Creative participated in a physical exhibition in Kaohsiung for the first time. The exhibition continued the spirit of the circular economy and presented the important achievements of using retired materials in creative industries, showcasing the complete development process.

3. Taipower Creative was invited by the Taiwan Design Research Institute (TDRI) to participate in the "Design for Transformation" summit organized by the Confederation of Indian Industry (CII) in India. Experiences in circular design were shared through an online presentation.

4. Taipower Creative launched the "Sun Moon Lake Sediment Repurposing Project" and introduced a series of products using sediment from Sun Moon Lake. These included the highly recognizable Taipower manhole cover sediment coasters and a set of matching cups. They also organized a "Chao Dian POP-UP Store" for a limited period of time to communicate the brand's message. The new product launch once again demonstrated the organization's commitment to circular sustainability. In addition, it collaborated with Hotel Royal in Jiaoxi for the "Chao Dian Outing" project and participated in the release of the hotel's ESG sustainability report, promoting sustainable and environmentally friendly practices. It also participated in the exhibition "Memory Recall - Jiaoxi Street Urban Renewal Documentation" and set up booths at weekend markets.

5. Taipower Creative's "Sun Moon Lake Sediment Manhole Cover Coaster" and "Retired Electrical Box Repurposing Project" received the Golden Pin Design Award's "Product Design Category" Gold Pin.

6. Taipower Creative's "Retired Electric Meter Glass Repurposing Project – the 54th Taipower Skills Competition Lecture and Commemorative Badge" competed in the 2022 Hsinchu City Golden Glass Award for Glass Art and Design Applications and received an "Honorable Mention" in the Design Application category.

7. Taipower Creative's "Sun Moon Lake Sediment Repurposing Project" and "the Retired Electrical Box Repurposing Project" were selected for the German iF Design Award.

# Management of Charitable Activities

Volunteer service is a noble endeavor requiring dedication and selflessness. Taipower employees and retirees from various locations willingly devote their time on holidays to participate in community care activities. This practice reflects the Company's commitment to caring for the community and actively showcasing the love and vitality of Taipower employees, enhancing the company's public image in terms of corporate social responsibility. We value the development of our volunteers and continuously implement volunteer cultivation programs. Through in-house volunteer training and experience-sharing sessions, we aim to enhance the skills and service quality of our volunteers. With the spirit of "One Taipower" as our foundation, we work together for the social good, embodying the Company's core principles of ensuring stable and safe power supply, catering to customer needs, cultivating a people-centric corporate culture, addressing environmental sustainability, and caring for vulnerable groups and local communities. This allows us to fulfill our mission of serving society and fulfilling our corporate social responsibility.

Taipower actively encourages its employees to participate in volunteer and community service work as a means of fulfilling the Company's social responsibilities and enhancing its corporate image. Taipower actively promotes education and communication about energy science, renewable energy, and environmental knowledge.

The Company's Environmental White Paper lays out a strategy for expanding internal and external engagement. In upholding that aim, the Company sets short, medium, and long-term goals for transferring environmental information on electricity. By 2030, it is estimated that information and communications on the topic of environmental protection within the power utility industry will be reaching 750,000 people per year.

## "Smart Hands-on Electricity Generation" – At Taipower D/S ONE

Taipower established the nation's first renewable energy exhibition hall – Taipower D/S ONE. The hall is connected to the Banciao Triple Junction by an elevated corridor and was designed to meet international standards and to become a significant and engaging educational venue for renewable energy in the country. Taipower D/S ONE takes its name from the abbreviation, D/S, which represents a power facility called a "Distribution/Substation." Cleverly, D/S ONE uses D/S as an abbreviation for "Design" and "Sustainability" as a reflection of Taipower's ambitions efforts to revitalize its brand, enhance communication with the public, and showcase the core spirit of promoting renewable energy. Since its official opening in 2020, D/S ONE has actively represented a green, smart, future by promoting energy education among students and teachers at all levels. It has been selected as one of the "Top 10 Popular Science Bases" by the Ministry of Education and has been recognized with the First Prize for Educational Promotion by Far Eastern Group's Corporate Social Responsibility Awards. D/S ONE is dedicated to collaborating with schools, educational institutions, and various resources across Taiwan, with the goal of becoming a significant driver for "integrated renewable energy education and information dissemination in Taiwan and educational learning."

As of the end of 2022, D/S ONE had attracted over 140,000 visitors and had cultivated more than 33,000 followers on Facebook. In the same year, three sets of wind power teaching tools were developed and promoted in over 40 high schools, junior high schools, and elementary schools across Taiwan. These tools were also integrated into student camps, teacher workshops, and activities with the National Taiwan Science Education Center and other museums, actively promoting energy science education. To celebrate the third anniversary of its opening, D/S ONE responded to the inauguration of the integrated solar-storage system at the Tainan's Salt Field Solar PV Farm by organizing the special exhibition "Solar Storage Fantasy." The exhibition displayed a scaled down version of an on-site energy storage container to a realistic model at a 1:20 ratio and brought it to the exhibition hall. The exhibition combined knowledge with interactive light spheres to create an intellectual and visually appealing spot in the Banqiao area. The exhibition attracted approximately 10,000 visitors and allowed the public to both gain a better understanding of energy storage system applications and to deepen its understanding of Taiwan's renewable energy development.

In the future, D/S ONE will continue to spark creative energy and create value by implementing green energy education in diverse forms and collaborating with various resources.

## "Delivering Knowledge through Design" - kW Design Award

To engage the public while promoting electricity and energy-related issues, Taipower has launched the " kW Design Awards" as an event brand. The Company has called for creative ideas nationwide through campus presentations that introduce the three categories of competitions: Communicative Design, Multimedia Design, and Creative Product Design. So far, the event has accumulated over 30,000 student participants and received nearly 15,000 submissions.

In 2022, the campus tour reached out to a total of 70 universities, colleges, and high schools, including four flagship locations in the northern, central, southern, and eastern regions, engaging with students, teachers, and the public. The total number of participants reached 1,800 people. The theme of the tour was "Re," and it explored various aspects of energy transition, storage development, smart electricity usage, and energy conservation. Under the framework of a zero-carbon future, the tour encouraged a rethinking of the possibilities of electricity. In the Communicative Design category, the event introduced a new infographic design that utilized visual graphics to convey scientific information, allowing design to speak for knowledge.


▲ Save Energy, Love the Earth, and Start from a Young Age – I Love the Mother Earth Action Story Educational Promotion Campaign

Since 2011, Taipower has been conducting an interactive storytelling campaign targeting children aged 4 to 6 in kindergartens. The campaign aims to promote concepts of electrical safety and energy conservation to the young children. In 2022, a total of 62 sessions were held in kindergartens near Taipower's power plants, substations, and service centers in the northern, central, and southern regions of Taiwan. Approximately 3,991 students and teachers participated in these sessions. Two additional sessions were organized in collaboration with Shin Kong Mitsukoshi Department Store, at their stores in Taipei Station and Tianmu, further strengthening the relationships among external organizations, government agencies, and local community leaders, while effectively conveying the message of energy conservation and love for the Earth to young children.

"I Love the Earth Mom" Facebook fan page.

## Enhancing Taipower's Professional Image and Promoting Scientific Knowledge on Campus - Little Power Worker

As part of the power education program designed for elementary school students, this activity aims to enhance children's knowledge of electricity and energy. Through various experiences, it also aims to broaden the younger generation's perspective and imagination about future careers. The activity was first held on October 12, 2022, at Guanghua Elementary School in Xinzhuang District, New Taipei City. Approximately 50 sixth-grade students participated. The activity featured power engineering vehicles and images of power workers, which attracted the children's attention. The equipment and tasks of power workers were introduced, and basic energy concepts were incorporated into the experience with the engineering vehicles to facilitate learning and ensure the continuous growth of energy knowledge among the students.


## Taipower's Public Welfare and Sponsorship Commitment

Taipower strives to achieve symbiosis and mutual prosperity with society by continuously investing in cultural, artistic, and charitable activities. It has deeply ingrained the image of being a practitioner of corporate social responsibility into its corporate identity. In collaboration with local communities, Taipower promotes harmonious coexistence and drives electricity infrastructure development. The Company engages in neighborly initiatives, including emergency assistance, support for low-income households, welfare for elderly people and those with disabilities, educational and cultural programs, and other public welfare actions. In 2022, there were a total of 3,758 neighborhood-care cases, with a donation amount of approximately NT$104.527 million.

The Company compiles the approved cases for each unit every month and makes the information public on the official website. https://info.taipower.com.tw/tc/index.aspx

## Rooted in Environmental Sustainability - Award Sponsorship to Encourage Students

In recent years, Taipower has actively engaged in environmental conservation and sustainable development. The company has also been dedicated to environmental education for over two decades. As environmental sustainability has become a prominent issue in society, it is crucial to foster a deep-rooted understanding of this concept. The "Mr. Tseng Hsiu Pai News Award" is the oldest journalism award in Taiwan, and it has garnered a wide student and audience base. To further encourage students' attention to environmental and ecological sustainability issues, Taipower sponsored the "Taipower College Student Environmental and Ecological Sustainability Reporting Awards" at the 48th Mr. Tseng Hsiu Pai News Awards. The awards include categories for video and audio reporting and aim to engage college students through the competition. The Company hopes that students, through the process of producing reports, will gain a better understanding of the importance of environmental sustainability and contribute to the sustainable development of Taiwan's ecology.

## Oil-Electric Harmony, Cherish the Rare

Taipower actively participates in social welfare initiatives. The "2022 Oil-Electric Harmony, Cherish the Rare" concert is a collaboration between the state-owned enterprises Taipower and CPC and the Rare Disease Foundation. The concert aims to engage the public in musical exchanges, so that sincere actions and moving voices can convey the melody of love for life. It also hopes to inspire others to extend their kindness and support to patients and disadvantaged individuals in society.

## The Candied Hawthorn Troupe presented the children's education play, "Return to Electric Mountain"

Taipower continues to focus on electricity education by collaborating with children's theater groups to impart diverse knowledge and literacy about electricity and sustainable energy.

## End-of-Year Care Program for Solitary Seniors

Since 2005, Taipower has been inviting elderly people that live alone to gather for a meal. The Company also arranges for them to buy New Year goods and receive care packages at power plants or district business offices both before and after the Lunar New Year. This initiative brings joy to the elderly during the Lunar New Year and fulfills the company's social responsibility. In 2022, the COVID-19 pandemic and the increased risk of large gatherings meant the annual event was replaced with individual interactions like accompanying the elderly to purchase New Year goods, gifting Lunar New Year dishes, offering gift vouchers for daily necessities, providing assistance with home organization, etc. Approximately 1,625 participants were involved in these activities.

## Seeds of Hope: The Hope Cultivation Project

Since 2005, Taipower has been providing summer job opportunities for underprivileged indigenous college students from Taitung, Hualien, and Pingtung. This initiative aims to alleviate the financial burden on participating students. Each year, approximately 75 summer job positions are offered, and 2022 marked the 18th year of the program. To date, more than 1,103 students have participated. Due to the Covid-19 pandemic, the program engaged 78 college students and served 488 school children in 2022. The program illustrates Taipower's commitment to deeply engage with indigenous communities, by providing students with opportunities for personal growth and development but also by strengthening their connections to their hometowns and allowing them to give back to their communities.

## Reading Promotion: The Firefly Children's Reading Project

In 2007, Taipower established multiple after-school programs for children in remote areas of Hualien and Taitung to promote ethical and art education. Taipower uses mobile library vans, summer reading camps, and year-end angel club activities to provide underprivileged children in remote areas with assistance and resources. The Company seeks to reduce the gap between urban and rural resource availability and helps children improve their knowledge and skills. About 4,500 people were served by the project in 2022.

As part of the Firefly Children's Reading Project, the first-ever power workers mission experience was held at the Taitung Regional Office. The Taitung Regional Office organized five activities, including the Fuse Chain Switch Power Cut Experience, the Switch Operation Experience in the Pavilion, the Hand-operated Compression Tool Experience, the Climbing a Pole Experience, and the Aerial Lift Experience. These activities allowed the little angels from the Firefly Children's Reading Project to fully understand the professionalism and hard work done by power workers. The event received widespread positive coverage from local media. A total of 116 elementary school students from 8 tutoring classes and 24 teachers from the Taitung area participated in the event.

# Cultivating Sports and Exerting Social Influence

Taipower is dedicated to promoting grassroots sports and giving back to society through various charity and promotional events. These included events such as the Caring Train, Ball Fun Power Camp, and the Taipower Cup Tournament. These activities have deepened the Company's involvement in grassroots sports. Through long-term training and competitions, many outstanding star players have been nurtured over the years. This has led to impressive performances by Taipower's sports teams in various arenas. Team members have achieved numerous victories and even earned spots on national teams. Taipower has become a cradle for national athletes, bringing honor to both the Company and the country. It is undoubtedly one of the most supportive enterprises for ball sports in the nation.

## Elevating the Level of Sports Performance

In line with the national sports policy, Taipower's various sports teams continue to scout talented and promising young players from high schools and universities (colleges and vocational schools). These potential players are appointed as sports officers and undergo long-term training to enable continuous growth and development. Through annual open tryouts, these players are given the opportunity to become official members of Taipower's sports teams. Taipower has established a comprehensive career support system for players that not only focuses on competitions, practices, and community service activities but also on nurturing players' professional skills. This prepares them for a career within Taipower after their athletic careers conclude. The lifelong employment system allows players to focus on rigorous training without worries about the future. It encourages them to strive for greater glory on the field and to leave a mark as outstanding athletes in the domestic sports arena while strengthening the nation's athletic capabilities, thus fulfilling the government's goals in promoting sports policy.

## Rooted in the Grassroots Level of Sports

To enhance the level of domestic sports and to deepen grassroots sports development, we have been actively conducting Caring Train programs and providing coaching on ball skills in remote and underprivileged areas. During the summer vacation, each sports team organizes Fun Electric Camp activities, where players teach children various ball sports techniques, help them to develop positive sports habits, improve their physical fitness, help them learn teamwork, and foster a spirit of sportsmanship. These initiatives aim to promote nationwide sports activities and cultivate talented athletes. Additionally, we hold the "Taipower Cup" competition to provide a competitive platform for discovering future sports stars. Through these events, students have the opportunity to showcase their skills, learn from each other, and master professional techniques and sportsmanship thereby nurturing the future of national sports. Along with diverse sports-related public welfare activities like the Caring Train, FunPower Camps, and Taipower Cup, we are positively influencing the promotion of Taiwan's sports culture.

## FunPower Camps

FunPower Camps are summer activities organized by Taipower that provide students with a fun experience in various sports. Taipower athletes (from baseball, badminton, volleyball, soccer, and basketball players) serve as coaches and National team players also participate in the camps to interact with and guide the students. Following the program's inception in 2016, the FunPower Camps were held for four consecutive years during the summer months of July and August. The number of camps increased from 10 sessions with 2,500 participants to 12 sessions with 3,600 participants. The camps received enthusiastic feedback from parents and students. Although the FunPower Camps were not held from 2020 to 2022 due to the impact of the pandemic, Taipower remains committed to injecting a sports culture into Taiwan.

Through these activities, Taipower aimed to provide children with a joyful and fulfilling summer while promoting grassroots sports, elevating the level of sports in Taiwan, and fostering a sports culture in society. In lieu of the camps, efforts have been focused on strengthening the "Caring Train" initiative to bring resources to children in remote areas.

## Caring Train

Recognizing the lack of educational and sports resources in remote areas, Taipower, as a responsible large corporation, has been actively involved in the Caring Train program. In addition to participating in various competitions, the sports teams regularly visit remote areas and organizations that serve the disadvantaged to deliver love and hope to every corner of Taiwan. In 2022, due to the pandemic's impact on the FunPower Camps, the Caring Train activities were conducted instead. The teams visited 16 schools to provide guidance in various sports and to share player experiences. For example, the baseball team visited Xizhi Junior High School, Chongyi High School, and Xiufeng High School in New Taipei City to teach young baseball players. The men's volleyball team visited Majia Junior High School in Pingtung County and also invited Jiayi and Saijia Elementary Schools to attend. The women's volleyball team visited Ganghe Elementary School in Kaohsiung City to interact with young players. The women's badminton team went to Niaosong Elementary School in Yunlin County and Daxi Elementary School in Taoyuan City to introduce the sport of badminton to elementary school children. The soccer team provided football skills training at Nanping Elementary School, Qixian Elementary School, and Kai Xuan Elementary School in Yilan County. The women's basketball team conducted activities at Xilin Multipurpose Activity Center in Hualien County, Guofeng Junior High School, Jinhu Elementary School, Jinsha Elementary School, and Zhuohuan Elementary School in Kinmen County. Through these enjoyable educational activities, Taipower actively supported the government's promotion of sports for all.

## The Taipower Cup

Since 2018, Taipower has been promoting the sports culture of ball games in Taiwan, encouraging widespread participation in sports and fostering physical and mental well-being. The first Taipower Cup Volleyball Tournament attracted 32 teams and received enthusiastic responses from participating students and the public. In 2019 and 2020, the second and third editions of the volleyball competition were successfully organized, with the number of participating teams increasing to 43, and the event expanding to cover the regions of Kaohsiung, Pingtung, and Tainan. However, due to the impact of the COVID-19 pandemic, the event was suspended in 2021. In 2022, after much anticipation and preparation, the 4th Taipower Cup Volleyball Tournament made a grand comeback, bringing together 32 elementary school teams from Tainan, Kaohsiung, and Pingtung to compete in the tournament.

In 2019, the Company's soccer team organized the 1st Taipower Cup Soccer Invitational Tournament at the Hsinta Power Plant. Nine elementary school teams were invited to participate. In 2020, 2021, and 2022, the second, third, and fourth editions of the soccer invitational tournament were held, with 12 school teams participating each year.

The inaugural Taipower Cup Basketball Invitational Tournament was held in 2020. Six elite, HBL high school girls' basketball teams were invited to compete. The basketball invitational tournament continued in 2021 and 2022, providing participating teams with the opportunity to improve through competitive play in preparation for the upcoming HBL league challenges.

Through these events, Taipower players pass on their professional skills and passion for sports, cultivating discipline and team spirit among young players. These efforts have garnered widespread praise and positive responses from the public, allowing the community to recognize Taipower's dedication to promoting sports.

## SASB Materiality Map for the Industry

| Topics | Accounting metric | Corresponding content |
|---|---|---|
| Activity metrics | IF-EU-000.A<br>IF-EU-000.B | Total number of users: 14.93 million<br>Customer power consumption (sold) by percentage: Industrial: 57% , Residential: 20% , Commercial: 15% , Other: 8%<br>User power supply: Industrial: 135.7 billion kWh , Residential: 48.1 billion kWh , Commercial: 35.4 billion kWh , Other: 17.6 billion kWh |
| | IF-EU-000.C | In 2022, there were 18,032 circuit kilometers of transmission lines and 410,071 circuit kilometers of distribution lines. |
| | IF-EU-000.D | The total power generation of 193.7 billion kWh was composed of 155.9 billion kWh (80.5%) of thermal generation, 22.9 billion kWh (11.8%) of nuclear generation, 8.7 billion kWh (4.5%) of pumped-storage hydropower generation, and 6.3 billion kWh (3.3%) of renewable generation |
| | IF-EU-000.E | Total power purchased: 62.4 billion kWh |
| Greenhouse gas emissions and energy resource planning | IF-EU-110a.1 | Scope 1 GHG emissions of 98.48 million tons, yet no regulations on emission limits or emission disclosures in the country |
| | IF-EU-110a.2 | $CO_2e$ Emissions of 98.475 million tons of $CO_2e$ in 2022 |
| | IF-EU-110a.3 | Regarding the short, medium, and long-term strategies and objectives of Taipower's management of scope 1 emissions, please refer to 2.3 |
| | IF-EU-110a.4 | Given Taiwan's renewable energy and other sources of electricity are all connected to the grid and mixed with other sources of electricity, it is impossible to distinguish renewables users independently |
| Air quality | IF-EU-120a.1 | (1) $NO_x$ : 169 kg/GWh (2) $SO_x$ : 84 kg/GWh (3) PM: 5 kg/GWh |
| Water resources management | IF-EU-140a.1 | The total water consumption of thermal power plants was 9,503,884 cubic meters |
| | IF-EU-140a.2 | In 2022, Taipower was involved in an incident that violated water resource regulations. On October 2021, the Taichung City Environmental Protection Bureau conducted an inspection at the desulfurization wastewater discharge outlet of the Taichung Power Plant. As the discharged water did not meet the standards, Taipower was fined 229.5 thousand NTD in 2022. Following adjustments made by the Taichung Power Plant to the methanol dosing quantity in the nitrate nitrogen treatment unit, the water quality in the November 2021 water quality test report met the discharge standards |
| | IF-EU-140a.3 | Please refer to 6.3.2 for the Water resources management |

## SASB Materiality Map for the Industry

| Topics | Accounting metric | Corresponding content |
|---|---|---|
| Coal ash management | IF-EU-150a.1 | Total coal ash production in 2022 was 2.178 million tons, with a reuse rate of 94.1% |
| | IF-EU-150a.2 | For detailed reporting on coal ash accumulation, please refer to 6.3.5 for a table of "Diameter, Height, and Actual Controlled Ash Levels of Fly Ash Silos at Various Coal-fired Power Plants" |
| Energy affordability | IF-EU-240a.1<br>IF-EU-240a.2 | In Taiwan, users are not differentiated based on 500MWh, 1000MWh of use. The average retail electricity prices are as follows for specific groups of users: (1) residential 2.6309 (dollar/kWh), (2) commercial 3.2447 (dollar/kWh), (3) industrial 2.5571 (dollar/kWh) |
| | IF-EU-240a.3 | Taipower currently does not have statistics required to calculate this metric beyond the 2022 average duration of power outages of 14.936 minutes/household and the average number of power outages of 0.185 times/household |
| | IF-EU-240a.4 | External factors such as the COVID-19 pandemic and Russia-Ukraine war affected electricity affordability in 2022 |
| Workplace health and safety | IF-EU-320a.1 | (1) Total Recordable Incident Rate (TRIR) of 2.4%, (2) Fatality rate of 0%, and (2) Near-Miss Frequency Rate (NMFR) of 3.1% |
| User efficiency and demand | IF-EU-420a.1 | Not applicable (LRAM is the profit calculation system adopted by the US power industry) |
| | IF-EU-420a.2 | Smart meters covered 75.64% of the country's electricity consumption information |
| | IF-EU-420a.3 | A total of 2.31 billion kWh of electricity were saved in 2022 |
| Nuclear safety and crisis management | IF-EU-540a.1 | Not applicable. This metric requires that the number of nuclear power plants must be classified according to the US NRC Action Matrix Column. Currently, there are only two nuclear power plants in operation in Taiwan |
| | IF-EU-540a.2 | Regarding Taipower's measures to ensure nuclear energy safety, please refer to 3.1.1 for details |
| Grid resiliency | IF-EU-550a.1 | 4 labor penalties, 21 work safety penalties, and 3 environmental protection penalties |
| | IF-EU-540a.2 | (1) System Average Interruption Duration Index (SAIDI) of 91.285, (2) System Average Interruption Frequency Index (SAIFI) of 0.467, and (3) the SAIDI/SAIFI formula for the Customer Average Interruption Duration Index (CAIDI) may not be synchronized with the power supply reliability, and so, cannot faithfully represent the performance of power supply reliability in use. Consequently, the evaluation has not been adopted. |

# GRI Standards Index

| | |
|---|---|
| Statement of Use | Taiwan Power Company Limited has reported content for the period of January 1, 2022 to December 31, 2022, in accordance with the GRI guidelines. |
| GRI Standard Used GRI 1 | GRI 1: Foundation 2021 |
| Applicable GRI Sector Guidelines | No applicable GRI sector guidelines. |

| GRI Standards | GRI Items | Reference | Page / URL |
|---|---|---|---|
| **GRI 2: General Disclosures (2021)** | | | |
| **The organization and its reporting practices** | | | |
| GRI 2: General Disclosures (2021) | 2-1 Organizational details | 1.1.1 Taipower Profile | 20 |
| | 2-2 Entities included in the organization' s sustainability reporting | Reporting Principles | 02 |
| | 2-3 Reporting period, frequency and contact point | Reporting Principles | 02 |
| | 2-4 Restatements of information | NA | - |
| | 2-5 External assurance | Assurance Statement | 128 |
| **Activities and workers** | | | |
| GRI 2: General Disclosures (2021) | 2-6 Activities, value chains and other business relationships | 1.1.1 Taipower Profile | 20 |
| | | 2.5.1 Supplier Management | 51 |
| | 2-7 Employees | 7.1.2 Human Resource Management Strategies and Structure | 102 |
| | 2-8 Workers who are not employees | | 102 |
| **Governance** | | | |
| GRI 2: General Disclosures (2021) | 2-9 Governance structure and composition | 1.3.1 The Sustainable Development Commission<br>2.1.1 Organization Structure<br>2.1.2 Board of Directors | 28<br>37<br>37 |
| | 2-10 Nomination and selection of the highest governance body | 2.1.2 Board of Directors | 37 |
| | 2-11 Chair of the highest governance body | 2.1.2 Board of Directors | 37 |
| | 2-12 Role of the highest governance body in overseeing the management of impacts | 1.3.1 The Sustainable Development Commission | 28 |
| | 2-13 Delegation of responsibility for managing impacts | | 28 |
| | 2-14 Role of the highest governance body in sustainability reporting | | 28 |

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| GRI 2: General Disclosures (2021) | 2-15 Conflicts of interest | 2.1.2 Board of Directors | 37 |
| | 2-16 Communication of critical concerns | 1.3.1 The Sustainable Development Commission | 28 |
| | 2-17 Collective knowledge of the highest governance body | 2.1.2 Board of Directors | 37 |
| | 2-18 Evaluation of the performance of the highest governance body | 2022 Shareholders Annual Report | - |
| | 2-19 Remuneration policies | 2.1.2 Board of Directors | 37 |
| | 2-20 Process to determine remuneration | 7.1.3 Personnel Training and Assessment | 104 |
| | 2-21 Annual total compensation ratio | 7.1.3 Personnel Training and Assessment | 104 |
| Strategy, policies and practices | | | |
| GRI 2: General Disclosures (2021) | 2-22 Statement on sustainable development strategy | Statement from the Chairman | 03 |
| | 2-23 Policy commitments | 7.1.1 Human Rights and Inclusion | 99 |
| | 2-24 Embedding policy commitments | 1.3.1 The Sustainable Development Commission | 28 |
| | 2-25 Processes to remediate negative impacts | 2.2.1 Risk Management Mechanism | 39 |
| | | 2.2.2 Risk Assessment and Identification | 42 |
| | 2-26 Mechanisms for seeking advice and raising concerns | 5.2.1 Diverse Channels for Engagement and Communication | 78 |
| | 2-27 Compliance with laws and regulations | 2.4.2 Compliance | 50 |
| | 2-28 Membership associations | 1.3.3 Stakeholder Communication Performance | 29 |
| Stakeholder engagement | | | |
| GRI 2: General Disclosures (2021) | 2-29 Approach to stakeholder engagement | 1.3.3 Stakeholder Communication Performance | 29 |
| | 2-30 Collective bargaining agreements | 7.2.2 Labor-Management Communication and Collective Bargaining | 112 |
| GRI 3: Material Topics (2021) | 3-1 Process to determine material topics | 1.3.4 Key Sustainability Issues | 33 |
| | 3-2 List of material topics | 1.3.4 Key Sustainability Issues | 33 |

| GRI Standards | GRI Items | Reference | Page / URL |
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| **Corporate governance and sustainable management** | | | |
| GRI 3: Material Topics (2021) | 3-3 Management of material topics | 1.1.2 Operational Performance<br>2.2.1 Risk Management Mechanism<br>2.2.2 Risk Assessment and Identification<br>2.4.1 Ethical Management<br>2.4.2 Compliance | 23<br>39<br>42<br>48<br>50 |
| GRI 205: Anti-corruption (2016) | 205-1 Operations assessed for risks related to corruption | 2.4.1 Ethical Management | 48 |
| | 205-2 Communication and training about anti-corruption policies and procedures | | |
| | 205-3 Confirmed incidents of corruption and actions taken | | |
| **Accessibility and affordability of electricity** | | | |
| GRI 3: Material Topics (2021) | 3-3 Management of material topics | 5.1.1 Demand Side Management Measures | 74 |
| GRI 203: Indirect Economic Impacts (2016) | 203-2 Significant indirect economic impacts | 1.1.2 Operational Performance<br>5.1.1 Demand Side Management Measures | 23<br>74 |
| **Stability and reliability of the power supply** | | | |
| GRI 3: Material Topics (2021) | 3-3 Management of material topics | 5.1.1 Demand Side Management Measures | 74 |
| GRI 203: Indirect Economic Impacts (2016) | 203-1 Infrastructure investments and services supported | 3.1.2 A Robust Transmission and Distribution System | 61 |
| | 203-2 Significant indirect economic impacts | 3.1.1 A Stable Power Supply and Generation System<br>3.2.1 The Transition to a New Generation of Energy | 57<br>63 |
| **Transforming into a power utility group** | | | |
| GRI 3: Material Topics (2021) | 3-3 Management of material topics | 1.2.1 Transformation Planning | 26 |
| GRI 2: General Disclosures (2021) | 2-6 Activities, value chain and other business relationships | | |

| GRI Standards | GRI Items | Reference | Page / URL |
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| **Management and financial performance** | | | |
| GRI 3: Material Topics (2021) | 3-3 Management of material topics | 1.1.2 Operational Performance | 23 |
| GRI 201: Economic Performance (2016) | 201-1Direct economic value generated and distributed | | |
| **Power plant renewal and decommissioning** | | | |
| GRI 3: Material Topics (2021) | 3-3 Management of material topics | 3.2.1 The Transition to a New Generation of Energy | 63 |
| GRI 203: Indirect Economic Impacts (2016) | 203-1 Infrastructure investments and services supported | 3.2.2 Renewable Development | 65 |
| | 203-2 Significant indirect economic impacts | | |
| **Service and product satisfaction** | | | |
| GRI 3: Material Topics (2021) | 3-3 Management of material topics | 5.2.1 Diverse Channels for Engagement and Communication | 78 |
| **Digital transformation and information security** | | | |
| GRI 3: Material Topics (2021) | 3-3 Management of material topics | 5.1.3 Digital Transformation | 76 |
| GRI 418: Customer Privacy (2016) | 418-1 Substantiated complaints concerning breaches of customer | 5.2.2 Guarding Information Security | 80 |
| **Climate change and low-carbon strategies** | | | |
| GRI 3: Material Topics (2021) | 3-3 Management of material topics | 2.3 Climate Change Management | 43 |
| GRI 201: Economic Performance (2016) | 201-2 Financial implications and other risks and opportunities due to climate change | | |
| GRI 305: Emissions (2016) | 305-1 Direct (Scope 1) GHG emissions | | |
| **Renewable and clean energy development** | | | |
| GRI 3: Material Topics (2021) | 3-3 Management of material topics | 3.2.1 The Transition to a New Generation of Energy | 63 |
| GRI 203: Indirect Economic Impacts (2016) | 203-1 Infrastructure investments and services supported | 3.2.2 Renewable Development | 65 |
| | | 4.1 Smart Grid General Planning | 69 |
| | 203-2 Significant indirect economic impacts | 4.2 Smart Grid Application | 72 |

| GRI Standards | GRI Items | Reference | Page / URL |
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| **Environmental impact management** | | | |
| GRI 3: Material Topics (2021) | 3-3 Management of material topics | 6.3 Minimizing Environmental Impacts | 88 |
| GRI 303: Water and Effluents (2018) | 303-1 Interactions with water as a shared resource | 6.3.2 Effluent Recycling | 90 |
| | 303-2 Management of water discharge-related impacts | | |
| | 303-3 Water withdrawal | | |
| | 303-4 Water discharge | | |
| | 303-5 Water consumption | | |
| GRI 305: Emissions (2016) | 305-6 Emissions of ozone-depleting substances (ODS) | 6.3.1 Response Measures to Air Pollution | 88 |
| | 305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions | | |
| GRI 306: Waste (2020) | 306-1 Waste generation and significant waste-related impacts | 6.3.3 Waste Management | 91 |
| | 306-2 Management of significant waste-related impacts | | |
| | 306-3 Waste generated | | |
| | 306-4 Waste diverted from disposal | | |
| | 306-5 Waste directed to disposal | | |
| **Demand side management and energy conservation** | | | |
| GRI 3: Material Topics (2021) | 3-3 Management of material topics | 4.1 Smart Grid General Planning | 69 |
| GRI 203: Indirect Economic Impacts (2016) | 203-2 Significant indirect economic impacts | 5.1.1 Demand Side Management Measures | 74 |
| **Other GRI-corresponding items** | | | |
| GRI 302: Energy (2016) | 302-1 Energy consumption within the organization | 6.2.1 Fuel Usage Management | 86 |
| | 302-3 Energy intensity | 6.2.2 Enhancing the Energy Efficiency of Taipower's Operations | 86 |
| | 302-4 Reduction of energy consumption | | |

# Independent Auditors' Limited Assurance Report

## INDEPENDENT AUDITORS' LIMITED ASSURANCE REPORT

To Taiwan Power Company,

We have been engaged by Taiwan Power Company ("the Company" or "Taipower") to perform assurance procedures on the sustainability performance information identified by the Company (see Appendix 1) and reported in the 2022 Taipower Sustainability Report ("the Report"), and have issued a limited assurance report based on the result of our work performed.

### Management's Responsibilities

Management is responsible for the preparation of the sustainability performance information disclosed in the ESG report in accordance with the GRI Standards published by the Global Reporting Initiative (GRI), and for such internal control as management determines is necessary to enable the preparation of the sustainability performance information that is free from material misstatement, whether due to fraud or error.

### Our Responsibilities

We planned and conducted our work on the sustainability performance information in the Report in accordance with the International Standard on Assurance Engagement 3000 Assurance Engagements Other Than Audits or Reviews of Historical Financial Information, issued by the International Auditing and Assurance Standards Board to issue a limited assurance report on the preparation, with no material misstatement in all material respects, of the Report. The nature, timing and extent of procedures performed in a limited assurance engagement are different from and more limited than a reasonable assurance engagement and, therefore, a lower assurance level is obtained than a reasonable assurance.

### Limited Assurance Procedures

We applied professional judgment in the planning and conduct of our work to obtain evidence supporting the limited assurance. Because of' the inherent limitations of any internal control, there is an unavoidable risk that even some material misstatements may remain undetected. The procedures we performed include, but not limited to:

- Obtaining and reading the Report in 2022;
- Inquiring management and personnel involved in the preparation of the Report to understand the policies and procedures for the preparation of the Report;
- Analyzing and examining, on a test basis, the documents and records supporting the sustainability performance information.

### Independence and Quality Controls

We have complied with the independence and other ethical requirements of the Norm of Professional Ethics for Certified Public Accountant in the Republic of China, which contains integrity, objectivity, professorial competence and due care, confidentiality and professional behavior as the fundamental principles. In addition, the firm applies Statement of Quality Management Standard 1 "Quality Management for Public Accounting Firms" issued by the Accounting Research and Development Foundation of the Republic of China, and accordingly requires the firm to design, implement and operate a system of quality management, including policies or procedures regarding compliance with ethical requirements: professional standards, and applicable legal and regulatory requirements.

### Inherent Limitations

The subject intonation included non-financial information, which was under more inherent limitations than financial information. The information may involve significant judgment, assumption and interpretations by the management, and the different stakeholders may have different interpretations of such information.

### Conclusion

Based on the procedures performed and evidence obtained, nothing has come to our attention that causes us to believe that the sustainability performance information in the Report in 2022 is in all material respects, not prepared in accordance with the above mentioned reporting criteria.

### Other Matters

The maintenance of the Company's website is the responsibility of the management. We shall not be responsible for conducting any further assurance work for any change of the sustainability performance information or the criteria applied after the issuance date of this report.

Crowe (TW) CPAs
Taipei, Taiwan
Republic of China June 10, 2023

# SUMMARY OF SUSTAINABILITY PERFORMANCE INFORMATION

| # | Corresponding Section | Page | Sustainability Performance Information | Applicable Criteria |
|---|---|---|---|---|
| 1 | 2.4 Integrity and compliance | 48 | Taipower launched a Business Risk and Integrity Investigation Authority Communication Platform in 2019. The platform seeks to reduce integrity risks and eliminate inappropriate interference. The Company has also organized regular meetings and visits, invited prosecutors to give speeches, and held business transparency seminars to ensure smoother business operations for Taipower. In 2022, a total of 69 Taipower units visited local prosecutors or chief prosecutors in their districts. Taipower invited prosecutors to give 23 lectures to promote business transparency. The Company will continue to pursue good relations with judicial authorities and to promote business transparency.<br>■ 2022 Taipower's Material Procurement and Utilization Enhancement Indicators and Relevant Performance:<br>There were 492 ethical investigation cases dosed in 2022. They were categorized according to the source of the cases, as shown in the figure below, among them, the ratio of "anonymously reported" cases is still high at 40%. Nevertheless, as long as the content of reports is specific and has veritable information, Taipower conducts proper investigations. | Taipower anti-corruption policies, communication and publicity, and handling situations |
| 2 | 2.5 Strengthening supplier management | 51 | 2022 Taipower's Enhanced Indicators and Relevant Achievements in Material Procurement and Utilization:<br>In 2022, Taipower received a total of 3,328 material procurement tenders from 1,055 domestic suppliers and 45 foreign suppliers, for a total of 1,100 suppliers. A total of approximately NT$113.3 billion in tenders was awarded. Domestic tender awards totaled approximately NT$99.6 billion and accounted for approximately 88% of the Company's procurement of property. Among them, the selective tendering came to roughly NT$71.8 billion and accounted for approximately 63% of Taipower's total procurement. There were 61 contracted suppliers (the tender that fell under the Localization Protection Policy came to approximately NT$34 billion and accounted for approximately 32% of Taipower's total procurement.) The other types of tenders amounted to approximately NT$41.5 billion which accounted for approximately 37% of Taipower's total procurement of property. | Major Fuel Purchase Statistics of Taipower |
| 3 | 3.1.2 A Robust Transmission and Distribution System | 61 | Increasing the reliability of power distribution<br>As Taiwan moves towards energy transition and a new generation of power supply systems, Taipower has accelerated the automation of its distribution feeders. This not only helps to improve the quality of the power supply but also enables fault detection. Through the remote control of on-site automatic line switches, outage areas can be isolated promptly to reduce the scale of power failures. At present, a feeder automation system has been implemented for industrial, vital metropolitan, and remote areas that are difficult to repair, with a penetration rate of about 82.15%. In the future, Taipower will continue to push forward and raise the target value for feeder construction, and is expecting to achieve full feeder automation by 2025.<br>■ 2022 Distribution Feeder Automation Installations<br>Feeder Automation: 8,384 lines<br>Switch Automation: 2,180 units | Taipower Distribution Feeder Automation Performance Statistics |

# SUMMARY OF SUSTAINABILITY PERFORMANCE INFORMATION

| # | Corresponding Section | Page | Sustainability Performance Information | Applicable Criteria |
|---|---|---|---|---|
| 4 | 5.1 Smart Electricity Service | 74 | In order to encourage energy conservation in practice, Taipower has employed power-saving incentives since July 2008. The Company continues to introduce new measures to maintain customer motivation and prompt additional power-saving over the long term. In order to increase user interaction and the effectiveness of voluntary power saving, a registration mechanism was introduced in 2018. Customers who sign up through the website, customer service hotline, or at a service counter will receive a reward of $0.6 per kWh of electricity saved, with a minimum bonus of $84 per period (2 months). The same year, a Power-Saving Reward Points mobile application was launched. This allows users to collect points by participating in various energy-saving puzzle activities on the app. Points may be redeemed for prizes or used to participate in prize draws. The goal is to promote power-saving among the public and to create a power-saving culture and habits. Taipower will continue to organize power-saving promotional activities that convey power-saving concepts through innovative and amusing approaches.<br>■ Power Savings Reward Performance in 2022<br>Amount of saved electricity: 2.31 billion kWh<br>Reward amount for power-saving: NT$1.7 billion<br>Carbon dioxide emission reduction: 1.17 million metric tons<br>Equivalent number of Daan Forest Parks (for CO2 absorption capacity) in one year: 3,016 | Deductions of electricity expenses and power-saving incentives of Taipower. |
| 5 | 7.1.2 Human Resource Management Strategies and Structure | 102 | ■ Taipower Training Statistics (Number of employees in 2022): Total 91,043 persons<br>Fundamental development training: 408 persons<br>On-the-job training (Professional training): Organized by the Training Institute (9,041 persons), Organized by other units (75,763 persons), External training (4,026 persons), total 88,830 persons.<br>Manager training: On- the- job training for managers (904 persons), Skill cultivation for managers (898 persons), total 1,802 persons.<br>Cooperative education: Recommendations for graduate school(3 persons)<br>■ Number and Ratio of Employees Covered by the Collective Agreement<br>Total employees: 28,079<br>Number of employees in the union (people): 27,878<br>Number of employees in the union (%): 99.3% | Major Fuel Purchase Statistics of Taipower |
| 6 | 7.3 Promoting Social Co-prosperity | 113 | Taipower strives to achieve symbiosis and mutual prosperity with society by continuously investing in cultural, artistic, and charitable activities. It has deeply ingrained the image of being a practitioner of corporate social responsibility into its corporate identity. In collaboration with local communities, Taipower promotes harmonious coexistence and drives electricity infrastructure development. The Company engages in neighborly initiatives, including emergency assistance, support for low-income households, welfare for elderly people and those with disabilities, educational and cultural programs, and other public welfare actions. In 2022, there were a total of 3,758 neighborhood-care cases, with a donation amount of approximately NT$1.04527 billion. | Taipower promotes social co-prosperity statistics |

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