



2021 Sustainability Report

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Reporting Principles

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This is the 16th 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. This report has been verified by SGS Taiwan to ensure it meets the core option requirements of the GRI Standards and is consistent with the AA1000 Accountability Principles (Type 1 Moderate Level of Assurance). The Report was approved by unit managers, the President and Chairman before publication.

Taipower continued to fulfill its responsibility to communicate with stakeholders in 2022. 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, 2021. To ensure complete disclosure and comparability, the report includes past data as well as information from 2022. 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 Official Website



Taipower Sustainable Development Section Website



Past Reports



Statement from the Chairman

Climate change and sustainability are important issues that are of increasing concern to the international community and the general public. In particular, the transition to net zero by 2050 has become a major global concern. In recent years, they have also come to the fore as key issues for companies as they engage in strategic planning and business operations. Taipower acts as the primary driving force behind Taiwan's industrial development, the Company not only must actively promotes energy transition towards net zero, and is accountable for providing a stable power supply. In recent years, Taipower has experienced a series of large-scale power outages caused by negligence. These have resulted in nationwide industrial disruptions and affected thousands of households. Taipower has taken responsibility for these issues and identified a "stable power supply" as the top priority this year. The company plans to take action by "enhancing grid resilience and safety" and by "strengthening risk management and internal inspection training." Taipower will focus on three main issues accordingly. First, the Company will conduct a comprehensive education and training review and evaluation of its employees. Second, it will fully review regulatory and system compliance. Last, but not least, the Company will reinforce maintenance procedures and inspection mechanisms for its facilities (and equipment). Taipower has dedicated itself to strengthening the resilience of the national grid and has made progress as quickly as possible while working to overcome the challenges of both a net zero policy and the need to ensure a stable power supply.

Enhancing Grid Resilience and Safety

In recent years, Taipower has decommissioned several nuclear and thermal power units in succession. Throughout this process, the Company has delivered solutions at each stage of the electric power system so as to ensure a stable power supply. On the power generation side, Taipower is accelerating the increase of gas use and the reduction of coal use. The Company is also actively developing renewable energy. On the transmission side, Taipower continues to enhance its grid resilience. Grid planning will move towards the dual-tracks of national integration and regional grids in the future. Moreover, the Company will incorporate the functions of a "distributed power supply" and "regional support" to enhance system operation efficiency, fortify power supply quality, and improve grid reliability. On the distribution side, the number of power outages in relevant areas has been reduced by 60% compared with 2012 through the promotion of a distribution system resilience plan. Moving forward, Taipower will continue to expand and implement comprehensive engineering improvements such as the replacement of distribution line equipment, fully automating feeders, and accelerating the deployment of smart meters, while continuing to replace outdated facilities to intensify grid resilience and strengthen overall power supply quality. The Company will continue to advocate for the application of energy storage systems. In addition to establishing the Energy Trading Platform to facilitate the participation of external battery energy storage systems and to provide frequency responsiveness ancillary services, Taipower will also build battery energy storage systems in its substations and solar photovoltaic fields. The Company is also persisting in the expansion of offshore energy storage systems to enhance system scheduling flexibility.

Driving Energy Transformation and Steadily Moving Towards Net Zero

The Executive Yuan of Taiwan passed the amended draft of the Greenhouse Gas Reduction and Management Act that would transform it into a Climate Change Response Act and has been sent to the Legislative Yuan for consideration on May 12, 2022. It is expected that a goal of net zero emissions by 2050 will be included in the legislation. Moreover, the National Development Council announced the "Taiwan's Pathway to Net-Zero Emissions in 2050" on March 30th, 2022. Taiwan's 2050 net-zero emissions pathway is based on the 4 major transition strategies of "Energy Transition", "Industrial Transition", "Lifestyle Transition", and "Social Transition", as well as "12 Key Strategies", with the government and various industrial sectors working together to achieve net zero emissions. Among those key strategies, Taipower acts as the primary driving force towards the net zero goal and plays a crucial role in implementing zero-carbon energy, forward-looking technology planning, and enhancing system resilience. Consequently, on the power supply side, Taipower expects to gradually reduce carbon emissions through energy structure adjustments over the short term and to introduce forward-looking technologies that achieve zero emissions over the long run. The grid will be expected to accommodate renewable grid-connections on a massive scale and investments are being made in grid transformation projects that facilitate decarbonization, smart-technology, and energy storage. On the demand side, Demand Side Management (DSM) is used to alleviate electricity demand and stabilize load fluctuation. Over the long-run, this multi-faceted promotion is expected to achieve the net zero target.

Strengthening Risk Management and the Inspection of Internal Training

Taipower faces risks because its grid facilities are complex and spread across the country. There are also systematic risks between power plants and grids. In response to these risks, Taipower proactively formulates risk management control measures. In addition to refining the existing risk management system, and strengthening risk control to prevent the recurrence of large-scale power outages, Taipower bought together professionals from power plants, grids, dispatch, and information security and established a Risk Control Center on April 1st, 2022. The President of Taipower is appointed Chief Risk Officer of the Risk Control Center. The Company three-tier mechanism, five levels of risk classification, and a daily risk reporting system. These measures allow the headquarter to oversee Taipower's risk events that were previously controlled and monitored by each supervisory unit, refine its risk control mechanism, strengthen the defense lines of the internal control system, and enhance its horizontal coordination mechanism. Taipower's workforce has always been highly professional. To maintain this quality, as the number of retirees gradually increases, the Company will continuously implement measures to improve its organizational structure, carry out basic training, and strengthen the experience and cultivation of power professionals that can effectively execute internal management and fundamental functions.

Future Outlook

Ensuring a stable power supply is the primary task at Taipower, but low-carbon electricity is essential to maintaining Taiwan's industrial competitiveness. To cope with complex emerging risks and issues, Taipower will implement systemic risk identification and management. An independent risk management department will be established and electrical experts will be introduced to assist in a general risk inspection of the Taipower system to strengthen the overall risk management structure of Taipower.

Looking forward to 2022, Taipower will continue to pragmatically address the challenges of ensuring a stable power supply, strive to strengthen its businesses, and continue to contribute to Taiwan's industrial development and standard of living. Taipower will undertake the vital mission of fostering stable growth in the national economy and aim to transform into a prestigious, trustworthy, world-class power utility group.



Acting Chairman
Tseng, Wen-Sheng

曾文生

Sustainability Performance

Environment

- ▶ Protected air quality by voluntarily reducing loads 1,200 times
- ▶ The Phase 1 of the Green Energy Project passed in 2021 is scheduled to develop the renewables generation system with a total capacity of 160 MW between 2022 and 2024. It will include solar photovoltaic, land-based wind power, geothermal power, and other energy types
- ▶ One power facility ecological integration plan was completed in 2021
- ▶ In 2021, 1.2 million fish fry were released into the sea near the power plant and offshore wind facilities



Society

- ▶ Number of participants in Taipower training in 2021: 69,938
- ▶ Number of participants in health and safety training in 2021: 30,672
- ▶ In 2021, 671 briefings on occupational health and safety were held for contractors with a total of 29,138 attendees
- ▶ 2021 Group Agreements Cover Up to 99.2 Percent of Employees
- ▶ Taipower donated approximately NT\$97 million in community support in 2021

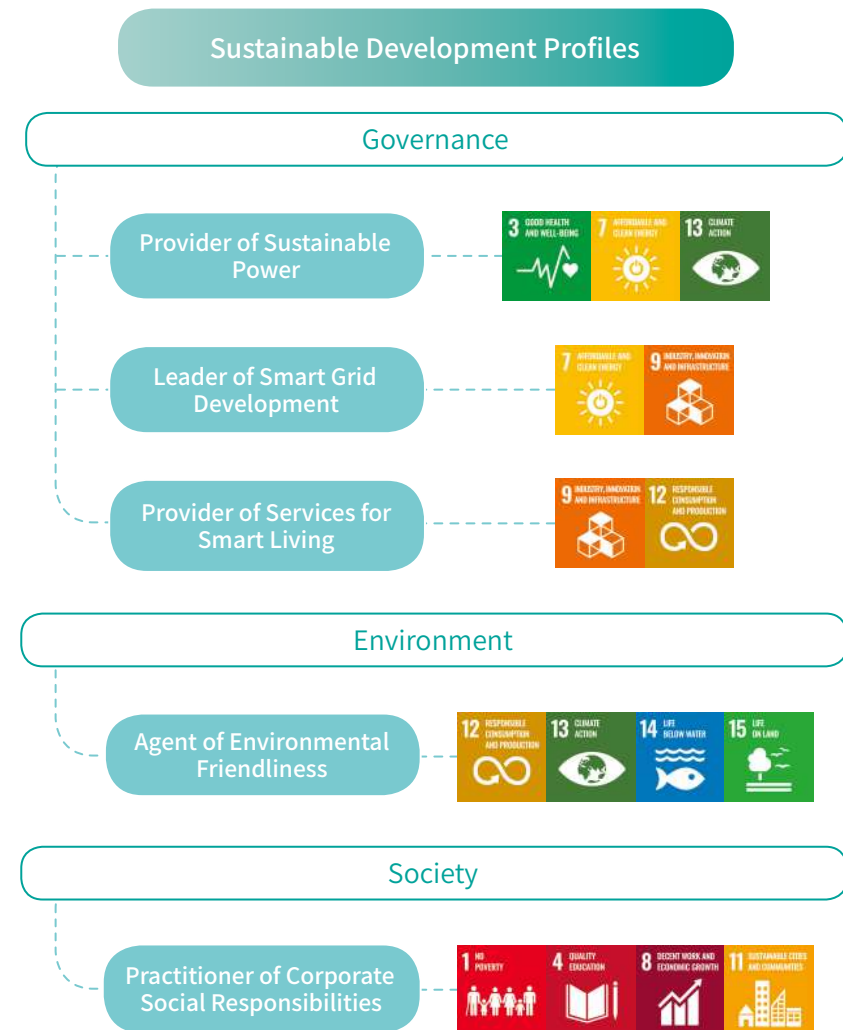
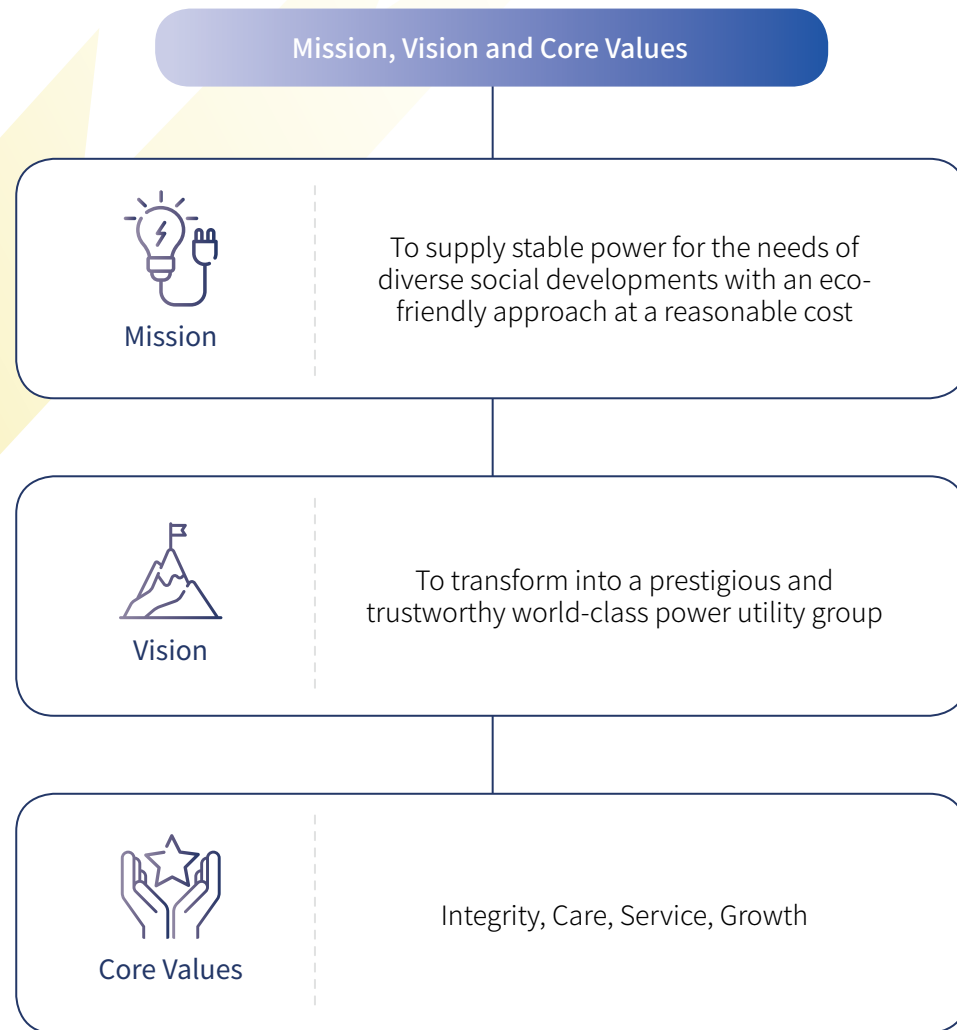


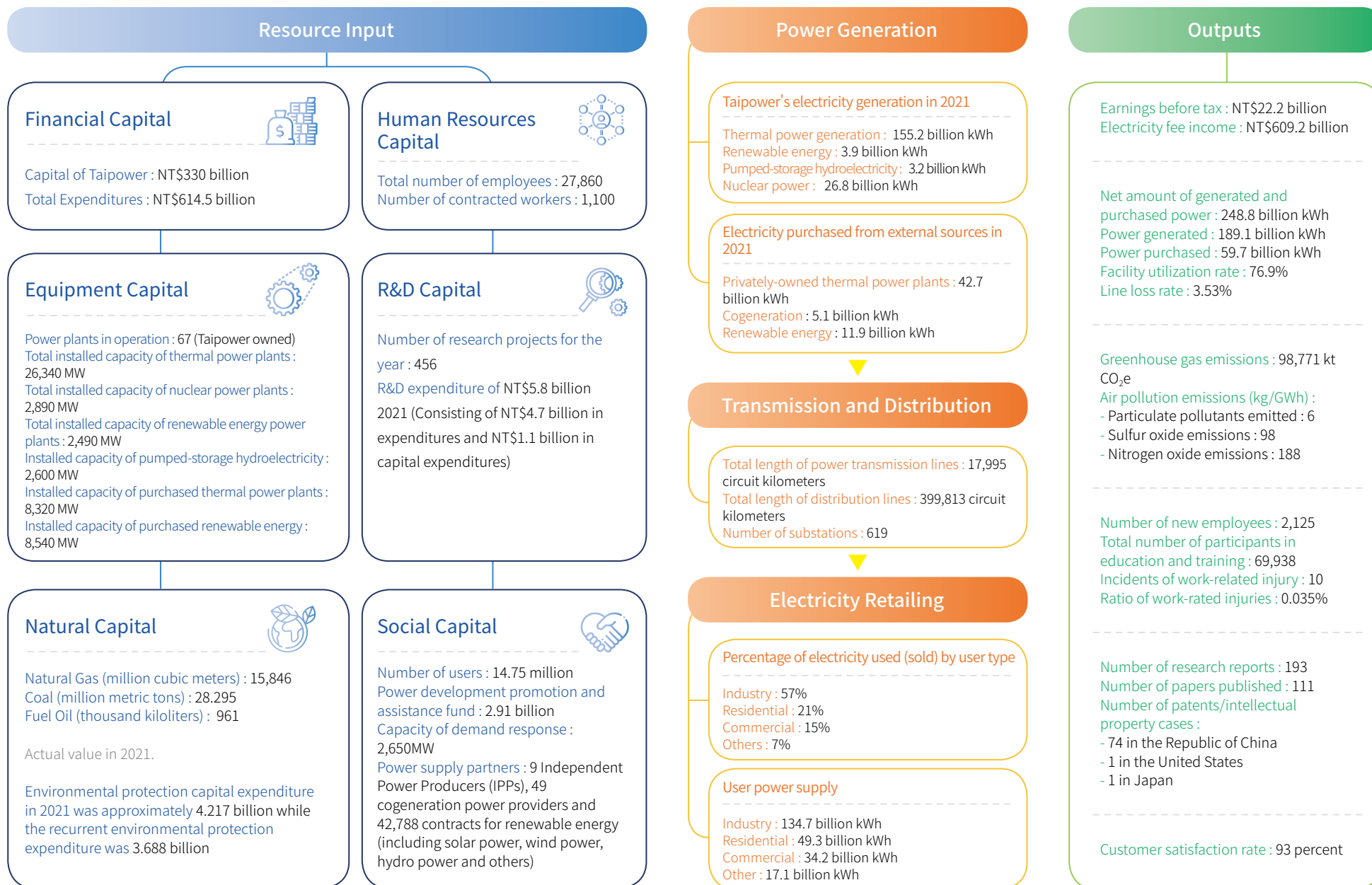
Governance

- ▶ Ranked first in the corporate governance evaluation of state-run enterprises for six consecutive years
- ▶ By the end of 2021, more than 1.5 million AMI had been installed, and 72% of the country's electricity consumption information had been obtained. By 2030, the deployment of 7 million AMI smart meters is expected
- ▶ Achieved another success at the 2021 TCSA Taiwan Corporate Sustainability Awards by winning the Taiwan Corporate Sustainability Report Platinum Awards for the 4th time, the Taiwan Corporate Sustainability Excellence Award, and the Creativity in Communication Leadership Award
- ▶ Won 40th place in the large corporate group category at the 2021 Common Wealth Magazine CSR Sustainable Citizenship Award – the only state-owned enterprise to win an award that year








Taipower's Value Chain and Operational Elements





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 roles. 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 2021, 2025, and 2030 identified as key milestones. The Company also set short, medium, and long-term goals that are clearly defined and quantifiable. Continuous reviews and improvements are implemented each year as key component of Taipower's sustainable development.



Sustainable Development Profiles	SDGs	T-SDGs	Strategy	Corresponding Targets	Actual Performance Values (As of 2021)	2021 Goals	Short-Term Goals (Until 2022)	Medium-Term Goals (Until 2025)	Long-Term Goals (Until 2030)		
Provider of Sustainable Power		T-SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all	Promote renewable energy power generation plans and expand the development of zero carbon energy	The accumulated total capacity of Taiwan Power Company	2,490MW ¹	2,526MW	2,564.9MW	3,107.4MW	4,522.3MW		
				Grid connection capacity of the Taipower system	11,027MW ²	13,025MW	16,829MW	29,086MW	41,718MW		
			Promote low-carbon energy, such as gas-fired power generation to ensure a stable power supply	Cumulative total capacity	13,149MW	13,149 MW	14,273MW	19,945MW	25,924MW		
			Improve the power generation efficiency of traditional thermal power-generating units, reduce consumption of fossil energy through recycling to improve the quality of the living environment	The average power generation efficiencies of Taipower's own thermal power-generating units (Excluding externally purchased power)	41.1%	Higher than 40.3%	Higher than 40.3%	Higher than 45%	Higher than 47%		
		T-SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all	Promote carbon-free fuel co-firing plans and introduce carbon fixation technologies to reduce carbon emissions while ensuring a stable power supply	Introduction of ammonia co-firing technology	New projects in 2022	New projects in 2022	Sign a Memorandum of Understanding (MoU) with MHI by the end of the year	Conduct administrative procedures related to environmental assessment, commissioning plans, safety regulations, etc.	One generating unit in Linkou to complete the demonstration of 5% ammonia co-firing		
				Introduction of hydrogen co-firing technology			Sign a Memorandum of Understanding on hydrogen co-firing technology with Siemens AG	Complete the demonstration of one gas turbine in Xingta Power Plant for hydrogen co-firing generation (hydrogen co-firing ratio of 5%)	Decide whether to increase the hydrogen co-firing ratio based on the assessment of domestic hydrogen production capacity and transmission and storage technology		
				Push forward the construction of pilot fields for carbon capture and storage			Seek Tender for Taichung Carbon Reduction Park and Carbon Capture Pilot Plant	Construction of the carbon capture pilot plant (2 kt-CO ₂ /year)	Carbon capture demonstration plant planning (1 Mt-CO ₂ /year)		
		T-SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all	While ensuring a stable power supply, increase the proportion of clean energy (renewables, gas) generation in the Taipower system	Proportions of clean fuel (renewables, gas) generation	New projects in 2022	New projects in 2022	The generation ratio of the Taipower system is 38% for coal, 42% for gas, 9% for nuclear, 8% for renewables, and 3% for others (fuel and pumped storage)	The generation ratio of the Taipower system is 30% for coal, 50% for gas, 20% for renewables source	The generation ratio of the Taipower system is 30% for coal, 50% for gas, 20% for renewables		
				Proportion of self-produced power generation (Renewable energy) in the Taipower System			6.3% (Approximately 15.8 billion kWh) ³	9.2% (Approximately 22 billion kWh)	8.1% (Approximately 20.9 billion kWh)	19.6% (Approximately 51.1 billion kWh)	24.1% (Approximately 68 billion kWh)
				Reliable power supply in extreme weather conditions			Completed risk assessments for 16 of the Company's power generation units (Excluding offshore islands and the Hsieh-ho Power Plant)	Completed an in-depth risk assessment of the Company's power generation system (Hydro and thermal power plants)	Complete climate monitoring and adaptation analysis report	Horizontal expansion of adaptation strategies and tasks for onsite units of thermal power generation systems (Excluding offshore islands)	Formulate strategic plans for systems to complete adaptation plans for power facilities (Excluding offshore islands)
	T-SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all	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	6.3% (Approximately 15.8 billion kWh) ³	9.2% (Approximately 22 billion kWh)	8.1% (Approximately 20.9 billion kWh)	19.6% (Approximately 51.1 billion kWh)	24.1% (Approximately 68 billion kWh)			
	T-SDG 13: Take urgent action to combat climate change and its impacts	Mitigate the impact of climate change on the power supply side through adaptation	Reliable power supply in extreme weather conditions	Completed risk assessments for 16 of the Company's power generation units (Excluding offshore islands and the Hsieh-ho Power Plant)	Completed an in-depth risk assessment of the Company's power generation system (Hydro and thermal power plants)	Complete climate monitoring and adaptation analysis report	Horizontal expansion of adaptation strategies and tasks for onsite units of thermal power generation systems (Excluding offshore islands)	Formulate strategic plans for systems to complete adaptation plans for power facilities (Excluding offshore islands)			






¹ Due to the impact of the decommissioning of onshore wind turbines and a 2021 capacity reduction of 15MW, the increment of solar photovoltaics failed to meet expectations. The completion of the hydropower plan was also delayed until 2022.

² Due to the progress of renewable energy construction.




³ Due to the water shortage in the first half of 2021 and the progress of renewable energy construction.

Sustainable Development Profiles	SDGs	T-SDGs	Strategy	Corresponding Targets	Actual Performance Values (As of 2021)	2021 Goals	Short-Term Goals (Until 2022)	Medium-Term Goals (Until 2025)	Long-Term Goals (Until 2030)		
Leader of Smart Grid Development		T-SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all	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	1. 35MW of self-built projects have been contracted: The 15MW energy storage system at the Tainan Salt Field Solar Power (TSFSP) facility was being contracted out at the end of April 2021, and the 20MW energy storage system at Luyuan was contracted out at the end of October 2021. 2. A trading platform was set up on July 1, 2021 that allows for procurement through competitive bidding, and the current qualified trading capacity has reached 15MW	1. Donglin P/S (10MW) energy storage equipment connected to the grid 2. Added 15MW of qualified capacity for energy storage in auxiliary services	Accumulate 102MW of which 38MW is self-built. This is composed of the self-built TSFSP (20MW) and Luyuan (21.6MW) energy storage projects, ancillary services (64MW), bilateral contracts (15MW) and qualified trading capacity (49MW)	Reach 1000MW storage capacity (160MW of Self-built + 840MW of Procured; continuous adjustment)	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		
		T-SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all	Strengthen information security, build a cloud data center, and improve backbone/regional fiber optic communications capabilities	Information security protection	Three IDS systems have been installed (the Yunlin Branch, TSFSP, and the Taichung Branch) and incorporated into the Security Operation Center (SOC) for monitoring and alarm analysis	Completed the plans for 32 sites, evaluated the installation sequence of IDS sites and include them in SOC monitoring. Evaluated the benefits of 3 pilot sites and formulated improvement plans	1. IDS continuous monitoring and performance evaluation 2. Expansion of IDS deployment - It is expected to complete the installation, procurement, and construction of eight fields	Complete the security protection and intrusion detection systems (IDS) at 32 sites for all independent system operators and include them in SOC monitoring	Continue to improve the overall security protection capabilities of the smart grid		
				Cloud data center construction	A big data analysis and data sharing platform has been established and was officially launched in December 2021. The groundbreaking ceremony of the Changhua Cloud Data Center was held in September 2021	Began trial operations on the big data analysis and data sharing platform in June 2021. Provided access to the entire company. Taipower will continue to review results and complete construction by the end of November	The Changhua Cloud Data Center is expected to obtain the building permit in June	Complete the construction of two cloud data centers (Yuan-Hsin and Changhua), which can accommodate 700 cabinets	Complete the construction of a third cloud data center (Taichung), which can accommodate 2,000 cabinets		
				Reduce the national power outage time (SAIDI value)	Promote applications of big data and AI on operational and maintenance information for transmission systems to reduce the System Average Interruption Duration Index value	16.376 min/household • year	16.7 min/household • year	16.6 min/household • year	15.7 min/household • year	15.5 min/household • year	
				The construction of IEC 61850 smart substations	Promote smart grids and introduce the construction of IEC 61850 smart substations	New projects in 2022		Completed 37 substations	Completion of 70 substations	Rolling reviews based on actual construction	
			T-SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all		Consolidate the information communication and smart management system, optimize transmission and substation asset management systems, and establish predictive maintenance capabilities	Continued optimization of the transmission and substation asset management system	New projects in 2022		1. Substation equipment asset management system: Ancillary equipment is added to the system management 2. Transmission equipment maintenance management system: Oil pressure monitoring system for interfacing oil-filled cable	Continuously introduce big data analysis and value-added applications into the transmission and substation equipment maintenance management system	Consolidate and reinforce transmission and substation equipment management to implement CBM goals and improve outage prevention capabilities
					Plan the IP of the entire fiber optics communication system in Taiwan to increase bandwidth and enhance reliability	Establish an ultra-speed optical cable communication system around the island	New projects in 2022		It is expected to complete the construction of 550 sets of Phase 3 10G IP-MPLS access routers	Carry out system-wide optimization and expansion planning	Establish a communication network system for next-generation communication technology
					Establish a smart grid to improve power supply quality and operational efficiency	Reduce the line loss rate	New projects in 2022		4.27%	Year-on-year rolling review	Year-by-year rolling review

Sustainable Development Profiles	SDGs	T-SDGs	Strategy	Corresponding Targets	Actual Performance Values (As of 2021)	2021 Goals	Short-Term Goals (Until 2022)	Medium-Term Goals (Until 2025)	Long-Term Goals (Until 2030)
Provider of Services for Smart Living		T-SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all	Low-voltage AMI smart meter infrastructure	Deployment of smart meters	Completed the deployment of a total of 1.501 million smart meters	Completed the deployment of a total of 1.5 million smart meters	Complete the deployment of a total of 2 million smart meters	Complete the deployment of a total of 4 million smart meters	Complete the deployment of a total of 7 million smart meters after a continuous review of deployment benefits
		T-SDG 12: Ensure sustainable consumption and production patterns	Refinement of customer services	Taipower APP Memberships	741,000	360,000	800,000	1 million	1.5 million
				The number of transactions via new technology payment channels for each period	Reached 980,000 transactions	Reached 630,000 transactions for each period	Reaches 1 million transactions for each period	Reaches 1.1 million transactions for each period	Reaches 1.5 million transactions for each period
				Cloud-based services	1. Introduced a payment certificate download service on the Taipower App 2. Added e-bill payment vouchers to high-voltage payment accounts for download 3. Added payment vouchers to the National Development Council's My Data platform for download	Increased cloud certificate download services	Number of cloud payment receipts reach 30,000 per year	Number of cloud payment receipts reach 300,000 per year	Number of cloud payment receipts 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	Added at least 1 advanced value-added service	Increase at least 1 advanced value-added service	Add at least 4 additional advanced value-added services	Add at least 6 additional advanced value-added services
				Number of visits to the Power Consumption Examination Center's website	180,000	160,000	200,000	260,000	310,000
				The proportion of households receiving electricity	New projects in 2022		Except in cases for which legal restrictions exist, Taipower provide electricity services and achieve a 100% rate of electricity applications.	Except in cases for which legal restrictions exist, Taipower will provide electricity services and achieves 100% rate of electricity applications.	Except in cases for which legal restrictions exist, Taipower will provide electricity services and achieves 100% rate of electricity applications.
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	Assist in the promotion of home energy management system (HEMS)	New projects in 2022		Push the Company forward in the field of home energy management services through demonstration site validation and application research	Continue to cooperate with private industry players to jointly promote home energy management services	Explore and develop value-added applications and provide innovative business models through cross-industry alliances			

Sustainable Development Profiles	SDGs	T-SDGs	Strategy	Corresponding Targets	Actual Performance Values (As of 2021)	2021 Goals	Short-Term Goals (Until 2022)	Medium-Term Goals (Until 2025)	Long-Term Goals (Until 2030)
Agent of Environmental Friendliness		T-SDG 12: Ensure sustainable consumption and production patterns	Establish a circular business model	The proportion of wastewater recycled at thermal power plants	77.33%	75%	76%	80%	85%
				Circular product supply models	Completed a manual on coal ash use for marine engineering	Inventoried circulating potential materials and pilots of viable business models	Complete the circular economy business model pilot	Rolling review and update on Taipower's Strategies for the Circular Economy	Complete at least one circular product supply model
		T-SDG 13: Take urgent action to combat climate change and its impact	Improve mitigation and adaptation capabilities	Net decrease of emission intensity at thermal power-generating units (Greenhouse Emissions) from 2016 levels	Decreased by 6.3%	Decreased by 7%	Decrease by 6.5%	Decrease by 15%	Decrease by 19%
				Climate adaptation action	The preliminary submission of a risk assessment report has been completed	Completed risk assessments for each generation, transmission and distribution unit (hydro and thermal power)	Establish the risk assessment management system for hydro and thermal power plants	Complete the transmission system adaptation strategy	Complete the Company's overall climate risk assessment report and communications
		T-SDG 14: Conserve and sustainably use the marine ecosystems, and prevent the degradation of the marine environment	Conduct marine ecological restoration and cleaning of the coastal environment	Marine ecological restoration, conservation and development of marine pastures	Plan the Linkou Marine Pasture	Implemented one marine ecological restoration and conservation project and conducted marine pasture research	Complete the research report on the business model for the Linkou Marine Pasture	Complete construction on one marine ecological restoration project, and select marine pasture sites	Complete construction of one marine pasture around a power plant to facilitate marine ecological restoration
	T-SDG 15: Conserve and sustainably use terrestrial ecosystems to ensure the persistence of biodiversity and prevent land degradation	Ecological restoration and environmental maintenance in the areas around power facilities	Ecological integration plan for power facilities	Completed the ecological integration project on bat nest boxes for the western Taiwan wind power facility	Constructed at least one ecologically inclusive plan for a power facility	Complete the interim report on the Yongan Wetland ecological integration project at the Xingta Power Plant	Complete the construction of the ecological integration site at the Dajia River Power Plant	Complete at least five ecological integration plans around power facilities to promote ecological restoration and environmental maintenance at power facilities	
Practitioner of Corporate Social Responsibilities		T-SDG 1: Strengthen social care services and economic security for the disadvantaged	Deepen social care activities	Cumulative investments and number of people reached by social care activities	Invested NT\$547 million, reached 49,000 people ⁴	Invested NT\$550 million, reached 50,000 people	Invest NT\$550 million and reach 50,000 people	Invest NT\$3.6 billion and reach 450,000 people	Invest NT\$6.6 billion and reach 800,000 people
				Cumulative investment in electricity discounts for disadvantaged Groups; Number of beneficiary households	NT\$93.76 million, 160,000 beneficiaries	Discounts of NT\$91 million, with 160,000 beneficiaries	Discounts of NT\$93 million with 160,000 beneficiaries	Discounts of NT\$550 million with 1 million beneficiaries	Discounts of NT\$1 billion with 1.8 million beneficiaries
				Cumulative investment in Power Development and Assistance Fund and number of beneficiary townships/ districts	NT\$2.44 billion invested and reached 102 beneficiary townships / districts	Total investment of NT\$2.18 billion, with 101 beneficiary townships / districts and	Total investment of NT\$2.4 billion with 101 beneficiary townships / districts	Total investment of NT\$15 billion with 600 beneficiary townships / districts	Total investment of NT\$27.5 billion with 1,100 beneficiary townships / districts

⁴Due to the impact of the pandemic, many physical events have been canceled. After the pandemic subsides, the Company will fervently organize various activities to increase the number of participants and people reached.

Sustainable Development Profiles	SDGs	T-SDGs	Strategy	Corresponding Targets	Actual Performance Values (As of 2021)	2021 Goals	Short-Term Goals (Until 2022)	Medium-Term Goals (Until 2025)	Long-Term Goals (Until 2030)
Practitioner of Corporate Social Responsibilities		T-SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	Dissemination of accurate energy knowledge	Cumulative number of people reached by diversified energy education	461,000 people ⁵	600,000 people	600,000 people	3 million people	6 million people
				Cumulative number of people reached by online promotions	Approximately 31 million people	21 million people	21 million people	120 million people	220 million people
		T-SDG 11: Make cities and human settlement inclusive, safe, resilient and sustainable	Promote the preservation and rejuvenation of cultural assets connected to the electricity industry	Sharing of electricity industry cultural assets	The number of archived heritage assets totaled 904 in the 2021 thematic project inventory	Conducted more than 800 cultural relic inspections at relevant units in 2021 under the themes of the electric industry on outlying islands and transmission and distribution systems	The 2022 inventory outsourced \geq 500 cases of electricity industry heritage through digital contracts	Complete inspections in each business unit by 2025, and inspect a cumulative number of at least 3,500 cultural relics	Launch an online database of historical relics from the electrical industry in 2028 to create a future cultural resource sharing environment and research platform; Continue to promote social communication and education on cultural power
				Cumulative number of events and participants in annual cultural asset themed exhibitions, forums, book series sharing sessions and other related activities	A new book-sharing session on the topic of the main island's thermal power was been suspended due to the impact of COVID-19 ⁶	Conducted one book-sharing session on the topic of the main island's thermal power (no special exhibition plan for cultural assets in 2021)	It is expected to hold one forum for publishing the research results of Taiwan's power industry cultural path planning survey	Hold 15 events or host more than 100,000 participants	Hold 25 events or host more than 150,000 participants
				Preserved electricity industry cultural sites	Carried out preliminary work related to the "Taiwan Electricity Heritage Research Center" in coordination with the work schedule of the North Region Construction Office	Carried out the preliminary onsite operations in accordance with the accepted operation period of the North District Department of Construction	The heritage collection management system has been developed and launched, and the Taiwan Electricity Heritage Collection Center has completed the tendering operation	Launch the Taiwan Power Cultural Relic Research Center on the 4th floor of the multi-purpose building in Wan-Lung D/S during the second half of 2022 to promote the research and restoration of cultural relics	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 subsidiaries 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)
				Employee injury rates	0.06	\leq 0.15	\leq 0.13	\leq 0.15	\leq 0.1
	Contractor labor injury rates	0.33	\leq 0.37	\leq 0.35	\leq 0.28	\leq 0.18			
		T-SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all	Establish a happy workplace culture	Employee satisfaction with internal communications	60%	\geq 60%	\geq 57%	\geq 60%	\geq 65%
				Rate of participation in Employees' Heart-to-Heart assistance programs that care for employees (81 in total)	22% ⁷	\geq 38%	\geq 23%	\geq 40%	\geq 50%

⁵ Due to the impact of the pandemic, many physical events have been canceled. After the pandemic subsides, the Company will fervently organize various activities to increase the number of participants and people reached.

⁶ Due to the impact of the pandemic, many physical events have been canceled. In the future, the book sharing sessions will be planned strategically and flexibly (e.g. online publishing conferences, podcast, etc).

⁷ Due to the impact of the pandemic, non-essential meetings and events have been reduced; the employee assistance business is not a core technology business and Heart-to-Heart is an informal organization of a concurrent nature, which has affected the implementation results.

Launching an Energy Trading Platform, Jointly Advancing Towards Energy Transition

Energy Trading Platform



Taiwan's power system is a self-sufficient independent grid. As energy transformation trends develop and the government energy policies are implemented, it is necessary to ensure the safety and stability of the grid while accommodating large numbers of renewable grid-connections and managing the intermittency and instability that accompanies renewables such as solar, wind, and tidal energy.

Taipower officially launched Taiwan's first "Energy Trading Platform" in 2021. The platform introduced private generation resources into the market and enhanced the added value of resources through four main participants trading in two major markets. Taipower invited the private sector to jointly participate in energy transition. It will gradually shift the grid management and power resources from centralization to distribution, thus creating new opportunities for the energy services industry.

"Day-ahead Ancillary Services Market"

The "Day-ahead" Market is so named because it facilitates auctions for projected demand on the day before dispatching. "Ancillary Services" consist of services required to maintain the safe and stable operation of the system or to restore the system to regular service after an outage. Each day, the Energy Trading Platform will announce the projected demand for three auxiliary services to be traded.

Private operators can participate in the market as long as they can provide dispatched power capacity greater than 1MW. They may also gather small-scale producers who have not reached the threshold through an "aggregator" that acts as an agent to consolidate power producers. Taipower will make use of these private resources to supplement the existing power capacity and convert the actual dispatched power capacity into service fees that are settled with operators monthly.



Electricity Market Participants



Generating Unit



Energy Storage Equipment



Self-Generating Equipment



Demand Response can be coordinated to meet the demands of users

Research and Planning

Taipower conducted research on countries with relatively mature electricity trading systems to gain insight into liberalized electricity market structures. Taipower has also conducted internal electricity auction trials since 2014. In 2019, the Company launched an "Interim Mechanism for Non-traditional Units to Participate in Real-time Reserve Ancillary Services." In 2020, Taipower successfully developed an "Automatic Frequency Control (AFC) Energy Storage System" that established a viable model for distributed power participation in the trading system. Through trial and error, Taipower has gradually developed an energy trading system that is suitable for Taiwan.

Enabling the Day-ahead Ancillary Service Market for the first time

1 Frequency Responsiveness Reserve Ancillary Service

Purpose
Follows system load volatility, and revises system frequency deviation through real-time power adjustments to maintain system stability

Response Time
In 1-10 seconds

Duration
Over 15 minutes

2 Real-time Reserve Ancillary Service

Purpose
Primarily a security capacity standby that responds to occasional events such as unit jumps, and serious imbalances of system supply and demand

Response Time
In 10 minutes

Duration
Over 1 hour

3 Supplementary Reserve Ancillary Service

Purpose
Supplies additional power to meet demand required by the system in response to load surges caused by supply and demand forecast errors

Response Time
In 30 minutes

Duration
Over 2 hours

Outlook

Following the launch of the Day-ahead Ancillary Services Market, Taipower actively developed and launched a second trading market, the "Capacity Reserve Market," in January 2022. The platform acts as a "matching mechanism" between supply and demand of the capacity reserve. The market represents a move towards a complete structure and set of services for the Energy Trading Platform. In the face of the 2025 energy transition goal, Taipower will continue to build and improve the electricity market and expects more industry players to join in participating in the future of Taiwan's brand-new electricity industry.

Phase 1 of the Offshore Wind Power Project - Powering Up Green Energy with Sea Breeze

The Taiwan Strait is considered a world-class environment for offshore wind farms and has excellent potential for offshore wind power development. It is a valuable assets in Taiwan's drive toward its energy-transition into a low-carbon society. As Taiwan's principle power provider, Taipower completed the first phase of its Offshore Wind Power Project in 2021. The project consisted of a total of 21 wind turbines that were built off the coast of Fangyuan Township, Changhua County. It began commercial operations after completing its initial grid connection.



* Phase 1 Offshore Wind Power Farm Site

Key Performance of Phase 1 Offshore Wind Power Project



Total capacity of Phase 1 Offshore Wind Power reaches

110 MW



Annual generation reaches

360 GWh



Provide year-around electricity to

90,000

households

Design and Development

Wind Turbine Design Tailored to Local Conditions

The engineering technology and development costs of constructing offshore wind turbines in turbulent seas are higher than those for land-based wind turbines. Moreover, the winter sea conditions in the Taiwan Strait often include wind and heavy waves, construction can only be done in a half-year period during the summer. Even at these times, high humidity and environmental salinity add extra challenges to the offshore project.

Additionally, ocean currents in the strait move in opposite directions during winter and summer. Consequently, Taipower has applied its experience in setting up marine meteorological observation towers to wind turbine tower construction. For instance, the Company installs two ladders on different sides of each tower's lower parts to increase the probability of successful tower climbing.

Furthermore, to prevent equipment damage caused by the northeast monsoon, Taipower implemented a "Winter plan" to strengthen dehumidification and protection for the wind turbine equipment at the pre-assembly site so that the wind turbines will safely survive the winter. It is clear that Taipower has brought its professionalism and innovation to the task of planning and designing its first-ever offshore wind farm, and has built a wind farm that is well-adapted for Taiwan's local conditions.



Construction Supervision

Overcoming COVID-19 Together

The first phase of Taipower's Offshore Project was planned by the Department of Construction and supervised by the Offshore Wind Power Construction Office. To complete tower assembly on land, Taipower and the Port of Taichung jointly established a pre-assembly site for wind turbines on a total of seven hectares of space in the Taichung Port area. The site is currently the largest offshore wind power terminal in Southeast Asia.

During the construction period, Taipower faced various challenges including the COVID-19 pandemic, which prevented the docking of foreign construction vessels for 5 months. Taipower actively negotiated with different stakeholders, and the Company was eventually able to break through the difficulties and proceed with construction. Taipower adopted an offshore quarantine sea taxi approach and implemented measures of control for personnel exchange with vessels, quarantine of all personnel, and disinfection of whole ships. Consequently, Taipower successfully reduced the risk level for the 7 wind farm work vessels from the "grey ships" to "white ships" level.

Through managing the severe impact of the pandemic, Taipower has demonstrated its outstanding collaborative spirit, overcome construction delays and completed Phase 1 of the Offshore Wind Power Project together with foreign engineering teams.



Sustainable Operation

Coexisting with Local Ecology

In order to protect the rich ecological resources of the Changhua area, Phase 1 of the Offshore Wind Power Project sought to coexist with the local environment and community.

To mitigate the environmental impact of the wind farm, Taipower used eco-friendly construction methods during the construction phase to minimize construction noise and avoid areas inhabited by cetaceans and used for raising oysters.

Taipower values the livelihood of local fishers and continues to communicate with the Changhua Fisheries Association to hear to the needs and voices of fishers. During the operation period, local fishers were employed in order to protect their rights to work. They were hired to operate guard boats and to serve as cetacean observers. They were also trained to handle the operation and maintenance boats.

Taipower is also actively assisting in the transformation of the fishing industry. In addition to conducting surveys on marine resources in Changhua's seas and sharing the research results with the fishers, Taipower is also promoting a Fishery Transformation Project. In the future, Taipower will experiment with the use of wind farms to raise oysters and continue to explore opportunities for fishery transformation to achieve the symbiosis of fishery and electricity. This will set a benchmark for the coexistence of wind farms and fisheries in the future.



Taipower Deeply Engages in Sports and Exerts Social Influence

Taipower has supported sports for more than 70 years and has spared no effort in improving the competitive level of sports in Taiwan. Since 1946, the Company has established six competitive semi-professional sports teams, including men's baseball, men's volleyball, women's badminton, women's volleyball, men's football, and women's basketball. Taipower has the most sports teams among Taiwan's state-owned enterprises and can be described as the cradle of the Taiwanese athletes. In addition to providing an excellent training environment, the Company has also pioneered the "player as employees" career protection system, which cultivates athletes' professional skills in the workplace, so that players can feel at ease while winning glory on the field because they have job security after retiring from the team.

Men's Baseball Team	Men's Volleyball Team	Women's Badminton Team	Women's Volleyball Team	Men's Football Team	Women's Basketball Team
<ul style="list-style-type: none"> Established in 1946 The first team established among the existing sports teams in the country 	<ul style="list-style-type: none"> Established in 1951 Seven consecutive regular season Championships and playoffs for the "Top Volleyball League Class A" 	<ul style="list-style-type: none"> Established in 1971 Taiwan's first professional women's badminton team Two players qualified for individual competition at the "2022 Asian Games" 	<ul style="list-style-type: none"> Established in 1974 Nine consecutive regular season championships, with additional playoff series wins for a total of 19 championships 	<ul style="list-style-type: none"> Established in 1978 Dominated the Taiwan Football Premier League for a record of 10 championships Winner of the 2011 AFC President's Cup 	<ul style="list-style-type: none"> Established in 1979 Winner of the women's 2021 National Basketball Championship

Elevating the Level of Competition and Establishing a Foundation for Athletic Development



Fulfill Corporate Social Responsibility by Promoting Community Athletic Events

To fulfill its corporate social responsibility and give back to society, Taipower has improved its brand image by organizing community athletic events such as Fun Ball Camps, Taipower Ball Tournaments, Care Crews, and by adopting school sports teams.

Enhance National Sports Development and Cultivate Athletes

Taipower offers a career protection system, allowing athletes to devote themselves to sports performance and enhance Taiwan's sporting visibility around the globe without worrying about the future. The system allows athletes to pursue a "second life" with Taipower after retiring from their sports careers.

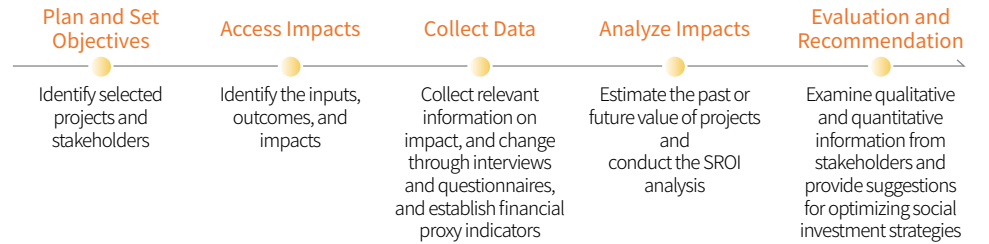
Pass on Experience and Deliver Love to Remote Rural Areas

Taipower's various community athletic events are meant to bring a touch of warmth to the disadvantaged. Taipower is aware of the lack of education and sports resources in remote areas, and its sports teams take the initiative to visit elementary and middle schools in remote rural areas and on outlying island. Taipower's sports teams aim to deliver love to every corner of Taiwan.

Introduce SROI, Creating a Social Value of \$8.63 for Every \$1 Invested

To evaluate the social influence of the Taipower sports teams, Taipower conducted an evaluative Social Return on Investment (SROI) analysis from the British "Social Value International." The SROI analysis provides further understanding of the social benefits created by the Taipower sports teams through talent development and community athletic events. The analysis is used to evaluate the intangible values of a project and to explain with a dollar value. There are five implementation steps for SROI and the analysis is done through in-depth interviews and questionnaires with stakeholders. These were used to analyze the benefits and changes produced by stakeholders in the overall project process, and interactive interviews with stakeholders were used to understand the causes and effects of events and define their benefits.

Five Steps to Implement SROI



SROI Analysis Results

The analysis indicates the SROI value of the Taipower sports team is 8.63, which means that every \$1 invested will create a social value of \$8.63. The top five benefits are improved brand image, a reinforced sense of job security for players, increased exposure for school teams, enhanced recognition of Taipower, and enhanced career and professional development paths. According to the results, the Taipower's sports teams have become an internal and external communication channel for Taipower that has helped to enhance its brand image. Taipower will continue to fulfill its corporate social responsibilities, promote community athletic events, and contribute to the development of Taiwan's sports.

74.69 % Improve the Brand Image of Taipower	14.59 % Reinforce the Players' Sense of Job Security	8.54 % Raise the Exposure of School Sports Teams
1.48 % Enhance Attachment to Taipower	0.20 % Build Career and Professional Development Paths	0.50 % Other Benefits

Improve the Brand Image of Taipower

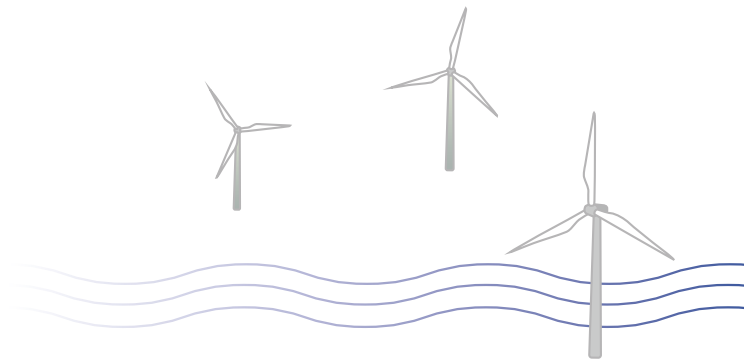
"Improve the brand image of Taipower" ranked top among all benefits, accounting for 74.6%. This indicates that Taipower has effectively enhanced its brand image through organizing community athletic events.

Reinforce the Players' Sense of Job Security

"Reinforce the players' sense of job security" ranks second among all benefits, accounting for 14.59%. This indicates that the "players as employees" career protection system has effectively improved the sense of job security and career development paths.

Enhance Attachment to Taipower

The community athletic events not only strengthen the Company's brand image externally but also consolidate employee identity and enhance attachment and sense of belonging towards Taipower internally. This is the most important asset for Taipower.



1

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 its stakeholders. The Company will also internalize suggestions and feedback about its operations from those stakeholders while gradually embracing the next generation of power industry trends.

◆ Performance Highlights

- Awards received at the 2021 Taiwan Corporate Sustainability Awards (TCSA): received a fourth **Taiwan Corporate Sustainability Report Platinum Award**, the **Taiwan Corporate Sustainability Excellence Award**, and the **Creativity in Communication Leadership Award**
- Ranked 40th in the large enterprise group at the 2021 Common Wealth Magazine **CSR Sustainable Citizenship Awards**. Taipower was the only state-owned enterprise to receive the award this year
- Won the **Social Empowerment** and the **Circular Economy Leadership Awards** at the 2021 Asia Responsible Enterprise Awards (AREA)
- Won the Environmental Sustainability Award for the project "The Key Step of Renewable Energy Development: Kinmen Energy Storage Demonstration System" at the 2021 Taiwan Sustainability Action Award (TSAA)

Primary Awards



Sustainable Development

- ▶ **The 2021 TCSA Taiwan Corporate Sustainability Awards**
Received a fourth Taiwan Corporate Sustainability Report Platinum Award, as well as the Taiwan Corporate Sustainability Excellence Award and the Creativity in Communication Leadership Award
- ▶ **The 2021 Taiwan Sustainability Action Awards (TSAA)**
Won the Environmental Sustainability Award for the project "The Key Step of Renewable Energy Development: Kinmen Energy Storage Demonstration System"
- ▶ **The 2021 Asia Responsible Enterprise Awards (AREA)**
Won the Social Empowerment and the Circular Economy Leadership Awards
- ▶ **The 2021 Common Wealth Magazine CSR Sustainable Citizenship Awards**
Attained 40th place in the large enterprise group for its efforts in the four areas of "corporate governance," "corporate commitment," "social participation," and "environmental sustainability." Taipower was the only state-owned enterprise to receive the award this year



Engineering Innovation

- ▶ **The 21st Public Construction Golden Quality Award and the Executive Yuan and Public Construction Quality Award from the Ministry of Economic Affairs**
The two awards were received for the "69kV Switch Field Repair Project for the Dongbu Power Plant Tongmen and Longjian Branch Plant"
- ▶ **The 2021 Taiwan Innotech Expo**
The Company participated in the invention competition with four technologies related to carbon reduction and environmental protection within the circular economy and received four bronze medals
- ▶ **The 2021 Presidential Hackathon Excellent Team Award**
The "Master - Fish Farming" Team won the highest honor – the Excellent Team Award – by proposing the concept of a "Shared Ocean Ranch" that uses warm drainage from power plants for fish and algae farming and carbon fixation
- ▶ **The 2021 Smart Grid Index (SGI) from the Singapore Power SG Group**
In the smart grid development evaluation of power companies in various countries, Taipower jumped from 10th place last year to 2nd place among the 86 evaluated global power operators
- ▶ **The 2021 Asian Power Silver Medal Awards**
The Third Nuclear Power Plant's (NPP3) "Safety-related Enhancement Project for Tank Earthquake Resistance" won the Asian Power Silver Medal Award issued by Asian Power Magazine
- ▶ **The 2021 Award of Excellent Green Building Works (Dimond Grade)**
The NPP3 Exhibit Center in Southern Taiwan was awarded the "Award of Excellent Green Building Works" by the Ministry of the Interior



Operations Management

- ▶ **The 2021 National Talent Development Awards**
The Kaohsiung Training Center of the Training Institute continues to strive for excellence and received the highest honor in the field of national human resources by winning the Talent Development Quality Management System (TTQS) Gold Medal Award
- ▶ **The 2021 Happiest Employees Awards**
Honored with a "Gold Award" in the manufacturing industry – the only state-owned enterprise in the manufacturing industry to win the Gold Award
- ▶ **The 2021 Occupational Safety and Health Excellent Awards**
The Second and Third Nuclear Power Plants (NPP2 and NPP3) were both awarded the Occupational Safety and Health Excellence Award issued by the Ministry of Labor



Social Co-prosperity

- ▶ **The Golden Pin Design Awards from Taiwan Design Research Institute**
The "2021 Daily Taipower" calendar won a "Communication Design" mark at the Golden Pin Design Awards, and the "2020 Taipower Cultural Heritage Special Exhibition - Charged with Electricity" won the "Integration Design" mark
- ▶ **The 2021 Sports Activist Awards**
Three primary awards, "Sponsor Category Gold Award," "Sponsor Category Long-term Sponsor Award," and "Promotion Category Gold Award," were presented by the Vice President
- ▶ **For Social Innovation Products and Services Procurement in 2021 from the Ministry of Economic Affairs**
Received a "Special Award" in the "Public Service Innovation" category at the "Homecoming" special exhibition of the circular economy during Environment Month

1.1 Taipower Business Overview and Strategy

1.1.1 Taipower Profile 102-1 102-2 102-3 102-4 102-5 102-6 102-7

Established on May 1, 1946, Taipower is a state-owned power industry group that operates in generation, transmission, distribution, and the sale of electricity. It is responsible for providing a stable electricity supply. Revenue from electricity sales accounted for 95.7% of the total revenue in 2021. As of 2021, the installed capacity in the Taipower System (including independent power producers) was 51.15 GW, consisting mainly of thermal power generation with hydroelectricity and renewable energy. In terms of transmission and distribution, Taipower's system has 619 substations, and its total length of power transmission lines reached 17,995 circuit kilometers while its total length of distribution lines reached 399,813 circuit kilometers in 2021.

In response to the recent global trends toward sustainability and the development of future electricity markets, Taipower has promoted 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 adopted a policy of centralization and management decentralization, 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 aims 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.

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% private owned
Total assets	2,205.74 billion
Operating revenue	6,210.2 billion
Number of employees	27,860
Number of users	14.75 million
Installed capacity	51.15 GW in the Taipower system (Taipower-owned: 34.32 GW)
Net amount of generated and purchased power	248,800 GWh

As of 2021/12/31.

Core Values

The successful operation of the power industry must contend with the trilemma of energy security, environmental sustainability, and affordable price. In response to global climate change, domestic energy transition, and the 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 employees, and allow it to move toward becoming a superior and sustainable power business group.



Management Strategy

Taipower is accountable for the reliability of the power supply, and for remaining eco-friendly while implementing national energy policies that meet business and household needs. Each year, Taipower conducts continuous reviews in order to comply with the specifications of the latest amendments of the Electricity Act. The Company also takes a range of other factors into account such as green energy, carbon reduction, energy conservation, and stable 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.



Taipower's Power Plants and Power Grid



1.1.2 Operational Performance 103-2 103-3 203-2 203-1

Sustainability Operation Goals and Financial Performance

In recent years, Taipower has been actively strengthening its business constitution, implementing goal setting and performance management appraisal, and annually reviewing indicator items to meet its overall operating objectives. In 2021, eighteen 18 overall targets and 112 key performance indicators were set, and a total of 99 were completed. In 2022, 41 overall targets and 117 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 2019 to 2021 was as follows.



Financial Performance

Unit: NT\$ millions

Year	Total assets	Operating revenue	Pre-tax profit	Equity data
2019	2,072,525	594,185	17,326	304,614
2020	2,145,316	604,648	23,855	326,296
2021	2,205,736	621,023	22,242	350,634

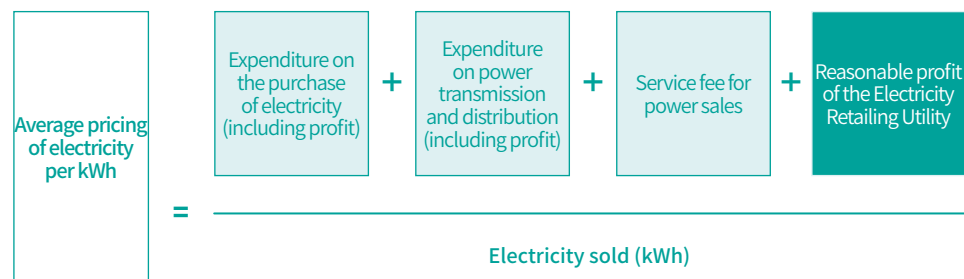
Note: 1. Taipower is a state-owned enterprise and, according to law, its final accounts are subject to review and certification by the National Audit Office. At the time of publication, the actual performance for 2021 has not been reviewed and certified by the National Audit Office and is thus reported according to the numbers reviewed and certified by certified public accountants.

2. The numbers for 2020 are reviewed and audited final accounts. Following the completion of this process, there are now some differences from the disclosure for the 2021 Sustainability Report.

Under the premise of stabilizing the power supply and meeting the needs of the public, the review mechanisms for electricity tariffs will continue to be a critical issue for Taipower. 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 and Taipower's operational performance. The electricity tariff is reviewed and adjusted twice a year. 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.

The Ministry of Economic Affairs held its electricity tariff review meetings in March and September of 2021, respectively. Taipower submitted electricity tariff review proposals with +0.07% and +1.20% adjustments. After evaluating international oil prices and the economic impact of the pandemic, the meeting concluded that the electricity tariff should remain unchanged and therefore not be adjusted. This was partially in consequence of Taipower's adjusted earnings in 2020 exceeding the reasonable profit of \$14.162 billion, and being deposited into the tariff stabilization reserve following the resolution of the 2021 review meeting. The funds will now be used for future tariff stabilization.

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



The Average Prices of Residential, Industrial, and Commercial Electricity from 2019 to 2021

Unit: NT\$/kWh

Category of Power Consumption	2019	2020	2021
Residential	2.5256	2.5596	2.5110
Industrial	2.4738	2.4461	2.4592
Commercial	3.2381	3.1787	3.1861
Other	2.6637	2.6586	2.6353

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.

Diversified Management and Strategies

Taipower is pursuing an expansion strategy aimed at extending its original business in the electricity industry, strengthening asset revitalization, and entering spin-off businesses. The Company is aggressively venturing into energy-related emerging industries and promoting renewables-related energy generation, energy storage, energy conservation, and smart energy management. Taipower's diversified business strategy and short, medium, and long-term revenue objectives are regularly reviewed on an annual basis and included in the performance indicators of relevant units. The implementation results of diversified projects are tracked and controlled quarterly to progressively cultivate corporate competitiveness, keep growth momentum, increase the Group's revenue, and strengthen financial performance.

At present, Taipower has successfully initiated intrapreneurship in areas such as power operation and maintenance, communication, real estate, cultural innovation, etc. It has also moved forward with reinvestment businesses such as coal and mine development, cogeneration, wind power training, etc. The Company generated \$3.1 billion in income from these diversified activities in 2021. Taipower's new business development will continue to utilize the Company's existing advantages and to synchronize them with external resources to dynamically deploy energy-related businesses more flexibly and support Taipower in developing its smart grid and digital energy internet, and to create opportunities for the development of the broader emerging energy industry.

Diversified Business Income in The Past Three Years



Note: There were fewer earnings from diversification in 2020, mainly due to coal sales proceeds from reinvestment in the coal mine development being affected by the global pandemic, and the drop in international coal prices. The annual income was for that year was only \$300 million, which was \$700 million less than the target value (\$1,000 million).

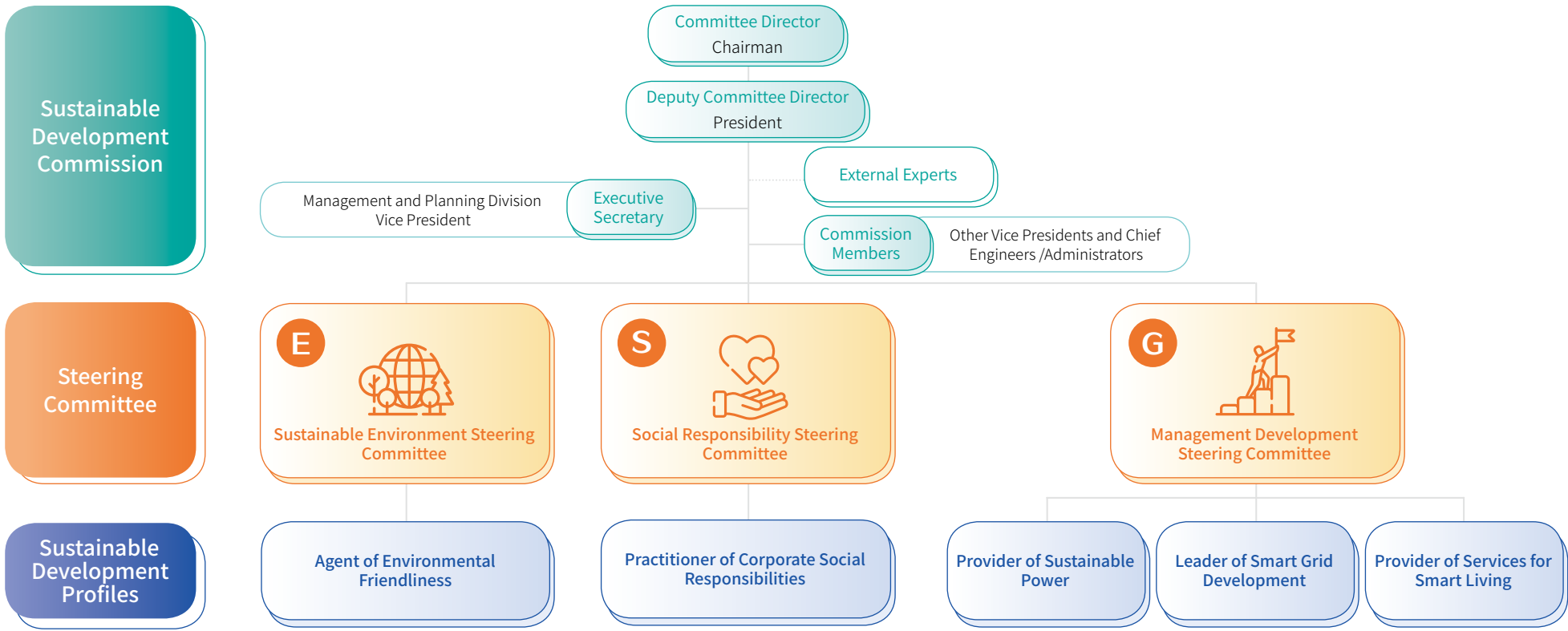
1.2 Implementing Sustainable Development

1.2.1 The Sustainable Development Commission 102-18 102-22

Organizational Structure of the Sustainable Development Commission (SDC)

Taipower set up a Sustainable Development Commission (SDC), with the chairman of the board of directors as the SDC's chairman, the president as the SDC's deputy chairman, and the 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. Through these three steering teams, the SDC tracks the implementation results of Taipower's short, medium, and long-term goals. Each committee analyzes the external environment and policy changes to plan the long-term sustainable development direction and to identify material issues of the company from three aspects: business development, environmental sustainability, and social responsibility. Since 2021, the SDC has reported on progress to the board of directors each year. Moreover, it also promptly submits special reports to the board of directors on relevant impact management and contingency situations for areas of policy or significant risk.

Structure of the Sustainable Development Commission



Key Tasks of the SDC

Management Development Steering Committee



The committee is currently focused on planning management direction and executing its transformation. Management direction is set by establishing 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 three 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. Taipower follows international trends and industry dynamics and conducts continuous reviews. Currently, Taipower is focused on climate-related risks and current phase results have been disclosed in 2.2.2 Environment and Climate Change Risks. The actual performance of the SDC is as follows:

Actual Performance in 2021

Name of Meeting	Responsibilities	Actual Performance in 2021
Sustainable Development Commission	Planned the Company's long-term sustainable development, established material topics and approved the Company's Sustainable Development Blueprint	Convened 1 meeting
Steering Committee	Formulated the Sustainable Development Plan and short, medium and long-term goals	Convened 3 meetings
Sustainable Development Profiles	Executed and followed 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. Since 2021, Taipower's Sustainable Development Commission 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.

1.3 Promoting Corporate Transformation

1.3.1 Transformation Planning 103-2 103-3 102-10

Core Transformation Concept

The Electricity Act was amended in 2017 with Article 6 stating that the "Electricity Transmission and Distribution Enterprise may not engage in the generation of electricity." This provision was initially expected to take effect in January, 2023 (Note: The electricity industry regulatory authority may submit requests for postponement to the Executive Yuan following assessments of the development and condition of the electricity market. Postponements can be made no later than January, 2026). An extension has now been granted by the Executive Yuan until January 1, 2025. In accordance with the law, Taipower will transform into a parent holding company and set up generation, transmission and distribution companies under it.

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 the stable power supply, energy transformation, a nuclear-free homeland, air pollution reduction, and 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, strategy 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, 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 department 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.

1.3.2 The Current Status of Promoting Transformation in Taipower 102-10

To prepare for the transition to parent and subsidiary operations, Taipower has studied external experiences through research projects and exchanges with benchmark companies. It has established a Transformation Promotion Commission that is chaired by the Company Chairman and set up related task forces. Through intense discussion, these task forces are actively planning and preparing for the organizational, financial, and operational aspects of transformation. The results as of 2021 are as follows:



Organizational

Taipower's transformation is the first among state-owned enterprises, and its organizational planning is particularly complicated. From 2017 to 2018, the parent-subsidiary functional position was first determined. From 2019 to 2020, the division of businesses between parent and subsidiary companies was carried out, and the attributions and divisions of labor for the 19 non-business divisions were discussed one-by-one. From 2020 to 2021, parent-subsidiary organizational planning was continued and carried out according to the division of the business. After a total of 41 meetings and discussions with first-tier units, senior executives, and the Power Labor Union, a consensus within the Company about the divisional organization of the Group was gradually built, and the organizational framework at the division level of the three companies was approved in October, 2021. Currently, more detailed organizational and workforce planning is ongoing.



Financial

Taipower established a separate accounting system in 2018 then completed a separation accounting procedures manual in 2019. The Company has prepared separate accounting reports for the transmission and distribution utility yearly since 2019. These are submitted to the Bureau of Energy for reference within the prescribed periods after being certified by CPAs. In addition, the division principle for the Group's real estate assets was completed in 2020, and the attribution of real estate assets was completed in 2021. The Company continues to study and analyze issues such as corporate bond transfer, taxation, NPP4 derogation processing, back-end decommissioning costs, and the repurchase of dissenting shares and is establishing a financial structure for the stable operation of parent and subsidiary companies through the continuous review of financial calculations.



Operational

Taipower is actively studying the Group's governance structure and management system. It has planned a trial run for the Group's administrative mechanisms to confirm the feasibility of financial flow plans and the smoothness of business operations before the transformation occurs.



1.4 Stakeholders and Key Sustainability Issues

1.4.1 Identification of Stakeholders 102-40 102-42 102-43

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.

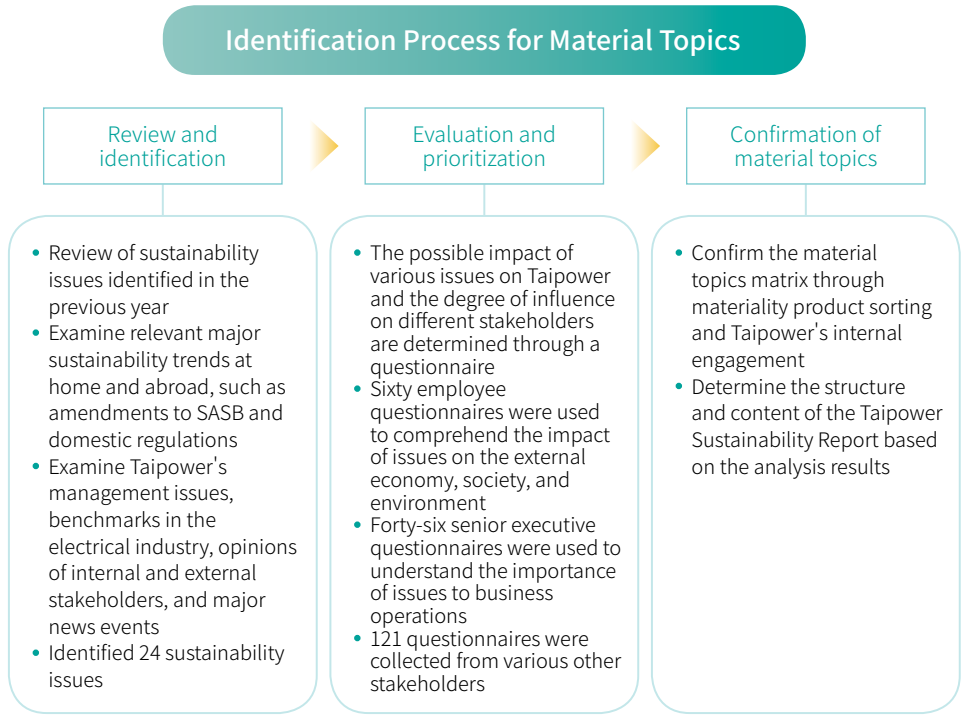
Stakeholder	Party
Board of directors	Directors
Shareholders	All shareholders
Employees	Employees and the union
Partners	Contractors, IPPs, suppliers and technology exchange partners
Government/competent authorities	The Ministry of Economic Affairs, the Bureau of Energy, the State-Owned Enterprise Commission, 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, academic organizations
Customers	General and large-scale customers
Residents/general public	Residents near facilities and the general public

1.4.2 Key Sustainability Issues 103-1 102-44 102-47 102-48 102-49

In compiling its annual reports, 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.

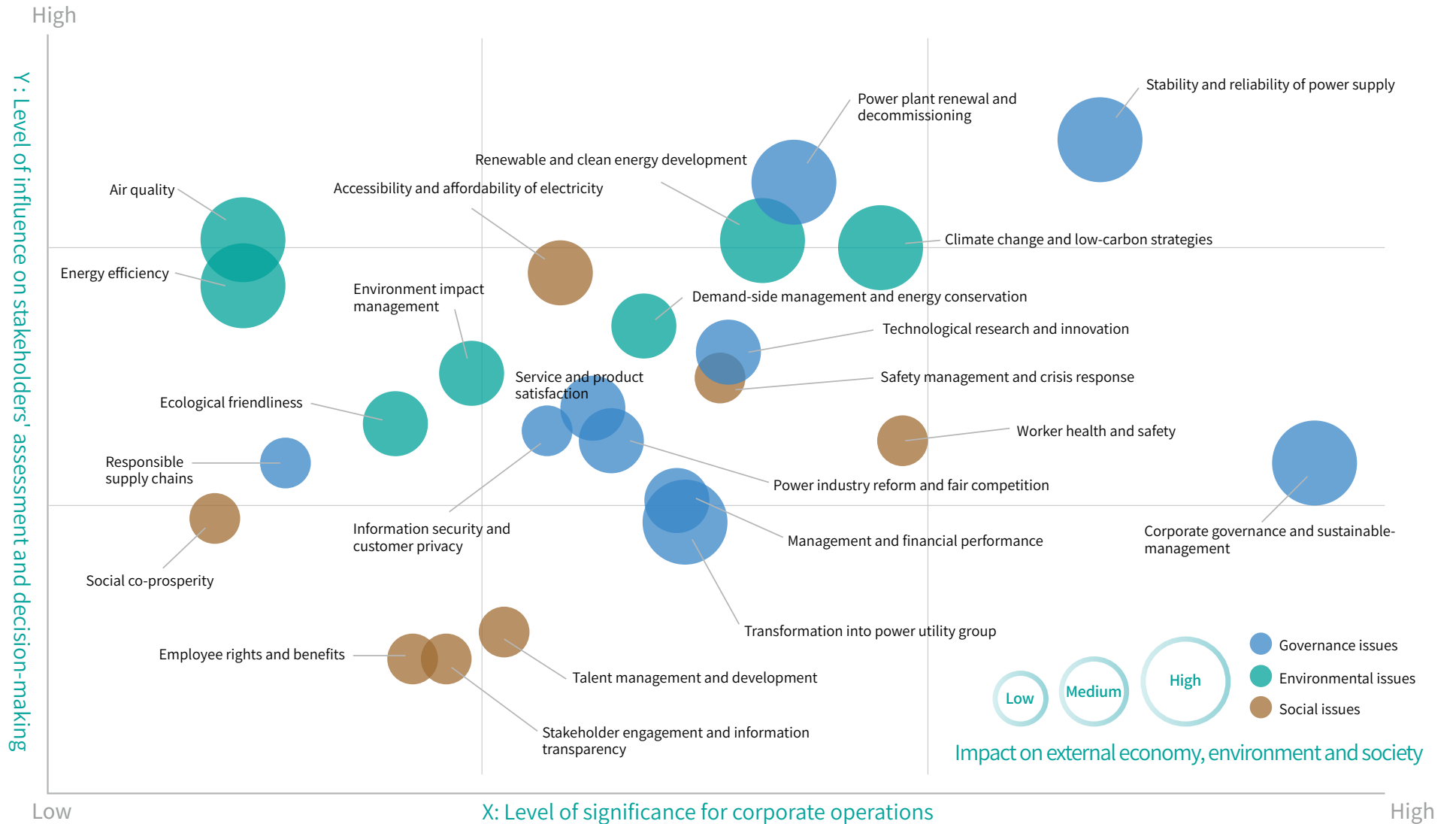
To identify the material topics of concern to stakeholders, Taipower refers to the GRI Standards to conduct materiality analysis that reviews and identifies the key material topics for the Company. Additionally, Taipower continues to observe international sustainability trends and has identified the "circular economy" as an emerging issue within the global power industries. In 2021, Taipower developed strategies for circular economies and will continue to discuss the issue. The Company has also included "circular economy" in its list of material topics. In 2022, Taipower additionally sought to identify material topics by surveying stakeholders. Survey results were collected from 106 Taipower employees (including 46 senior executives) and 121 other stakeholders for a total of 227 responses.



Based on the identification process in the above figure, 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
Integrity and sustainability management	Corporate governance and sustainability management	Consolidation of other material topics and renamed	Consolidated the former "integrity and sustainability management" with relevant regulatory penalties in "anti-corruption" and "environmental impact management and compliance," fine-tuned and renamed to "corporate governance and sustainability management," demonstrating Taipower's promotion of corporate governance, commitment to legal compliance, and advancement of integrity and anti-corruption. At the same time, sustainable development was combined with operational tactics, developing a sustainable governance structure and strategy, and strengthening corporate resilience.
Environmental impact management and compliance	Environmental impact management	Consolidation of other material topics and renamed	Legal compliance is a governance issue and spans ESG aspects. It was recommended that the focus be placed on "environmental impact management" here and that implications be fine-tuned to focus on the management of water resources, waste, and hazardous substances to minimize the negative environmental impact of Taipower's operation.
Transforming into a new energy group	Transforming into a power utility group	Renamed	This topic remains fundamentally unchanged, but includes an improved explanation of the shift from internal governance to group management and the splitting of the business division. It will continue to follow the development of Electricity Act toward the liberalization of the electricity industry.
Rationality of electricity price, accessibility, and popularity of electricity	Accessibility and affordability of electricity	Consolidation of other material topics and renamed	Consolidated the former 2021 governance issue "rationality of electricity price" and the social issue "accessibility and popularity of electricity," fine-tuned and renamed it "accessibility and affordability of electricity," and shift it to the social aspect. This adjustment is based on the relevant requirements of SASB indicators, indicating that Taipower is devoted to improving the popularity of electricity services and maintaining affordable electricity prices that stabilize Taiwan's livelihood needs.
Power plant renewal and decommissioning	Power plant renewal and decommissioning	Shifted	In 2021, "Power plant renewal and decommissioning" highlighted the impact of plant decommissioning on residents in surrounding areas, and so was focused on social aspects. As the issue of energy transformation becomes increasingly important, "power plant renewal and decommissioning" has become part of the energy transformation plan. Since energy transformation is a governance issue, this material topic has been shifted from the social aspect to the governance aspect.
Climate change and low-carbon strategy	Climate change and low-carbon strategy	Fine-tuned implications	In response to the net zero carbon emissions trend, implications were fine-tuned to improve the explanation of how Taipower inventories and manages its greenhouse gas and carbon emissions. Climate change risks were identified and carbon reduction targets were set to cope with the possible future impacts of climate change risks.
Stakeholder communication and information transparency	Stakeholder communication and information transparency	Fine-tuned implications	Keenly communicate with stakeholders through different channels, strive to enhance information transparency, improve explanations for sudden disputes, and be able to respond positively and promptly.
Humanistic development and Social prosperity	Social prosperity	Consolidation	With reference to other benchmark power industry topics, the relevant contents of "humanistic development" were consolidated into the topic of "social prosperity," which indicates that Taipower enthusiastically supports social welfare, including the preservation of cultural assets in the power industry, the strengthening of community relationships at the pre-operation site, and the carrying out of actions in popular science, rural education, etc. to develop the collective intelligence of society and enhance the positive influence of Taipower in society.

2021 Material Topics Matrix



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. Fourteen 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 "power industry reform and fair competition," "technological research and innovation," and "power plant renewal and decommissioning." The topics "transforming into a power utility group" and "management and financial performance" are also essential issues for the operation and future transformation of the power industry.

In terms of the environment aspect, 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, "energy efficiency" and "air quality" are emphases of environmental disclosure under the current energy structure.

The successful maintenance of a stable power supply is fundamentally the consequence of the joint efforts of Taipower's conscientious engineering units. Hence, Taipower proactively attends to industrial safety issues and has made "worker health and safety" a material issue. 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	
	Within Taipower	Business Relationships		Other Social Relationships				
		Partners	Users	Private organizations	Government units			Residents/general public
Corporate governance and sustainability management	✓				✓	General Disclosures: Governance Economic: Anti-corruption Environmental: Environmental Compliance Social: Socioeconomic Compliance	1.1 Taipower Business Overview and Strategy 1.2 Implementing Sustainable Development 2.2 Risk Management Mechanisms and Control Measures 2.3 Integrity and Compliance	
Management and financial performance	✓					Economic: Performance	1.1 Taipower Business Overview and Strategy	
Transformation into a power utility group	✓				✓	Topics Specific to Taipower	1.1 Taipower Business Overview and Strategy 1.3 Promoting Corporate Transformation	
Power industry reform and fair competition	✓				✓	Topics Specific to Taipower	1.3 Promoting Corporate Transformation	
Accessibility and affordability of electricity	✓				✓	Economic: Indirect Economic Performance	1.1 Taipower Business Overview and Strategy 3.1 Providing High Quality Electricity Service	
Stability and reliability of power supply	✓	✓			✓	Economic: Indirect Economic Performance	3.1 Providing High Quality Electricity Service	
Renewable and clean energy development	✓	✓			✓	Economic: Indirect Economic Performance	3.2 Planning for New Source of Energy	
Power plant renewal and decommissioning	✓				✓	Economic: Indirect Economic Performance	3.2 Planning for New Source of Energy	
Technological research and innovation	✓				✓	General Disclosures: Governance	4.1 The Smart Grid General Planning 4.2 Smart Grid Application- Vehicle-to-Grid Bi-directional Charging System	
Demand-side management and energy conservation	✓		✓			Economic: Indirect Economic Performance	4.1 The Smart Grid General Planning 5.1 Smart Electricity Service	
Climate change and low-carbon strategies	✓				✓	Environmental: Energy	6.1 Strengthening Environmental Management 6.2 Reducing Use of Energy and Resources	
Energy efficiency	✓		✓		✓	Environmental: Energy	6.2 Reducing Use of Energy and Resources	
Air quality	✓					Topics Specific to Taipower	6.3 Minimizing Environmental Impact	
Worker health and safety	✓	✓				Social: Occupational Health and Safety	7.2 A Sound Working Environment	

2

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 stable operation and long-term development. The Company constantly reinforces the disclosure of 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, and enhancement of the function of its Board of Directors particularly in its role of providing sustainable management policy supervision over the 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 of corporate governance directors and corporate governance personnel, and deepen the corporate governance culture. Taipower persistently strives to provide a high standard of sustainable power services.

◆ Performance Highlights

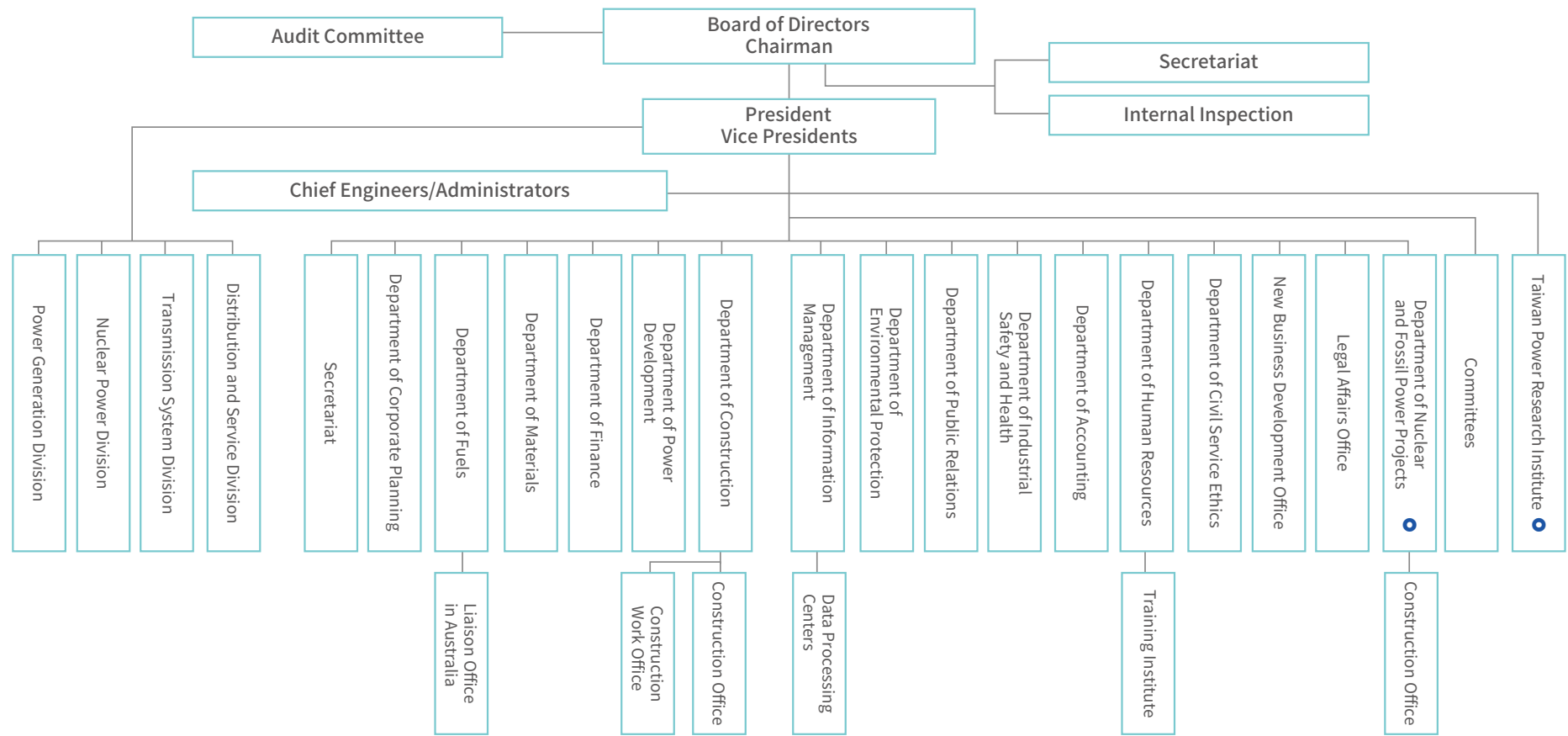
- Ranked **first in the corporate governance evaluation** of state-owned enterprises under the Ministry of Economic Affairs for six consecutive years.
- The average attendance rate of board meetings was **99%** for Directors and **100%** for independent directors.
- Professional corporate training on governance for Directors (including independent directors) totaled **210 hours**.

2.1 Taipower's Organizational and Governance Structures

2.1.1 Organizational Structure 102-18

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.).

Taiwan Power Company - Organizational Structure Chart



Note: 1. ● Denotes units that are not located at the headquarters.
 2. The Taiwan Power Research Institute reports to the President directly.

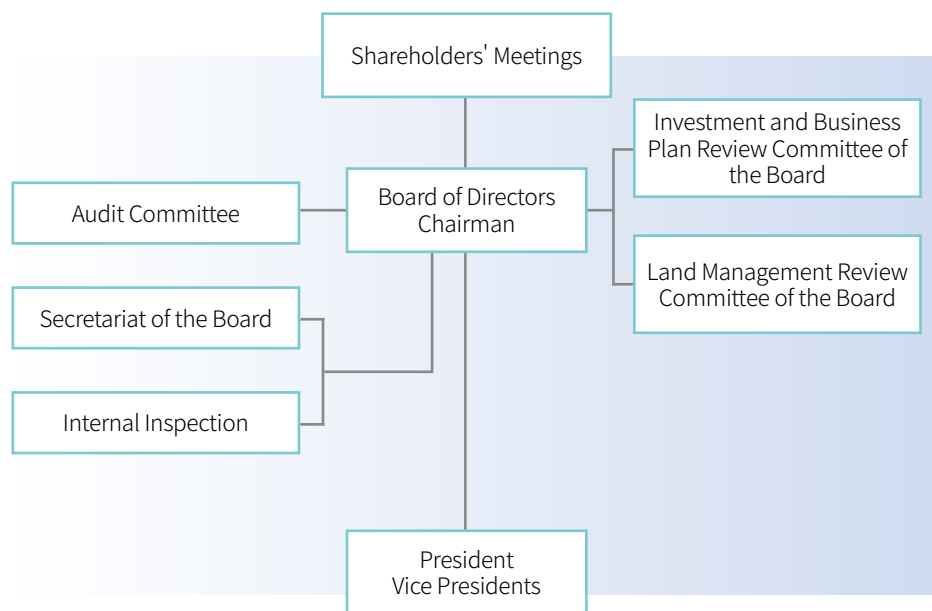
2.1.2 Board of Directors

The Structure of the Board of Directors

103-2

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 the directors, one of whom must be an independent director. The term of service for directors (including both independent and managing directors) is two years, and they are eligible for re-election. 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.

Board of Directors Organization Structure Chart



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 shall 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 increasing the number of female directors. Overall, the professionalism, experience, and gender ratio of Taipower's directors are diversified. The Board members of the current term (July 2021 to July 2023) are as follows:



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.



Industry and academic experience

The directors include nine representatives from the government, academia, three independent directors, and three directors from the labor union.



Gender

Taipower currently has five female and 10 male directors on the board. This is an increase of three female directors from the previous term and has now reached the target percentage of gender diversity.

Members of Taipower's Board of Directors in 2021

Information accurate as of March 8, 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 of Taipower
Managing Director	Lin, Faa-Jeng	Dean, College of Electrical Engineering & Computer Science, National Central University
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	Deputy Director, Green Energy and Environment Research Laboratories, Industrial Technology Research Institute
Director	Lin, Tze-Luen	Associate Professor, Department of Politics, National Taiwan University
Director	Chiang, Yau-Chi	Associate Professor, Graduate Institute of Intellectual Property and Patent Licensing and Technology Transfer Center, National Taipei University of Technology
Director	Chuang, Ming-Chih	Director, Bureau of Energy, 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, Taipower
Director (Labor Director)	Peng, Chi-Chung	Inspector, Department of Power Supply, Taipower
Director (Labor Director)	You, Zheng-Da	Section Chief, Chiayi Branch Sales Office, Taipower

Note: The former Acting Chairman Wei-Fuu Yang and President Bin-Li Chung were discharged on Mar. 8, 2022, while 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 public offering company but not listed on TWSE or TPEX. However, to assist the directors in effectively implementing sound corporate governance, the Company actively arranges continuing education for directors in accordance with regulations and the continuing education system for the Implementation of Continuing Education for Directors and Supervisors for TWSE and TPEX Listed Companies. In 2021, Taipower directors (including independent directors) participated in corporate governance-related courses for a total of 210 hours, with an average of 14 hours for each director. This met the threshold proscribed in the aforementioned standards. Participation in external lectures, seminars, and forum totaled 128 hours (accounting for 61%), and participation in internal training totaled 82 hours (accounting for 39%). 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

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 2021, the remuneration for Taipower directors (including the Chairman, independent directors, and labor directors) constituted 0.1019% of the Company's net income after tax.

2.2 Risk Management and Response

2.2.1 Risk Management Mechanism 102-11 103-2 103-3

Corporate management inevitably involves both the impact of external risks and potential opportunities for development. Taipower constantly reflects on its business and makes improvements to effectively identify potential external risk factors while searching for opportunities for development and creating effective guidelines for response. In 2021, a series of incidents attracted a lot of public attention. These included the May 13 and May 17 power outages, damage to the Taichung Thermal Power Plant on June 10, an accidental shutdown of NPP2 on Jul 27, and the Wanlong Substation outage of December 12. Through those incidents, Taipower has had the opportunity to reflect deeply, review its risk management and internal control mechanisms, and initiate improvements and reviews from various aspects. In response to the challenges of domestic energy transition and the international community's embrace of a low carbon approach to climate change after the 26th UN Climate Change Conference (COP26), Taipower will continue to implement risk control, reinforce personnel risk awareness, and identify, evaluate, review and respond to potential internal and external risks on a continuous basis to reduce operational risks.

Risk Management Policies

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

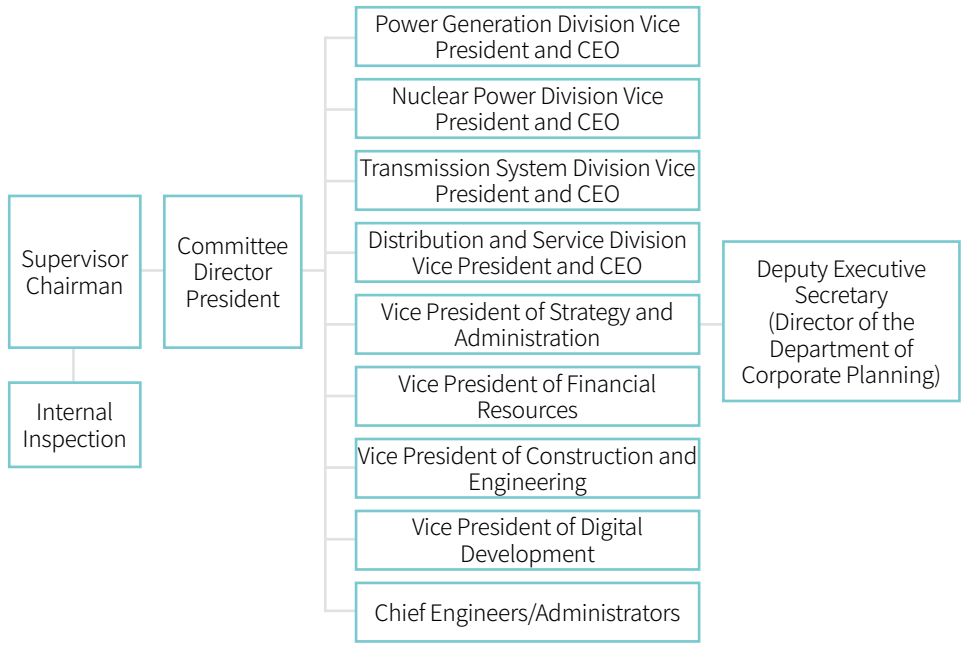


Risk Management Steering Committee

Under 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 VPs and 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.

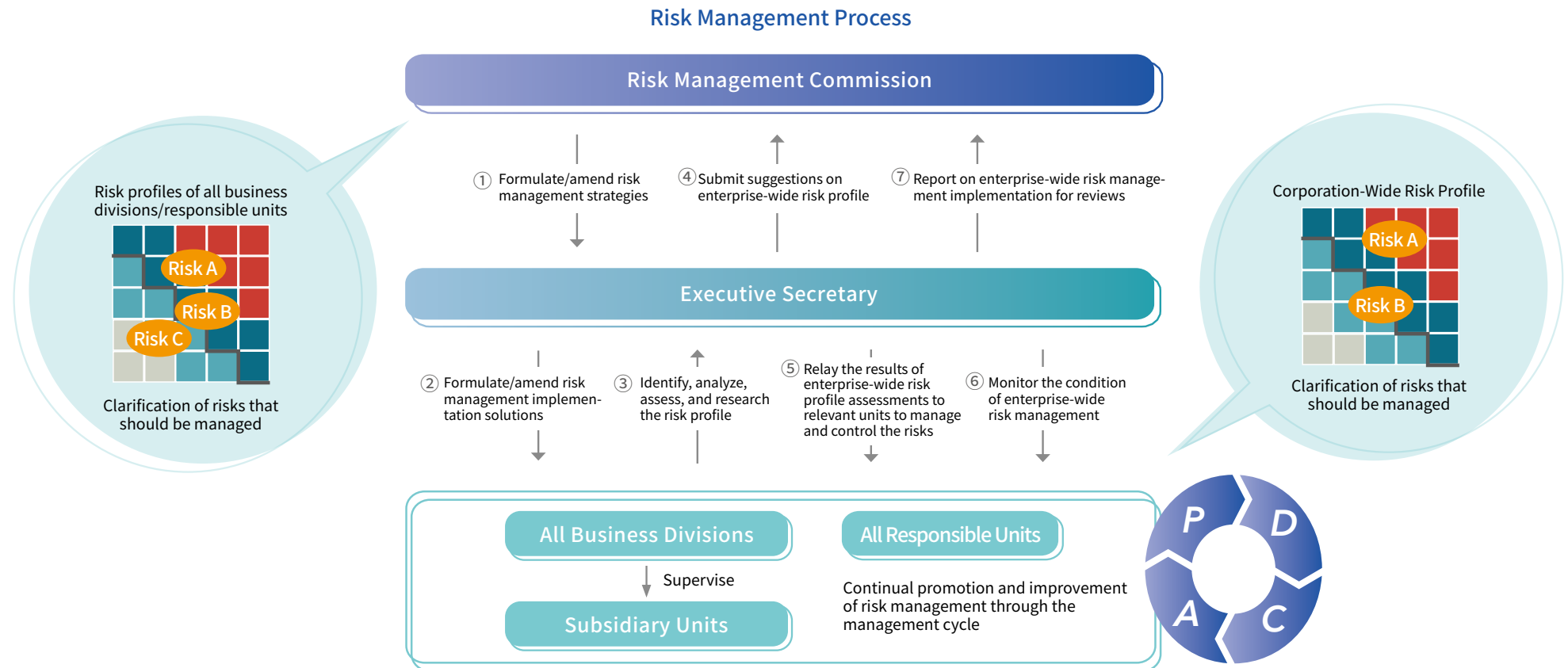
Taipower's Risk Management Organization Structure



The 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. The Risk Management Plan is reviewed and revised for the next year based on changes to internal and external environments.



2.2.2 Risk Assessment and Identification 102-11 102-15 103-2 103-3





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



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
 <p>Power Supply Operation Risks</p>	<ul style="list-style-type: none"> • Short-term imbalance between supply and demand • Damage to safety and resilience of critical power facilities • Medium and long-term major power generation projects behind schedule • Medium and long-term major transmission and substation projects behind schedule
 <p>Environment and Climate Change Risks</p>	<ul style="list-style-type: none"> • Impact of environmental pollution • Lower-than-expected carbon emission reduction
 <p>Legal Compliance and Issue Risks</p>	<ul style="list-style-type: none"> • Severe safety and health accidents • Negative news expansion • Violation of major regulation • Outbreaks of labor-management disputes and employee protests
 <p>Strategic and Financial Risks</p>	<ul style="list-style-type: none"> • Accrual of losses resulting in greater impacts to the Company's operations • Insufficient cultivation of core technology • Failure of protection in the information system

Environment and Climate Change Risks

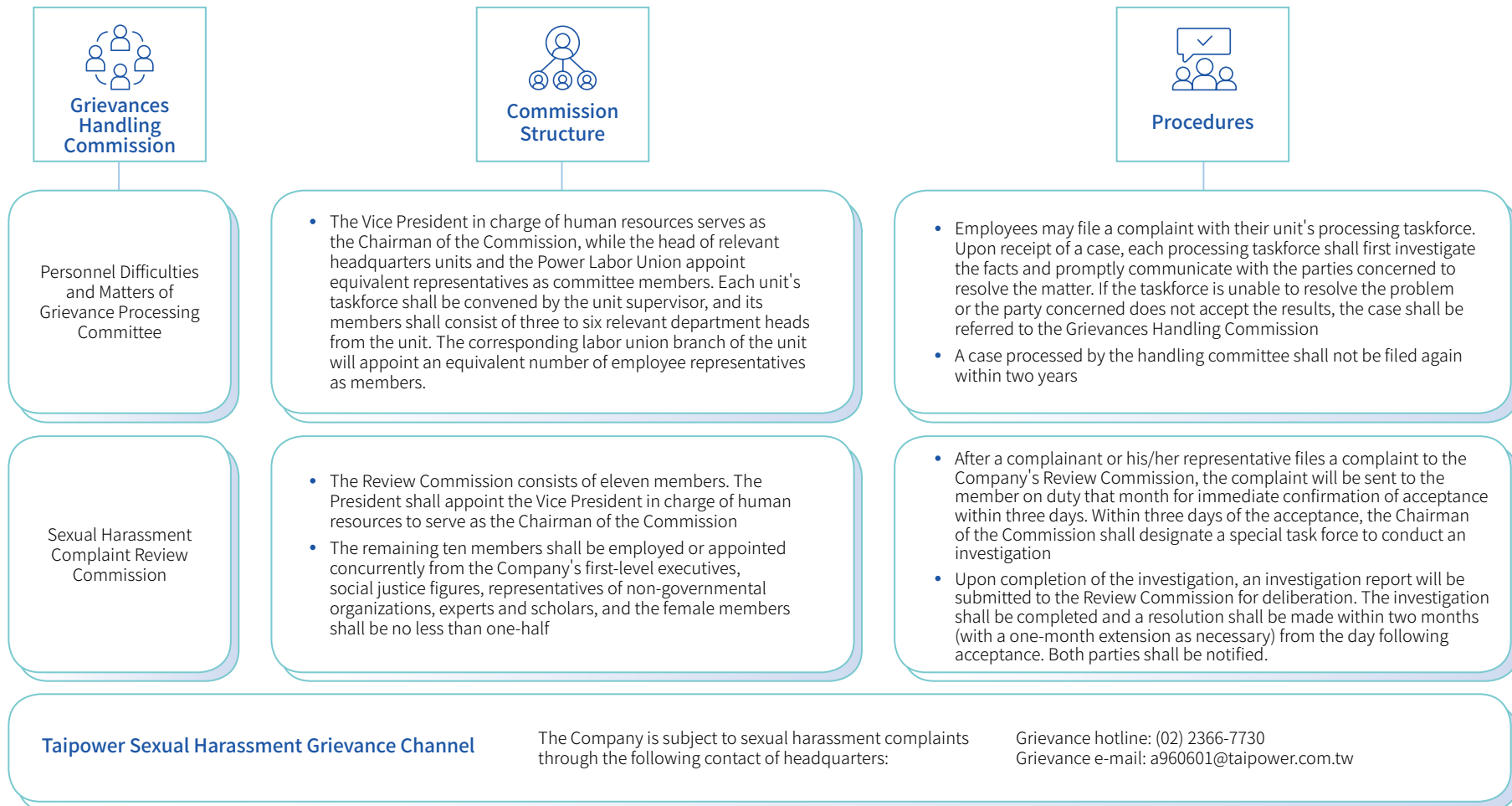
Global environmental and extreme climate threats are becoming increasingly serious. Taipower has responded by making reference to the guidelines of the Global Risk Report issued by the World Economic Forum and by conducting risk assessments on climate change issues with an eye to both adaptation and mitigation. Adaptation seeks to maintain control of facility failures caused by natural disasters through exploring scenarios in which there is damage to safety and resilience of critical power facilities. Mitigation seeks to make advances on the issues of environment and climate change and to proactively take further risk management actions. In addition to an event aimed at environmental pollution impact, Taipower will also include an event in 2022 that explores a net zero carbon reduction that is not as expected.

Risk Incident	Risk Scenario	Main Management and Control Measures
Damage to safety and resilience of critical power facilities	Facility failure caused by natural disasters	<p>Supply system:</p> <ul style="list-style-type: none"> Conduct regular meetings to review follow-up on system electromechanical outage, annual lightning damage and salt fog damage management plans, as well as outage prevention management plans for underground transmission cable lines <p>Nuclear power plants:</p> <ul style="list-style-type: none"> Implement enhancements to prevent emergencies at nuclear power plants caused by natural disasters such as typhoons, strong earthquakes, and floods Conduct Annual emergency response drills at each nuclear power plant <p>Hydrothermal power plants:</p> <ul style="list-style-type: none"> Review, complete, and execute the Principles for Hydroelectric Generator Operations during Typhoons and Floods to reduce the risk of damage to hydroelectric equipment and generators Formulate disaster response measures for equipment safety, emergency evacuation and life support response measures for possible damage caused by concentrated heavy rainfall and extremely heavy rainfall Prepare sufficient spare parts and construction equipment to restore facilities and power generation equipment for rapid resumption of power generation Conduct disaster prevention campaigns and drills <p>Power Distribution system:</p> <ul style="list-style-type: none"> Strengthen the relevant prevention and contingency measures related to typhoons, floods, and torrential rains for secondary substations in each jurisdiction before the flood and typhoon seasons Carry out disaster prevention drills
Impact of environmental pollution	Violation of environmental laws and regulations (1) Violation of Air Pollution Control Act (2) Violation of Water Pollution Control Act (3) Violation of other environmental laws	<ul style="list-style-type: none"> Implement the integration of the environmental management system and on-site operations, and track the improvement of non-conformities Carry out inspections of environmental laws and regulations and improve deficiencies from annual environmental penalty cases Enhance training on environmental protection regulations Survey the latest control trends in domestic and international environmental regulations and advanced pollution prevention control technologies to respond to new, amended, and tightened emission standards of domestic environmental laws and regulations
Lower-than-expected carbon emission reduction	No clear strategic blueprint is defined for net zero emission	<ul style="list-style-type: none"> Continue to discuss a strategic blueprint, and establish a strategic driving direction and scheduled target from the supply, grid, and demand sides
	Carbon capture and storage demonstration project falls short of expectations *Sequestration environmental impact fails to pass as scheduled, and has nowhere to go after CO ₂ capture	<ul style="list-style-type: none"> Establish an execution plan related to required data for carbon sequestration environmental impact assessment to improve the quality and completeness of review documents Establish a checkpoint mechanism to regularly review and control required data for carbon sequestration environmental impact assessment
	International cooperation on hydrogen co-firing and ammonia co-firing in thermal power plants is not progressing as expected	<ul style="list-style-type: none"> Set up a Net Zero Emissions Task Force in the Department of Generation and an MOU Task Force with Siemens AG to promptly communicate promoted issues and actively handle matters related to technical cooperation Track monthly business implementation of the introduction of ammonia co-firing technology
	Failure to reach the benchmark electricity carbon emission factor in the previous period	<ul style="list-style-type: none"> Convene a meeting of the Company's Carbon Emission Factor Benchmark Task Force and discuss with all relevant units the reduction of the electricity carbon emission factor. Continuously review the 2022 power purchase portfolio

Processes to Remediate Negative Impacts

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 7.2.2 Labor-Management Communication and Collective Bargaining for the key points.

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:



2.2.3 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 2021.

The Annual Inspection Plan identifies the risks of the units based on the implementation results of corporation-wide risk stated in the Taipower Risk Management Plan, the result of the previous inspection, and important recent business. The units being selected for patrol inspection were based on risk assessment results. The inspected items in 2021 included: internal control management and self-regulatory mechanisms, risk management, effect and efficiency of major operational target projects, information, communication and reporting, compliance with relevant laws and regulations, items required by the Board of Directors/Audit Committee/Inspection Office of the Board, and corrections or instructions from superior authorities.

In 2021, patrol inspections took place at 54 units. There were also an additional 15 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 2021 Annual Internal Control System Statements. Future improvements in internal auditing are proposed as follows.

(I) Assist in implementation of internal control audits and control of high-risk matters

- Assist the Business Division in promoting internal control audits, verify the risk issues of the Business Division or the issues valued by the CEO. Hold an annual internal control audit review meeting to share and exchange information.
- 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

- Assist in reviewing the Company's relevant outage prevention mechanism and establishing a special inspection to check the horizontal deployment of each related unit. Plan for intensifying management of high-risk issues through internal controls, and immediately initiate inspections and pandemic measures of control in response to confirmed cases in the headquarters building.
- In line with the Company's objectives of corporate transformation, energy transition, and digitalization, Taipower has developed review directions that focus on the five primary businesses of the company in 2021, namely organizational transformation, smart grids, project progress, industrial safety, and environmental protection. This will help to assist units in preventive management and enhance operational efficiency.

2.3 Integrity and Compliance

2.3.1 Ethical Management 102-11 102-16 103-2 103-3 205-1

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 Affairs' Guidelines for the Implementation of the National Integrity Building Action Plan in its planning and promotion of various ethics-related tasks. Taipower has also integrated these measures through a consensus on anti-corruption within the private sector, as the Company employs the highest integrity standards for itself.

Every year, Taipower sets up a plan for the integrity supervision 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 2021, a total of 61 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 2021, a total of 61 Taipower units visited local prosecutors or chief prosecutors in their districts. Taipower invited prosecutors to give 5 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 promulgated Precautions on Interactions between Taipower Procurement Personnel and Other Businesses. The precautions not only provide specific and feasible guidelines for interactions between procurement personnel and suppliers, but also protect 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.

The Ethics Conference Section



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 suppliers to prevent corruption. The training sessions held in 2021 included the publication of a monthly integrity e-newsletter, online training courses, bribery prosecutions for vendors, and the arrangement of 1-2 hour integrity promotion and on-the-job training courses (including training courses for supervisors at all levels).

Cases Investigated in 2021

There were 474 cases of ethical investigation closed in 2021. They were categorized according to the source of the cases, as shown in the figure below. Among them, the ratio of "anonymous reported" cases is still high at 33%. Nevertheless, as long as the content is specific with verifiable information, Taipower will properly handle it.



Cases in Which Employees Are Charged with Regulatory Violations

In 2021, there were three cases in which Taipower employees were prosecuted for allegedly violating corruption regulations. These cases were suspected of violating the Anti-Corruption Act. The causes of the cases were accepting bribes from contractors and fraudulent payment of forged documents. The above cases have been prosecuted by the district attorney's office and are under administrative litigation. In response to the above incidents, 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.

2.3.2 Compliance 205-3 307 419

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 the 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

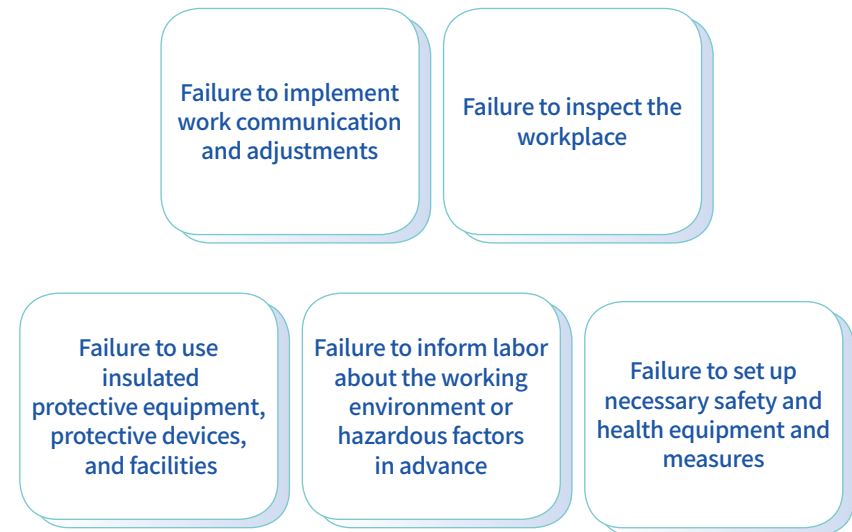
In 2020, three labor penalty cases occurred within the scope of this report (the cases were directly connected to Taipower rather than related legal entities). All three cases were associated with violations of the Labor Standards Act. Key points are as follows:

1. A penalty was imposed for failing to include a nightly fee in the average salary calculation of a retired employee. This resulted in a fine of NT\$300,000. The fine mainly resulted from a difference in the recognition of the scope of wages and extended working hours between Taipower and the labor authority. The payroll and overtime management of Taipower's employees are governed in compliance with the Administrative Law of State-Owned Enterprise and regulations of superior authorities. The Company has a single salary system and the scope of wages cannot be decided solely by the Company itself. In addition, overtime work must be managed in accordance with related management procedures. All preceding cases have been appealed in accordance with the legal administrative relief procedures. The appeals in two cases were dismissed and are under administrative litigation. The Company has reviewed the penalties and proposed response strategies to reaffirm the Company's position and practices.
2. The Company was fined NT\$20,000 for violating the labor law over days off. According to the law, employees shall have at least one regular day off every seven days. In this case,

the employee failed to report overtime attendance in advance. The unit recognized the employee's hard work and provided overtime remuneration afterward. Nonetheless, the Company failed to find out in time that the employee had been on duty continuously. In the future, the Company will strengthen measures associated with the relevant labor laws and regulations to avoid a recurrence of similar incidents.

Administrative Sanctions for Industrial Safety

Taipower received 18 penalties for industrial safety in 2021 and the types of cases are categorized as follows:



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 Violation of Safety and Health Regulations by Contractors of Taiwan Power Company Limited. 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.

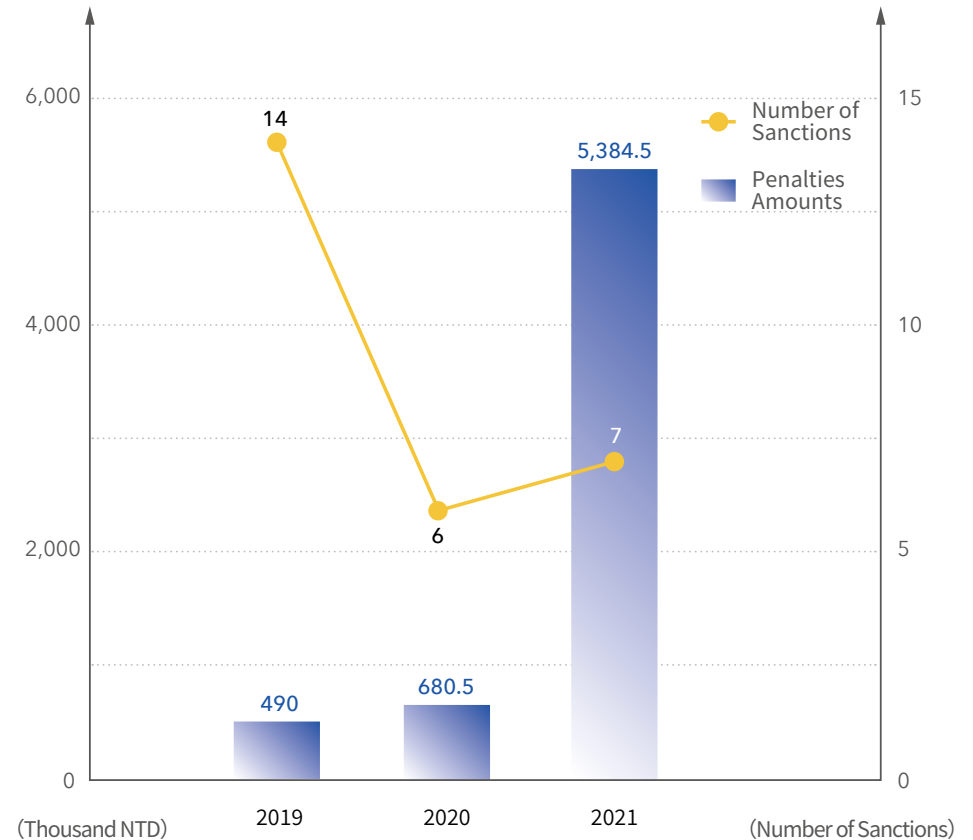
In 2021, Taipower continued to participate in the Ministry of Labor's Inter-ministerial Platform Conference on Disaster Reduction of State-owned Public Enterprises and the Ministry of Economic Affairs' Disaster Reduction Working Group. Taipower will continue to participate in quarterly conferences to 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 2021, a total of NT\$5,384,500 in environmental fines was imposed on Taipower. The number of penalties (excluding policy penalties) is increased in this year. The largest of the fines, at NT\$ 5 million, was imposed on Taichung Power Plant for a coal conveyor belt that caught fire and burned during the transportation of coal in the coal storage yard. The case was followed up, and preventative improvements were completed on July 21, 2021. 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 continued to effectively inhibit 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 on environmental protection for on-site operations without prior notice
- 
Annual discussions of cases of 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 continue to improve the operational processes that have failed to fulfill 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.



Note: The number of penalties in the table has excluded policy-related penalties. The statistics for the past three years are as follows:

In 2019, there were 17 policy-related fines and the amount of fines was NT\$105,089 thousand.

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.

2.4 Strengthening Supplier Management

As a state-owned enterprise, Taipower manages all types of suppliers based on 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.

2.4.1 Supplier Management 102-9 102-10

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 of 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:







CPC Corporation LNG Taichung Receiving Station

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 at suitable quality and quantity to ensure the safety and stability of the power supply. Detailed measures and actions are described below:

Energy Supply Diversification

- 
 - Supplied by CPC; Continual tracking of CPC's sources of supply
 - CPC has long-term contracts with sources in Malaysia, Indonesia, Qatar, Australia, Papua New Guinea, and the United States to achieve the goal of energy supply diversification
- 
 - Caps are set on coal originating from each single coal source country and single suppliers for long-term contracts
- 
 - Fuel oil is supplied by CPC Corporation
 - Diesel fuel is supplied by both CPC Corporation and Formosa Petrochemical Corp.
- 
 - Spread out nuclear fuel processing 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

- In 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 event 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 for the Hsieh-ho power plant is 120,000±40,000 kilobin, while the operating stock of the other power plants on the outlying islands is determined according to the supply and transmission conditions of each power plant
- 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
- All units at nuclear power plants require one batch of nuclear fuel components in inventory

Stable Coal Transportation

Taipower's coal carriers transported approximately 3.13 million tons of coal with a 10.89% shipping ratio in 2021. 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 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 Corp. (hereinafter referred to as CPC). Hence, Taipower is actively working with CPC to establish an even more complete contact mechanism to cope with the impact of the external environment on electricity supply. Taipower's natural gas expenditure reached \$131.8 billion in 2021.

Taipower will disperse its procurement of natural gas 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 Tonghsiao 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.



CPC Corporation LNG Taichung Receiving Station

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

Frequency	Means of Communication
Annually	<ul style="list-style-type: none"> 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. 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. Each year before the end of October, Taipower officially informs CPC of any revisions to its monthly estimates of total gas consumption.
Quarterly	<ul style="list-style-type: none"> Both parties take part in a quarterly supply coordination meeting to discuss relevant issues on LNG usage.
Monthly	<ul style="list-style-type: none"> Before the 25th of each month (N), Taipower sends a "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 letter. 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 following Taipower's requests.
Daily	<ul style="list-style-type: none"> CPC updates its LNG usage and inventory notice by no later than 10:30 a.m. every day (including holidays) through fax or email. 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. 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	<ul style="list-style-type: none"> 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. In addition, 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. Under the premise of conforming with environmental protection requirements, high-quality coal is provided to all coal-fired power plants.

2021		
Coal Expenditure (Billion)	82.078	
Coal Source	Total Procurement Quantities (Unit: Ten Thousand Tons)	Ratio (%)
Indonesia	1,222	43%
Australia	1,499	52%
Russia	92	3%
Colombia	54	2%
South Africa	8	0%

To reduce the cost of coal purchase, Taipower has improved the competitiveness of its bids by amending the procurement specifications, increasing the sources of bunker coal, and purchasing. In 2021, expenditures on coal reached \$82.078 billion. The coal that year was sourced from Indonesia, Australia, Russia, Colombia, South Africa, and other countries.

Fuel Supply

Taipower currently purchases fuel oil exclusively from CPC, but diesel from both CPC and the Formosa Petrochemical Corporation. Both contractors have 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 2021 reached \$18.1 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 2021, nuclear fuel expenses reached \$1.653 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 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 from design to services.

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, in 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 announced by the electricity industry's regulatory authority in 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 2021, Taipower has signed contracts with nine independent power producers (IPPs), 49 co-generation power providers, and has 42,788 contracts for renewable energy including solar power, wind power, hydropower, and others. A full 59.7kWh of electricity was purchased from external sources in 2021.



2.4.2 Creating a Sustainable Supply Chain

Review and Procurement Standards for Taipower Suppliers

Supplier Review Standards Pursuant to the Government Procurement Act

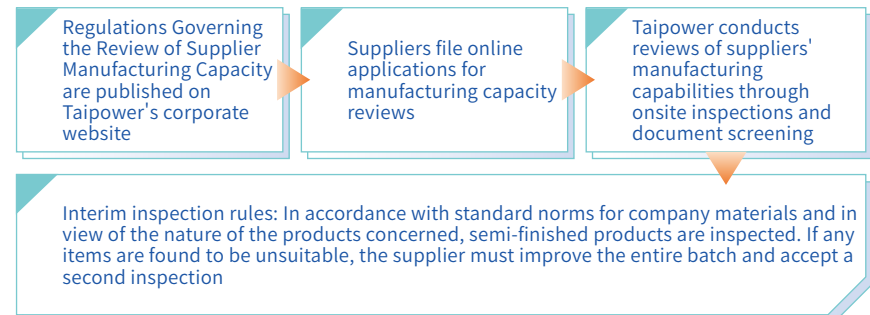
To ensure material quality, maintain power supply safety, and improve procurement efficiency, Taipower reviews the bidding documents of suppliers in keeping with the Government Procurement Act. If the Company has doubts about the contents of documents provided by suppliers that participate in bidding, it may notify the said suppliers and ask for further information. The procurement of electrical equipment (such as cables and gas-insulated switchgear, etc.) must also comply with pertinent government policies such as the Power Equipment Localization Policy. This essentially means that important components must be produced, assembled, or cut in domestic factories. Taipower evaluates supplier bids on this basis.

In 2021, Taipower received a total of 3,120 material procurement tenders from 1,118 domestic suppliers and 56 foreign suppliers, or a total of 1,174 suppliers. A total of approximately NT\$83.4 billion in tenders was awarded. Domestic tender awards totaled approximately NT\$73.8 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\$52.7 billion and accounted for approximately 63% of Taipower's total procurement of property. There were 77 contracted suppliers (the tender awards for items that fell under the purview of the localization policy came to approximately NT\$27 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\$30.7 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 General Principles of Reviewing Supplier Equipment Manufacturing Capacity in Selective Tendering 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's 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.

Supplier Evaluations and Audits

Taipower conducts supplier re-evaluation based on 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 2021, Taipower strengthened its auditing of material suppliers. Among 151 qualified suppliers in selective bidding, 29 were re-evaluated which accounted for 19%* (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 of re-evaluation). Among the 156 qualified selective tendering suppliers, 31 were chosen for re-assessment which accounted for 20% of the suppliers. All of the re-assessed suppliers met Taipower's requirements. In addition, the Company conducted inspections during the manufacturing process and on-site audits of suppliers a total of 434 times.

Note: In 2021, 29 supplier risk assessments were conducted, accounting for 19% of 151 selective bidding suppliers and 2.5% of 1,174 domestic and foreign suppliers (1,118 domestic and 56 foreign suppliers).

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.

To demonstrate its dedication to open and transparent information, as well as its rejection of the interference of illegal forces, Taipower held a public announcement event called "Public and Private All in Power Transparency" on October 19, 2021. The event was presided over by Taipower's acting Chairman Wei-Fuu Yang, along with Director-General Ming-Chian Cheng of the Agency Against Corruption, Chief Prosecutor Tai-Chao Hsing of the High Prosecutors Office, Chief Prosecutor Ban-Liang Lin of the Taipei District Prosecutors Office, Chief Prosecutor Hsiu-Tuan Yu of the Changhua District Prosecutors Office, Deputy Director Yi-Cun Huang of the Investigation Bureau, and other heads of the judiciary. The event invited suppliers and VIPs from across industries to attend. Taipower hopes these efforts will help ensure that its 2022 Ultra-high Calorific Value Bituminous Coal Spot and Phase 2 Offshore Wind Power - Wind Farm Property Procurement and Installation projects will be completed on schedule and with the required level of quality.

3

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 units 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

- Strengthen 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 2021, substation capacity had reached **16,035.98 KVA** (92.95%) and **1,799.54 circuit kilometers** (94.71%) of lines had been completed.
- In 2021, the total length of the underground transmission cable reached **4,639.6 circuit kilometers**.
- In 2021, Taipower's operational renewable capacity was **1,800 MW** for hydropower, **297 MW** for wind power, and **284 MW** for solar power.
- The gross thermal efficiency of all thermal power plants has increased year on year, from **46%** in 2020 to **46.1%** in 2021.
- In 2021, wind power generated **774.4 GWh** and solar power generated **408.8 GWh**.
- The progress of renewal, expansion and new thermal generating unit projects in 2021 was as follows: the Linkou Plant (99.22%), Phase 1 of the Tonghsiao Plant (99.85%), the Datan Plant (63.72%), the Hsinta Plant (38.97%), the Taichung Plant (10.83%).








3.1 Providing Quality Electricity Service

3.1.1 A Stable Power Supply and Generation System 103-2 103-3 203-2

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. For nuclear power plants, core management measures include analyzing and reviewing the operational weaknesses of each nuclear power plant, strengthening management of operations during overhauls, improving and renewing equipment, as well as reviewing unplanned events in the current year. As shown in the following table, the percentage of energy generated and purchased from renewable sources continues to increase, and the average availability of each plant generator remains stable.

Total Amount and Composition of Power Generation from 2019 - 2021

	2019		2020		2021	
	Billion kWh	Percentage	Billion kWh	Percentage	Billion kWh	Percentage
Net amount of power generated and purchased	232.5	100.0%	238.9	100.0%	248.8	100.0%
Amount of power generated	180.4	77.6%	183.9	77.0%	189.1	76.0%
 Pumped storage hydro	3.2	1.4%	3.1	1.3%	3.2	1.3%
 Thermal	140.6	60.5%	147.0	61.5%	155.2	62.4%
 Nuclear	31.1	13.4%	30.3	12.7%	26.8	10.8%
 Renewable energy	5.5	2.4%	3.4	1.4%	3.9	1.6%
Amount of purchased power	52	22.4%	55.1	23.0%	59.7	24.0%
 Privately-owned thermal	39.4	16.9%	40.6	17.0%	42.7	17.1%
 Renewable energy	8.5	3.7%	10.4	4.3%	11.9	4.8%
 Cogeneration	4.1	1.8%	4.1	1.7%	5.1	2.1%

Average Availability Rates for Power Plants from 2019-2021

Unit: %

Unit	Energy type	2019	2020	2021	
Thermal	Coal	82.65	86.82	89.12	
	Oil	93.83	87.01	92.74	
	LNG	73.70	95.51	82.33	
	Combined cycle	LNG	88.00	87.98	88.13
Hydro	Hydro	94.30	96.81	96.09	

Average Availability Rates for Nuclear Power Plants from 2019-2021

Unit: %

Year	NPP1		NPP2		NPP3	
	Reactor 1	Reactor 2	Reactor 1	Reactor 2	Reactor 1	Reactor 2
2019	(Note 1)	(Note 2)	100.00	88.03	87.38	97.11
2020	-	-	87.29	88.81	99.36	86.71
2021	-	-	50.43 (Note 3)	98.02	88.09	88.85




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

1. Reactor 1 of Nuclear Power Plant 1 (NPP1) entered the decommissioning stage on December 5, 2018, when its operating license expired.
2. The operating license for Reactor 2 of Nuclear Power Plant 1 (NPP1) expired on July 15, 2019, and remained in shut-down condition during the year.
3. Reactor 1 of Nuclear Power Plant 2 (NPP2) was originally scheduled to remain shut down from February 25, 2021 due to a full fuel pool until the expiration of its operating license on December 27. However, in order to maximize the supply efficiency of the nuclear fuel before decommissioning, the reactor's life was extended until July 2 in a decreasing power operation mode. It was shut down for maintenance until the expiration of the operating license on December 27. 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:

Power Dispatch and Reliability Management Mechanism

 Regular Review and Analysis	Execution method <ul style="list-style-type: none"> Conduct regular electromechanical system incident review meetings Conduct regular power dispatch system incident review meetings
	Execution status <ul style="list-style-type: none"> In 2021, 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. In 2021, power dispatch system incident review meetings were held every two months to ensure the normal operation of energy management system (EMS) related software/hardware and peripheral equipment and the safe and stable operation of power dispatching.
 Risk Management Implementation	Execution method <ul style="list-style-type: none"> 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. Also, relevant measures were formulated for tracking and control. Quarterly follow ups on reviews and execution. Conducted a general review at the end of the quarter and set future control objectives.
	Execution status <ul style="list-style-type: none"> On December 30, 2021, a review of the execution and effectiveness of the response to power shortages affecting system stability and safety for the fourth quarter of 2021 was conducted. On February 5, 2022, a meeting was held to review the execution responses to power shortages affecting system stability and safety in 2021. These meetings also conducted continuous adjustments and set control objectives for 2022.
 Personnel Training	Execution method <ul style="list-style-type: none"> 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 operation and quotations for business personnel. 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 <ul style="list-style-type: none"> 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 27 participants. Dispatchers who passed the examination after completing the training internship can participate in the dispatcher license examination. No dispatcher licenses were issued in 2021 due to the pandemic. Despite this, eight senior dispatchers and seven 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 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 of generators and substations in the area to resolve problems with overly concentrated units and lines at the Tashan Plant. This helps to avoid complete blackouts in the area should an electrical system outage occur.

Simultaneously, Taipower undertook planning to integrate the Penghu regional grid into the main island's through synchronization. A new primary substation project was completed in Penghu and the first 161kV transmission-grade submarine cable (Penghu-Beigang, Sihua Circuit No.2) in the country successfully connected the Taiwan system with the Penghu system at the end of October 2021. A second 161kV transmission-grade submarine cable (Penghu-Beigang, Sihua Circuit No.1) also joined the system in November 2021. The 161kV transmission-grade double circuit supply from Taiwan to Penghu makes power dispatching more flexible. In addition to improving the power supply stability in the Penghu area and reducing the use of local thermal power, it can also send the abundant renewables energy from the Penghu area back to the main island to strengthen broader grid stability.

Power Supply Reliability Results from 2019 to 2021

		2019		2020		2021	
		Target	Performance	Target	Performance	Target	Performance
The average duration of outages (minutes/household · year)	Work blackout	12.481	12.125	12.253	11.696	12.213	11.7324
	Outage blackout	4.619	4.363	4.547	4.235	4.487	48.1593
	Total	17.1	16.488	16.8	15.931	16.7	59.8917
The average number of outages (times/household · year)	Work blackout	0.064	0.059	0.064	0.059	0.064	0.0586
	Outage blackout	0.206	0.150	0.196	0.171	0.196	1.0381
	Total	0.270	0.209	0.260	0.230	0.26	1.0967

Note: Excluding 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).

Line Loss Rate from 2019 to 2021



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 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, Nanbu, Hsinta, NPP3, Mailiao, Jiahui and Fengde 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 Xinda Power Plant. The error results 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 (SOP), reviewing various preventive mechanisms, and completing the interface for construction, Taipower is refining the operation 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.

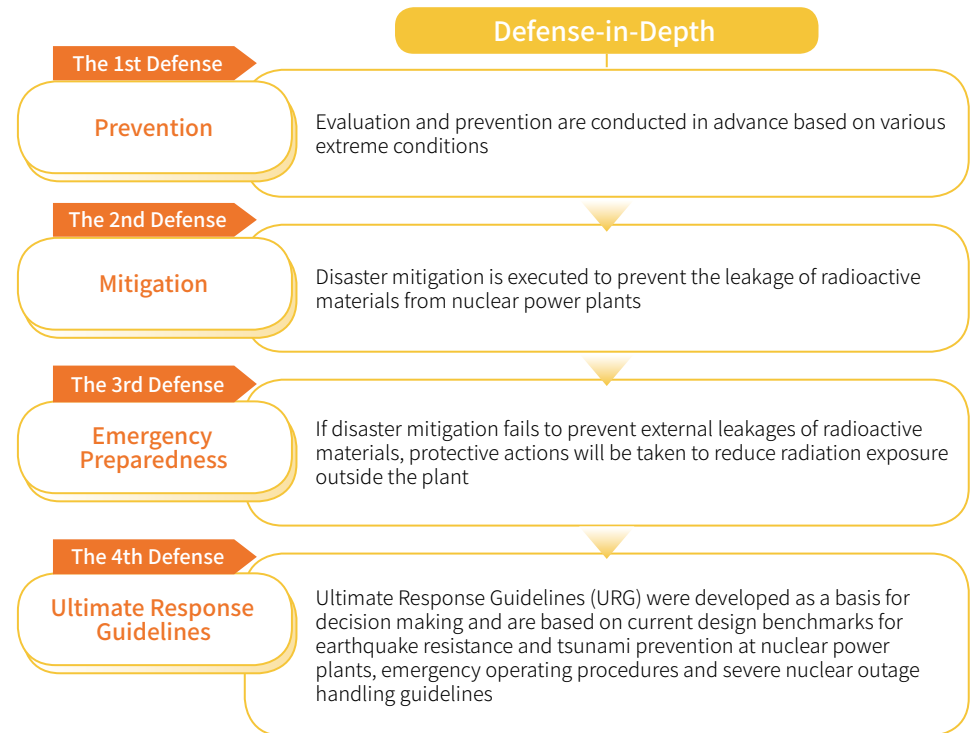
In terms of external response, Taipower's branch offices issue at least one local press release every day before, during, and after each typhoon to reinforce public awareness of disaster prevention and preparation. The Company has also established the Taipower 1911 customer service hotline, a power outage inquiry and notification system on the official website, and an "apply/repair" function on the Taiwan Power 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.

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.



Taipower has joined the Nuclear Procurement Issues Corporation (NUPIC) of the United States and regularly participates in meetings. This allows the Company to obtain audit information on purchase vendors for each nuclear power plant. It ensures 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 reports on the annual operation, 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	<ul style="list-style-type: none"> 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. 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	<ul style="list-style-type: none"> 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 and other units in turn to conduct one nuclear safety drill every year at each operating 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. In September 2021, Taipower held "Nuclear Safety Drill No. 27" at Nuclear Power Plant 1 (NPP1). Nuclear Power Plant 2 (NPP2) and Nuclear Power Plant 3 (NPP3) also conducted emergency response planning drills to for nuclear power plants in November and July respectively.
	Construct and implement emergency preparedness performance indicators	<ul style="list-style-type: none"> 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. <ol style="list-style-type: none"> Drill/drill performance. Participation in the drills of the emergency response organization. Reliability of the warning and notification system.
Response operations in case of outages	Take emergency measures	<ul style="list-style-type: none"> 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. In accordance with the Nuclear Emergency Response Act, nuclear accidents shall be properly classified according to the degree of possible impact, and response and notification provisions shall be formulated accordingly. Under the provisions of the Nuclear Accident Categories Notification and Response Measures, accidents are classified into the following three categories based on the degree of possible impact: <ol style="list-style-type: none"> Emergency Preparedness Alert: Upon the occurrence or possible occurrence of a significant safety deterioration of nuclear reactor facilities which does not yet require the implementation of a Nuclear Emergency Public Protective Action. Site Area Emergency: Upon the occurrence or possible occurrence of a significant failure of the safety function of the nuclear reactor facility which may require the implementation of a Nuclear Emergency Public Protective Action. Full-scale Emergency: Upon the occurrence or risk of a severe core deterioration or meltdown of the nuclear reactor facility and possible loss of containment integrity which requires the implementation of a Nuclear Emergency Public Protective Action. 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	<ul style="list-style-type: none"> 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. 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. Taipower is responsible for the recovery of the units within the plant. 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 organization that carries out recovery operations based on the plant's situation.

3.1.2 A Robust Transmission and Distribution System 203-1

In response to the planned energy transition, Taipower has vigorously promoted renewables. However, due to geographical limitations, solar and wind power generation are mostly concentrated in the central and southern regions. Moreover, with the development of the nation's high-tech industry, the power demand of the Science Parks in the country is increasing, and there is 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 and 265 service centers in Taiwan, Penghu, Kinmen, and Matsu. 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 construction 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 more than 99.99%. As of December 2021, Taipower has built 619 distribution-level substations and 10,138 feeders.

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 use electricity conveniently. Regular maintenance of related facilities is also an important part of a stable power supply. Taipower will continue to promote plans that increase the power grid's resilience, to replace old facilities and lines in order to reduce the line loss rate year by year as well and to maintain a high-quality supply of electricity.

Taipower's current performance indicators for power supply reliability are the System Average Interruption Duration Index (SAIDI) and the System Average Interruption Frequency Index (SAIFI). In May 2021, the 513 and 517 power outage incidents caused the SAIDI to increase to 59.8917 minutes/household, and the SAIFI to increase to 1.0967 times/household. If these two incidents are excluded, the SAIDI was 16.376 minutes/household, and the SAIFI was 0.2331 times/household.

Considering the expected global climate changes of the future, the unstable nature of renewables which is 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 reinforce various prevention and system improvement measures. Taipower will constantly strengthen line maintenance and equipment improvement to reduce outages and to ensure power supply quality. Additionally, as intermittent renewables, which may affect the system stability, are added to the grid, 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.

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.

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 allocated by the Department of System Operations. Branch offices are instructed to find improvements for lines and for anti-distortion of electricity 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. 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,

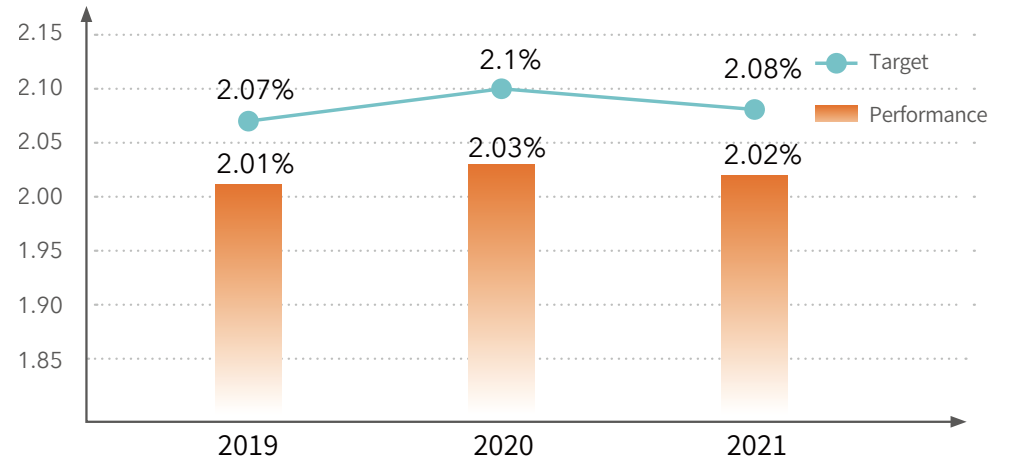
Taipower regularly organizes on-the-job education and training for maintenance personnel and dispatchers to advance professional skills and strengthen maintenance capabilities.

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.

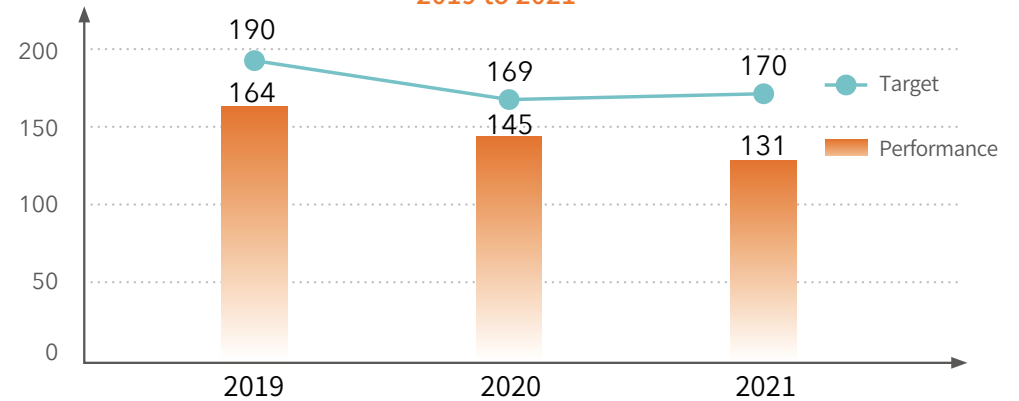
As Taiwan moves towards energy transition and a new generation of power supply systems, Taipower has accelerated the automation of its distribution feeders. This not only helps to improve the quality of the power supply but also enables fault detection. Through remote control of on-site automatic line 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 areas, vital metropolitan areas, and remote areas that are difficult to repair, with a penetration rate of about 78.6%. In the future, Taipower will continue to push forward and raise the target value of feeder construction, and is expecting to achieve full feeder automation by 2025.



Distribution Line Loss Rate from 2019 to 2021



Reduction of Feeder Lines with Currents Exceeding 300A from 2019 to 2021



Distribution Feeder Automation Installations from 2019 to 2021

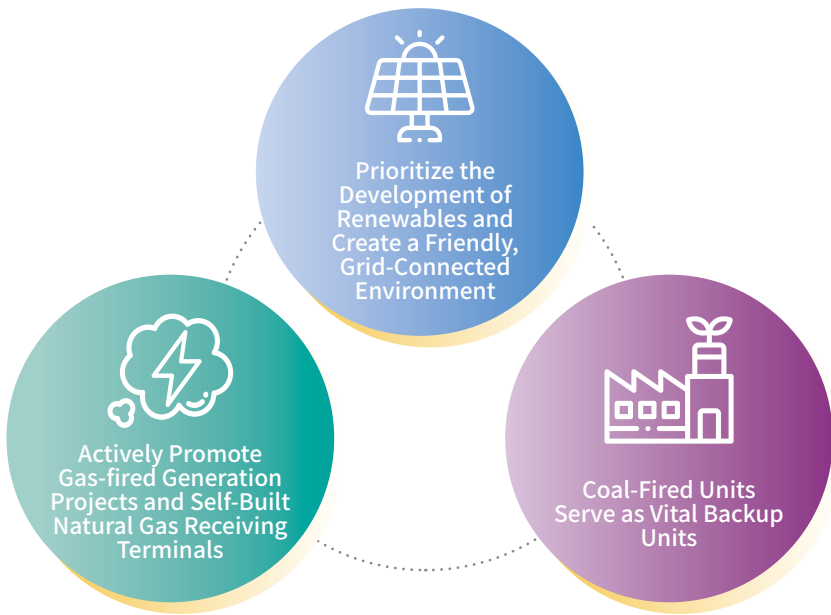
	2019	2020	2021
Feeder Automation	7,590 lines	7,815 lines	7,969 lines
Switch Automation	970 units	1,304 units	1,422 units

3.2 Planning for New Sources of Energy

3.2.1 The Transition to a New Generation of Energy 103-2 103-3 203-2 305-5

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 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 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 strengthen grid construction, create a friendly, grid-connected environment for private applications, and collaborate with the private sector to fully stimulate the development of renewables.

Actively Promote Gas-fired Generation Projects and Self-Built 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 plants with gas-fired generation. 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 Taichung Port and Keelung Port (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 the 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 13.5% in the Taipower system in 2021. The overall generation structure consisted of 42.5% gas-fired, 35.5% coal-fired, 10.8% nuclear energy, 1.6% fuel oil, 6.3% renewable, and 3.4% 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 not-in-my-backyard (NIMBY) sentiment and greenhouse gas emissions attracting intense attention from the general public, the promotion of plant construction is 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, etc.
- Review the feasibility of using aging units as emergency backups.
- Ensure the stable operation of existing units and that power generation units under construction remain on schedule.



Medium-Term Measures

Taipower continues to push forward with the replacement of its old plants with new thermal power plants. To facilitate the balance of power supply in Taiwan, improve generation efficiency, and coordinate 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 plans. The power plant renewal and expansion projects in 2021 were as follows:

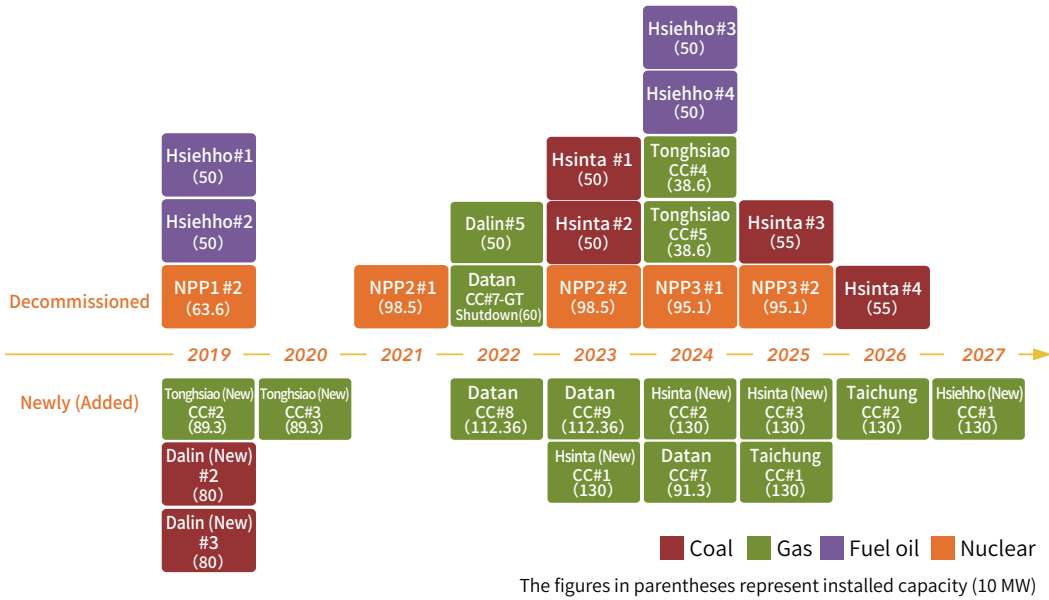
2021 Power Plant Renewal and Expansion Projects

Generation Category	Project Name	Project Capacity	Progress
 Hydropower Plant Construction Project	The Liyutan Reservoir of the Jingshan Hydropower Project	Installation of one vertical, Francis-turbine hydraulic generation unit with a capacity of 4,013 kW at the Liyutan Reservoir in Miaoli. The annual capacity of power generation will be 13.886 GWh	As of December 31, 2021, the project was 98.32% completed and was scheduled to begin commercial operation at the end of June 2022
	Hushan Reservoir Small Hydropower Project	It is estimated that the capacity will reach 1.935 MW and the annual generation will be 8.097 GWh	Scheduled for commercial operation at the end of June 2022
	Jiji Weirs South Connecting Channels Small Hydropower Project	It is estimated that the capacity will reach 3.510 MW, and the annual generation will be 16.89 GWh	Scheduled for commercial operation in July 2023
	Phase 1 of the Island-Wide Small Hydropower Project (7 projects)	The installation of one vertical axis Francis turbine generating unit at the crossover pipe of the stone waterway and 12 bulb turbine generating units at six plant sites, including connecting roads on the south bank of the Jiji River Dam for a total of 13 units with a total installed capacity of 16.553 MW and an annual generating capacity of 74.6 GWh	As of December 31, 2021, the project was 60% finished and is expected to be completed in June 2023
 Offshore Wind Power Plant Construction Project	Phase 1 of the Offshore Wind Power Project	Installation of a wind field with a total installed capacity of 109.2 MW and an annual generating capacity of 360 GWh	As of December 31, 2021, the project is 92.59% finished and commercialize after the renewal of the Electricity Power Generation license

Long-Term Power Development

Due to the growing power consumption and successive decommissioning of various units, Taipower has planned its long-term power development projects until 2027 in order to meet electricity needs and remain aligned with the government's energy transition policy and various environmental requirements. The plan is shown in the figure below:

Taipower's 2021 Power Planning Table



3.2.2 Renewables Development 103-2 103-3 203-1

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 renewables with connecting to the grid smoothly.



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

skills.

(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 2021, wind power generation reached 774.4 GWh and solar photovoltaic reached 408.8 GWh.

Renewables Generation Status

	Deployments	Installed Capacity (MW)	Generation in 2021 (GWh)	Number of Households Accommodated
 Wind Power	24 sites 189 units	406.24	774.4	215,117
 Solar Photovoltaics	52 sites	283.845	408.8	113,566

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 generation and researching and developing potential renewables. 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

Development Timeline	Government's Target		Taipower's Target	
	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 Photovoltaics	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	46.5029	3,107.4	7.2

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 R&D 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 has a long history at Taipower. By the end of 2021, the Company had an installed hydropower capacity of 2.09 GWh (including IPPs). As the government continues to promote renewables, Taipower plans to utilize existing water conservancy facilities such as reservoir weirs, irrigation channels, and hydropower plants to set up small environmentally friendly hydropower generating units that are simple in construction and low in cost. At present, the installation of small generating units at small hydropower plants such as Jingshan's Liyutan Reservoir, the Hushan Reservoir, the Shihmen Reservoir, and the Jiji Weirs are still under construction. Small hydropower generation is expected to reach 88 GWh in 2023 with a capacity of 20.566 MW.



Since 2000, Taipower has been dedicated to wind power development. By the end of 2021, the Company had completed the Zhongtun Wind Power Demonstration Project, Phases 1 to 4 of the Wind Power Generation Project, Penghu's Huxi Wind Power Project, and Kinmen's Jinsha Wind Power Project. There are currently 17 wind fields and 168 wind turbines in operation with a total installed capacity of approximately 297 MW. Phase 1 of the Offshore Wind Power Project is deploying 21 offshore wind power generators in the open sea off Fangyuan Township to effectively utilize the abundant wind energy in the Changhua County Sea area. The project has a total installed capacity of about 110 MW and an annual generation capacity of 362 GWh. It began commercial operation on December, 30 2021.



Phase 1 of the Solar Power Project was implemented in 2008. By the end of 2020, a total installed system capacity of approximately 283MW had been completed, including the Tainan Salt Field Photovoltaic Project which generates 150MW, the largest photovoltaic field in Taiwan. The planning for Phase 1 of the Green Energy Project was also launched in 2020. It is estimated that 110MW of solar power will be added within three years between 2022 and 2024.



In cooperation with CPC, Taipower is promoting the Yilan Renze Geothermal Generation Project with a capacity of 0.84MW. It is expected to be operating in 2023.

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 international technology and the latest 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 accumulation of capacity are as follows (as of March 10, 2022):

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

Case Status		Cases (Number)	Capacity (MW)
Accepted Cases	Under review and without approval (A)	4,220	8,354.37
	Approved but without a signed contract (B)	6,747	29,221.31
	Have signed a contract but haven't connected to the grid (C)	38,957	10,567.83
	Subtotal (=A+B+C)	58,858	48,143.51
Grid-Connected Cases		46,194	7,884.45
Official Power Purchase Cases		42,114	6,366.20

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 also 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 generation of facilities.

Average Availability Rates of Renewable Energy from 2019 to 2021

	2019	2020	2021
Availability rate of wind power (%)	92.19	93.03	92.61
Capacity factor of solar power (%)	13.85	16.02	16.44

Note: 1. Annual Wind Power Availability Rate = Unit Generating Hours (Including Standby Hours) / Annual Number of Hours
 2. Solar Power Capacity Factor = Annual Power Generation of Units / Device Capacity * Year-Round Hours

Countermeasures to 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 in a centralized deployment method to avoid wasting Taipower's investment. Meanwhile, Taipower continues to implement its distribution-grade power grid reinforcement project that will enable increased renewable grid-connection and promote short, medium, and long-term model plans:

- Short-term plan (within 1 year): Adjust the load of existing distribution lines, strengthen or add main transformer lines
- Mid-term plan (1 to 3 years): Continue to conduct the expansion of substations and new distribution lines
- Long-term plan (over 3 years): Construct new substations

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 to appropriately allocate the capacity of joint booster stations and accelerate renewable grid-connection.

To facilitate information disclosure, Taipower established a renewable application progress query system so that the public can make instant 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 renewable energy development projects such as wind, solar, geothermal, and small hydro, it is necessary for the Company to provide a friendly, grid-connection environment for private industry that is seeking to apply for green energy power generation equipment. These steps are facilitating Taipower's move towards actualizing the government's goal of 20% renewable energy by 2025.

4

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 R&D 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 policy short term (2020), the Company focused on enhancing operational flexibility, developing a stable power supply network with a high proportion of renewable energy, and strengthening the flexible dispatching capabilities of grid supply, demand, and outage. In the medium term (by 2025), the Company will be focused on reinforcing grid resilience and establishing a safe and highly adaptable grid in response to climate change. In the long term (by 2030), Taipower will have implemented reforms in the electricity industry, increased the use 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 2021, there had been more than **1.5 million** AMI installations encapsulating 72% of the nation's power use information. It is estimated that **7 million** AMI smart meters will be deployed by 2030.
- In 2021, the real-time monitorable capacity of renewables reached **3GW**.
- The deployment of **80.7 kilometers** of optical cables, **85 sets** of fiber optic communication systems, **1,225 communication circuits**, and **215 sets** of backbone (10G) routers was completed in 2021.

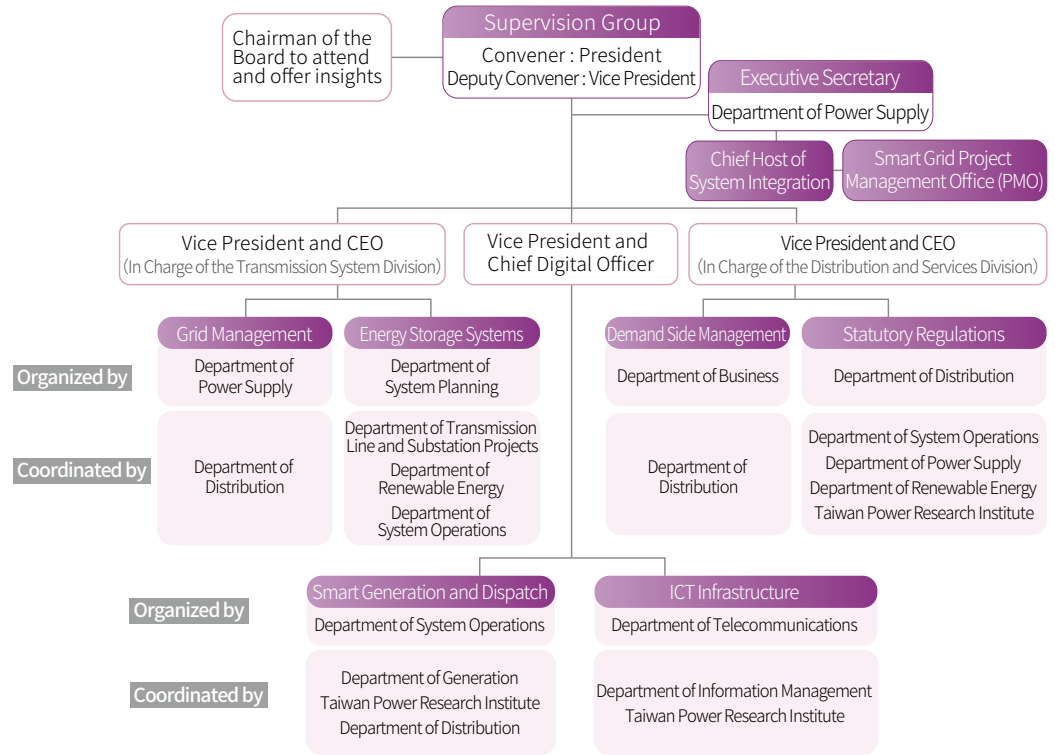
4.1 Smart Grid General Planning

103-2 103-3 203-2

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. The Company is committed to improving disaster prevention and troubleshooting capabilities while increasing the system's supply and demand performance, incorporating load management methods, enhancing user participation opportunities, and progressively building a stable and effective smart grid.

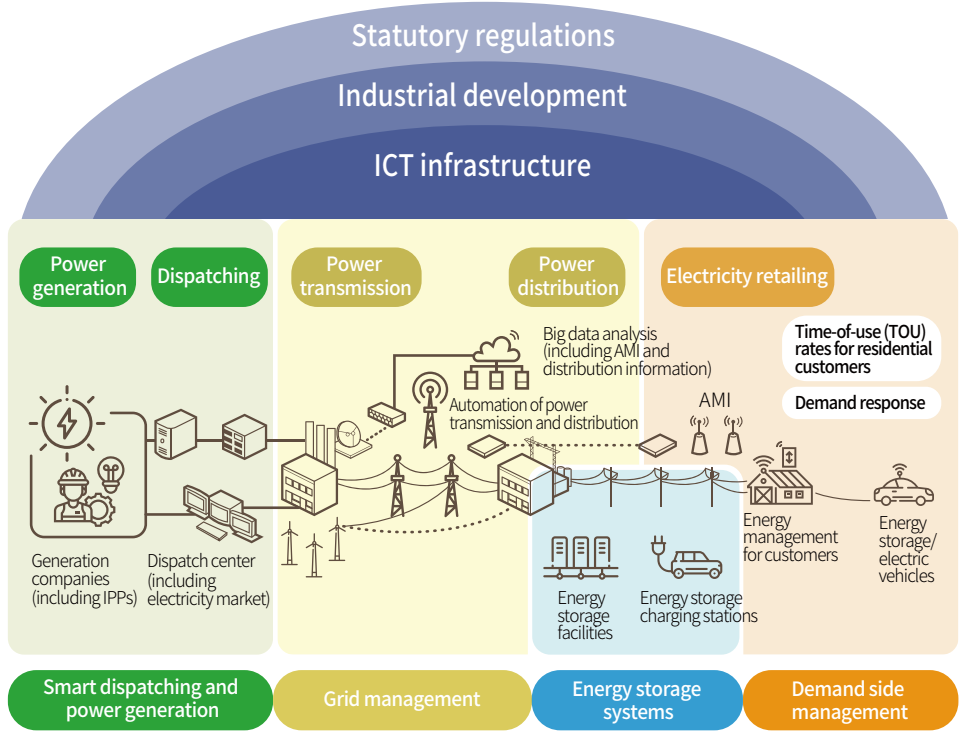
In developing the smart grid, the priority objectives are: (1) responding to the challenges of renewable energy grid connection, (2) strengthening the resilience of existing grids to enhance power supply quality in the face of extreme climates, and (3) encouraging user participation in energy conservation 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 to strengthen its energy management and grid resilience.



The Smart Grid General Planning Framework

Seven key strategic areas	Specific Practices (21 items)
Smart dispatching and power generation	<ul style="list-style-type: none"> Establish the renewable energy generation monitoring system Establish the energy trading platform Establish the big data damage monitoring system for the boiler tubes of coal-fired units Ancillary service demand research
Grid management	<ul style="list-style-type: none"> Application and promotion of transmission system data in planning, operation, and maintenance Application and promotion of feeder automation system data
Energy storage systems	<ul style="list-style-type: none"> Construction of an energy storage system at a Taipower site Establish an ancillary service procurement mechanism
Demand side management	<ul style="list-style-type: none"> Low voltage Automated Meter Infrastructure (AMI) AMI data application Review electricity price structure and run trials on dynamic prices Review and run trials on various demand response schemes
ICT infrastructure	<ul style="list-style-type: none"> Enhance security of the smart grid information program Smart grid data application plan Upgrade plan for backbone / regional fiber optics communication systems Introduction of an electrical IoT communication system to the plan
Industrial development	<ul style="list-style-type: none"> Expand product and system services Drive enterprises to participate in the electricity market
Statutory regulations	<ul style="list-style-type: none"> Review current electricity-related regulations Refine renewable generation system interconnection technology Develop national standards for smart grids and establish an equipment testing platform

Performance of Smart Grid in 2021

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

Smart dispatching and power generation

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 introducing a Distribution-level Renewable Energy Advanced Management System (DREAMS). The real-time monitoring capacity of renewable energy (GW) reached 3 GW in 2021.

Grid management

Plan, operate, and maintain transmission system data, and consolidate information to strengthen the management of power transmission and distribution assets. The ratio of power outage recoveries for downstream automated feeders (within five minutes) reached 45%.

Energy storage system

The target capacity of energy storage systems was achieved in 2021 and reached 57 MW.

Demand side management

Taipower is targeting potential power-saving users in its deployment of smart meters. By the end of 2021, a total of 29,621 high-voltage AMIs and 1,096,869 low-voltage AMIs had been installed. The meters now encapsulate 72% of the country's electricity consumption information.

ICT infrastructure

Completed the installation of 80.7 kilometers of optical cables, 85 optical fiber communication systems providing 773 communication circuits, and installing 215 sets of backbone (10G) routers in 2021.

Performance and Target of Smart Grid

Review Objectives	2021 Performance	2022 Target	
1. Real-time monitorable capacity of renewables (GW)	3 (Wind power 0.9; Solar photovoltaics 2.1)	7	
2. Accuracy of renewable forecasts (Day-ahead / hour-ahead error rate %)	Wind power	12.07% / 7.47%	13 / 6.5
	Solar photovoltaics	4.04% / 2.57%	12 / 6
3. Ancillary service reserve (MW)	Regulation reserve	800	1000
	Real-time reserve	1000	1100
	Supplemental reserve	1000	1100
4. Number of electrical and mechanical accidents (Times / year)	10	16	
5. Equivalent Unavailability Factor (EUF) of coal-fired power plants (Total hours of equivalent tube rupture outage)	0.27% (23.5 hours / unit / year)	Under 1.35% (under 118 hours / unit / year)	
6. Average time for transmission system equipment failure (Hours / year)	0.29	1.44	
7. The ratio (%) of power recovery outages for downstream automated feeders (within five minutes)	45%	35%	
8. Capacity of energy storage systems (MW)	57	102	
9. AMI smart meter infrastructure (cumulative number of households)	1,501,531 households	2 million households	
10. AMI user power use data available online for inquiry (hours)	6 hours ago	5 hours ago	
11. Participation in demand response scheme (GW)	2.68 GW	2.6 GW	
12. Bandwidth improvement of backbone / regional fiber optics system (Gbps)	Completed 215 sets of backbone (10G) routers	100Gbps backbone network optimization	
13. Introduction of IDS information security protection	Completed performance evaluation of intrusion detection system in 3 domains	Promote experimental sites (8 domains)	

4.2 Smart Grid Application - Vehicle-to-Grid Bi-directional Charging System

103-2 103-3

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

There are more than 500,000 electric vehicles in Taiwan. Giving these vehicles the capacity to transmit electricity back to the grid when needed for emergency dispatching, would essentially allow Taiwan's electric vehicles to act as an emergency energy storage system. This would provide a tremendous boost to the transition. Taipower and electric scooter maker and battery swapping system provider Gogoro have officially announced the new technology concept is possible and will offer bidirectional charging through Gogoro's battery swapping stations.

On October 26, 2021, Taipower held a Taipower X Gogoro Battery Exchange Station Vehicle-to-Grid (hereinafter referred as V2G) Technology Presentation, where then-Taipower Chairman Wei-Fuu Yang, and Gogoro Founder, Chairman and CEO Horace Luke witnessed the world's first battery exchange station for electric scooters with V2G abilities. In addition to demonstrating a bi-directional charging and discharging function, Taipower also debuted its self-developed energy management system (EMS).

In response to the continuous growth of domestic electricity demand, Taipower has developed multiple sources of electricity. But the Company has also thought beyond the existing mindset of simply building power plants by integrating smart grids and energy storage systems to strengthen demand management. Taiwan has experienced a substantial growth in electric vehicles. Statistics from the Ministry of Transportation and Communications indicate that the number of registered electric vehicles had reach nearly 530,000 by the end of September 2021. In addition to providing the electricity required for driving, Taipower has further validated the V2G technology by utilizing the battery storage characteristics of the vehicles, allowing electric vehicles to become energy storage.

In 2019, Taipower started a "Research on Electric Carriers, Charging and Exchange Stations to Provide Auxiliary Services to the Grid" project using the Shulin Site of the Taiwan Power Research Institute as a development base. Last year, Taipower completed its verification by transmitting the electricity from vehicles to the grid and an automatic frequency modulation ancillary service function. By the end of 2021, the Company had launched two V2G electric vehicle smart charging demonstration sites.

Meanwhile, Taipower also worked with Gogoro to build the world's first electric scooter V2G battery exchange station. In the future, apart from meeting the demand from electric scooters, battery exchange stations are expected to transform into decentralized energy storage stations throughout the country, thus playing the role of "virtual power plants" to help strengthen grid stability and create smart cities.

5

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.

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, and same-day economic dispatch to provide flexible adjustments in power system dispatching. The demand response participation target in 2021 was 2.55GW and is expected to reach 3.0GW by 2030.

Performance Highlights

- Implemented Time-of-Use (TOU) rates to stimulate the management of people's power consumption, cumulatively suppressing the peak load by **4.11 GW** in 2021
- Promoted demand bidding and bolstered user participation to suppress peak loads and the implementation of demand-response load management measures on the highest load days throughout 2021 and effectively reducing peak loads by **1.07 GW**
- Provided communities and associations with power-saving advocacy services. A total of **1,460 sessions** were held in 2021, attracting **170,000 participants**
- Taipower's Power-Saving Service Team visited **4,231 customers** in 2021, with an estimated power saving of **99.92 GWh**
- In 2021, Taipower's 1911 customer service hotline received more than **2.004 million** calls. The proportion of calls that were answered within 20 seconds was **95.40%**
- In 2021, a total of **5,133** dedicated services were provided for corporate customers

5.1 Smart Electricity Service

5.1.1 Demand Side Management Measures 103-2 103-3 203-2

In recent years, the demand for electricity in Taiwan has been growing. Coupled with the difficulty of setting up new power 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. Taipower's current approach entails pursuing both demand response and energy conservation as two key elements of demand side management. This includes implementing various demand response load management measures, stimulating multiple time tariffs, adjusting and piloting new Time-of-Use (TOU) rates, organizing power saving incentives and holding assorted power saving promotions to guide customers to manage their electricity consumption. It is hoped that by creating an atmosphere of power saving, Taipower will be able to drive the collective effects of national power saving, making energy saving and the suppression of peak loads a national movement. This will lead to a win-win situation for the power industry, customers, and the environment.

Demand-Based Bidding

Since 2015, Taipower has promoted feedback pricing, which determines rates as customers voluntarily reduce their electricity consumption, and demand bidding, which takes place during the peak period of summer power consumption. If customers reduce their electricity consumption after winning a bid, the saved electricity can be sold back to Taipower according to the quoted price. Taipower's demand bidding scheme is diversified, using various pricing mechanisms to provide incentives and give users autonomy. The approach guides users to change their electricity consumption habits and help achieve a stable power supply. 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 12 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.

Time-of-Use (TOU) Rates User Ratio

Power Consumption Category	Total Customers (Households)	TOU Customers (Households)	Ratio (%)
Meter-rated lighting for non-business	13,204,434	47,295	0.36
Meter-rated lighting for business	1,034,448	118,742	11.48
Low-voltage electricity	301,722	36,128	11.97
High-voltage electricity	24,686	24,686	100.00
Ultra-high-voltage electricity	661	661	100.00
Total	14,565,951	227,512	1.56

Note: Except for contracted light and contracted power being 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

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-business	Residences
		Electricity for business	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 1 kW but less than 100 kW. In cases where the power supply is 380V with no technical difficulties, the capacity can be expanded to 499 kW	Medium-sized agencies, schools, supermarkets, medium-sized shopping malls, small and medium-sized factories
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 100 kW	Large-sized factories, agencies, schools, banks, department stores
	Ultra-high voltage electricity		Mega factories, MRT, airports

In line with the deployment and application of smart meters, Taipower launched simplified residential/commercial TOU rates in 2016 and new, standard three-stage TOU rates for meter-rated lighting and low-voltage electricity on May 1, 2021 to provide customers with multiple options. In response to the increase in renewable generation, the peak and off-peak hour tariffs were adjusted to meet the system needs, Taipower launched a Trial Tariff Program for Time Slot Adjusted TOU rates in October 2021. In the future, Taipower will continue to develop diversified tariffs and demand response schemes in conjunction with the deployment of smart meters. The Company will integrate smart home appliances and energy management systems, in order to manage customers' power consumption more flexibly with price signals and increase load management efficiency.

Demand Side Management Measures

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 at peak hours	Optional for meter-rated lighting and low-voltage customers; applicable to all high-voltage customers	The cumulatively suppressed peak load reached 4.11 GW in 2021
	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			
	Launched a "Trial Tariff Program for Time Slot Adjusted TOU rates" that will run from October 2021 to September 2022	A new tariff scheme for peak and off-peak hours to help cope with system needs. Peak hours are adjusted from 10 - 12 and 13 - 17 to 16 - 22 hours. Half and off-peak hours are also changed	TOU rate customers	
Demand Response Load Management Measures	Implemented Air Conditioner Duty Cycling Load Control Measures in 1991	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)	Daily peak load reduced by 1.07 GW on the peak load day of 2021
	Implemented Power Consumption Reduction Measures in 1987	Provides reduced rates as incentives to encourage customers to reduce electricity consumption during peak hours or shift to off-peak hours, to reduce system peak loads	Either (super) high-voltage customers of more than 100 kW of 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 attain their power-consumption mitigation potential and improve system loads. This mitigates the demand for new power development and reduces the risk of power shortages	Above High-voltage frequent power users	
	Implemented new Demand-Based Bidding Measures - Joint Solution in 2017	Allows customers to apply for Demand-Based Bidding in groups	Above High-voltage frequent power users	
	Implemented "emergency response measures" and "pact-guarantees" in 2021	In line with load reduction in cases of emergency the system improves demand-side resilience	Above High-voltage frequent power users	
	Implemented "flexible night reductions" from 2022	Offers flexible suppression options for different hours during night peak periods to encourage users to reduce power consumption	Above High-voltage frequent power users	
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	Above High-voltage users	Taipower's Power-Saving Service Team visited 4,231 users in 2021, with an estimated power saving potential of 99.92 GWh
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, associations	A total of 1,460 seminars were organized in 2021, with approximately 170,000 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 over the 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 app 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 within 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. Taipower will also operate through diversified marketing channels to highlight topics and increase the exposure and popularity of the activities that enhance public awareness of power-saving.



Power Savings Reward Performance in 2021

Year	Amount of saved electricity (billion kWh)	Reward amount for saving electricity (NT\$100 million)	Carbon dioxide emission reduction (10,000 metric tons)	Equivalent number of Daan Forest Parks (for CO ₂ absorption capacity) in one year
2019	1.43	11.7	76	2,062
2020	1.19	10.3	61	1,638
2021	1.49	11.8	75	1,924

Note: 1. The calculation of electricity consumption reduction for the current year is based on the previous year, which is also the base 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 (3.34 million customers in 2018, 3.95 million customers in 2019, and 4.22 million customers in 2020, and 4.34 million customers in 2021).






3. Based on the nation's 2019 electricity emission coefficient of 509 grams CO₂e/kWh as announced by the Bureau of Energy, Ministry of Economic Affairs in June 2020 and the Bureau of Energy's 2020 report that the absorption capacity of one Daan Forest Park is 389 metric tons of CO₂ per year.






5.2 Stakeholder Communication

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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 those suggestions into management measures or operational behavior optimization projects in order to respond to stakeholders' appeals and expectations.

Stakeholders	Main Concerns	Frequency and Method of Engagement	2021 Engagement Performance	Related Action
 Board of Directors	<ul style="list-style-type: none"> Transforming into a power utility group Corporate governance and sustainable development 	<ul style="list-style-type: none"> One regular Board and Functional Review Committee meeting per month At least one Audit Committee meeting per quarter Continuing education for directors (including independent directors) Annual Board performance evaluations 	<ul style="list-style-type: none"> Held 15 Board meetings, six Investment and Business Plan Review Committee meetings, and seven Land Management Review Committee meetings Held six Audit Committee meetings Professional training in corporate governance for directors (including independent directors) totaled 210 hours The 2021 performance evaluation was carried out as per the "Performance Evaluation Guidelines for Boards of Directors," and the evaluation results have been disclosed on Taipower's official website Highlight reports on Taipower's transition status 	<ul style="list-style-type: none"> Regularly reported to the Board of Directors on progress highlights Conducted timely reporting on projects
 Shareholders	<ul style="list-style-type: none"> Corporate governance and sustainable development Management and financial performance Technology R&D and innovation 	<ul style="list-style-type: none"> Shareholders' meetings Taipower's official website and Market Observation Post System (MOPS) 	<ul style="list-style-type: none"> Regular shareholders' meetings Market Observation Post System (MOPS) Taipower's official website Corporate Governance / Shareholder's Area 	<ul style="list-style-type: none"> Communicate status with shareholders through the minutes of the regular shareholders' meeting
 Employees	<ul style="list-style-type: none"> Transforming into a power utility group Corporate governance and sustainable development Worker health and safety 	<ul style="list-style-type: none"> On-the-job training Labor-management meetings Keynote speeches, symposiums Communication briefings on organizational transformation 	<ul style="list-style-type: none"> On-the-job training at the Training Institute, training organized by each unit, and external training for a total of 69,938 participants Held seven labor-management meetings Organized five keynote speeches 	<ul style="list-style-type: none"> Organized corporate-level labor-management meetings and labor-management communication seminars for each system Collected proposals from union member representatives or branch directors and implemented them after discussion and resolution at meetings
 Partners	<ul style="list-style-type: none"> Renewable and clean energy development Worker health and safety Climate change and the low-carbon strategy 	<ul style="list-style-type: none"> Periodic consultation meetings 	<ul style="list-style-type: none"> Preliminary discussions on contract renewals with five IPPs 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Stability and reliability of the power supply Accessibility and affordability of electricity Renewable and clean energy development Power plant renewal and decommissioning 	<ul style="list-style-type: none"> Official documents Submission of various work schedules Continuous communication on projects and participation in meetings as required by competent authorities 	<ul style="list-style-type: none"> Important motions of the monthly Board meeting were submitted to the competent authority in advance The minutes of monthly Board meetings were submitted to the competent authority 	<ul style="list-style-type: none"> Provided relevant information and attended review meetings in accordance with government regulations and requirements

Stakeholders	Main Concerns	Frequency and Method of Engagement	2021 Engagement Performance	Related Action
 <p>Elected Representatives</p>	<ul style="list-style-type: none"> Climate change and the low-carbon strategy Air quality Renewable and clean energy development Power plant renewal and decommissioning 	<ul style="list-style-type: none"> Attendance at committee meetings of the Legislative Yuan as a non-voting participant Coordination meetings and public hearings Provide relevant explanatory information on the corporate business Take the initiative to visit legislators 	<ul style="list-style-type: none"> Executives at the level of Vice President or above attended 60 sessions at the Legislative Yuan as non-voting participants 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 841 times throughout the year Executives at the level of Vice President or above had a total of 141 communication sessions with legislators throughout the year 	<ul style="list-style-type: none"> Arranged senior executive visits to elected representatives to explain important business Actively responded to elected representatives' queries and provided written information in due course Attended public hearings and coordination meetings to explain the implementation of the Company's business
 <p>Media</p>	<ul style="list-style-type: none"> Transforming into a power utility group Renewable and clean energy development Environmental impact management Stability and reliability of the power supply Air quality 	<ul style="list-style-type: none"> Press releases Printed media Public hearings / Explanatory meetings On-site visits / Commissioner visits Taipower's official website Market Observation Post System (MOPS) 	<ul style="list-style-type: none"> Published a total of 100 press releases and 35 instant explanations on issues related to air quality improvement, power supply and demand, 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 	<ul style="list-style-type: none"> Offered complete press information proactively for media coverage (on the implementation of renewable energy, power saving measures, preservation of cultural power assets, and recruitment of new personnel) regarding the company's important business strategies and external concerns. Demonstrated the company's specific actions in response to government policies and social expectations Implemented the spokesperson system, promptly responded to the public's concerns on livelihood issues, and publicized Taipower's important policies 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 Arranged media interviews on diverse issues
 <p>Non-Governmental Organizations</p>	<ul style="list-style-type: none"> Air quality Energy efficiency Power plant decommissioning and renewal 	<ul style="list-style-type: none"> Briefing sessions Proactive visits Participation in relevant forums and activities Taipower's official website Taipower publications 	<ul style="list-style-type: none"> Meetings according to project needs Publication of the Monthly Journal of Taipower Disclosed the latest corporate information on Taipower's official website 	<ul style="list-style-type: none"> Visited non-governmental organizations based on the project needs to gain insight into social feelings and public needs and harmonized the interaction of stakeholders. Published the Taipower Journal, targeting government agencies, business-related units, Taipower employees (including retirees), colleges and universities, etc.
 <p>Customers</p>	<ul style="list-style-type: none"> Information security and customer privacy Demand-side management and energy conservation 	<ul style="list-style-type: none"> Customer comment box Specialist visits Occasional newsletters 	<ul style="list-style-type: none"> The customer comment box received 5,492 letters in 2021 Conducted advocacy to promote the usage of high-efficiency electrical appliances and power conservation techniques. A total of 1,460 meetings were held in 2021, with about 170,000 participants Organized a series of power-saving activities over nine consecutive years The Power-Saving Service Teams visited 4,231 customers in 2021, with an estimated power saving potential of 99.92 GWh 	<ul style="list-style-type: none"> Conducted power conservation advocacy. Set the number of promotional sessions per year, and each branch office was responsible for implementation Advocated the usage of high-efficiency electrical appliances and power conservation techniques, to convey power-saving knowledge to users Organized a series of power-saving activities Power-Saving Service Teams visited customers. The number of customers to be visited is set annually, and each branch office is responsible for conducting an inventory of potential energy savings and promoting demand response measures in order to achieve benefits from visits
 <p>Residents / The General Public</p>	<ul style="list-style-type: none"> Accessibility and affordability of electricity Environmental impact management Corporate governance and sustainable development Transforming into a power utility group 	<ul style="list-style-type: none"> The Taipower Fan Page on Facebook Public information on the official website 	<ul style="list-style-type: none"> The Facebook fan page had more than 30 million views in 2021 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 Disclosed financial information and corporate governance status in the "Corporate Governance Section" 	<ul style="list-style-type: none"> The Taipower Fan Page on Facebook promoted topics such as electricity knowledge, power safety, power saving, and other electricity-related content for daily life, as well as information on the latest convenient services and activities

Material External Communication Policy

Media Communication

Taipower proactively releases complete press information packages of 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 the communication front line of public concern, policy direction, and planning. Taipower has been actively responding to the requirements of legislators' political questioning 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 situations.

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.

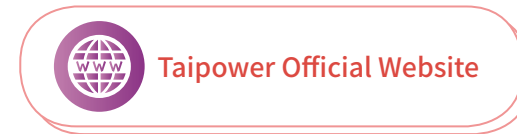
Participating in External Associations

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 2021, The Company engaged with 26 international organizations, 72 academic organizations, and 25 professional organizations for a total of 123 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 safety and health.

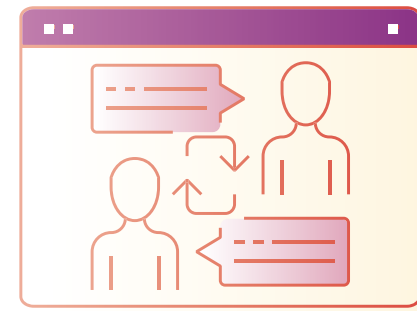
5.3 Customer Service and Management

5.3.1 Diverse Channels for Engagement and Communication 103-2 103-3

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.



In order to increase public awareness of the electric 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. Taipower has also added new sections for net-zero electricity emissions and 2021 COVID-19 relief to facilitate two-way communication with the public.





Taipower TV - YouTube Channel

Since its establishment on May 1, 2013, Taipower TV has accumulated more than 7.58 million views. In recent years, Taipower has been producing online videos for different target audiences. From planning, shooting, editing, post-production and shelving, to marketing, Taipower is able to produce its online videos without outsourcing. Through video series, such as "A-Liang Looking for Experts," "Primary School Power," and "One Minute to Understand the Key Point," Taipower is able to transform electricity knowledge that is considered rigid into amusing information that is easier to understand. The "Power Talk" series invites renowned experts and scholars from Taiwan to provide in-depth analysis of the power industry and energy trends. Topics covers energy transition, renewables, electric vehicles, and smart grids. This gives the public an in-depth understanding of power issues and strengthens online communication.



The Taipower Fan Page on Facebook

The Taipower Fan Page on Facebook currently has over 240,000 followers and has had more than 30 million views as of 2021. The themes of the posts include electricity knowledge, power saving, power safety, convenience measures, activities, etc. In addition, through this visual approach, Taipower hopes the public will recognize its efforts in stabilizing the power supply and reducing coal and emissions at the Taichung Thermal Power Plant 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.



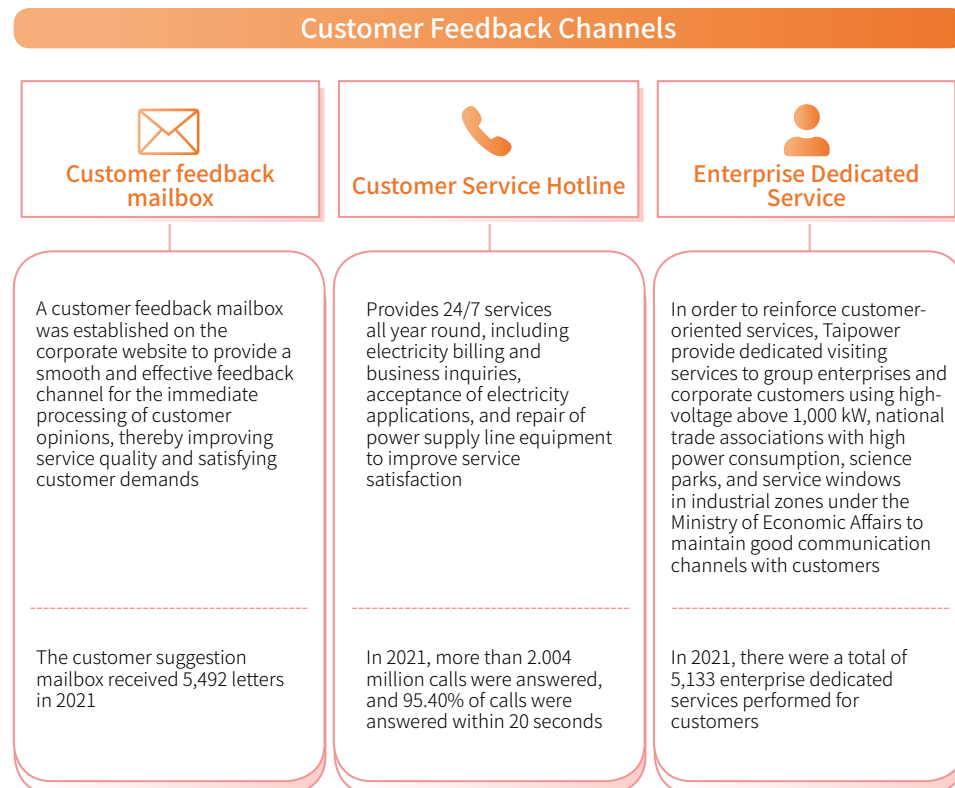
User Communication and Management

Through the Medium of 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.

Online Feedback Channel

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 Satisfaction

In 2021, 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. In recent years, customer satisfaction has consistently been maintained at over 90%. The results indicate that the quality of Taipower's services is being recognized by its customers.



Note: 1. In 2020, the State-owned Enterprises Commission incorporated a weighting concept into its satisfaction scoring method. The conversion resulted in a decrease in scores when compared with 2019.
 2. In May 2021, two power outages occurred throughout Taiwan. The implementation of regional rotating emergency power restrictions caused inconvenience to customers and resulted in a decrease in satisfaction scores.

The result of the 2021 customer satisfaction survey was a score of 93, a significant decline in satisfaction with the stability of the power supply in the past year. It is assumed that this is principally the result of the power outages on May 13 and May 17 that caused rotating power interruptions in all regions of Taiwan. 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 the 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.

5.3.2 Guarding Information Security 103-2 103-3 418-1

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 electricity cut off 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 confidentiality 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 over the course of business execution. Take branch offices as an example. In consideration of both legal requirements and the need for convenient services, customers must cooperate with their local branch office by providing identity verification and presenting documents when making inquiries or printing electricity consumption. This remains true whether business is conducted in person, by proxy and through a service counter, telephone (or fax), internet, or through another channel.

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 2021, 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. Taipower will continue to require each branch office to properly manage customer information and conduct regular audits as well as reviews of relevant processes. In the medium and long term, Taipower will continue to optimize its customer-related application systems, work towards robust system cyber security protection, reduce paper-based documentation to lower the risk of accidental document leakage, and implement the management of protecting customer personal information.

Information Security Plan

"Information and communication infrastructure" is one of the areas of concern for Taipower's smart grid development. 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.

- 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 as appropriate protective measures shall be implemented accordingly.
- The collection, processing, and utilization of personal information shall comply with the provisions of the "Personal Information Protection Act."
- 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.

- 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 operation.
- All employees shall be fully aware of the purpose of the cyber security policy and their responsibilities under it.
- The effectiveness of the information security management system shall be reviewed regularly.
- 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 Project and Achievement

Management Aspect	Management Performance Project	2021 Achievement
 Information Security	<ul style="list-style-type: none"> • Information security policy documents approved and released by management shall be communicated to all employees • Assets shall be classified • Vulnerability assessment will be conducted on host computers quarterly and improvement records will be tracked • The use of information and communication products from Mainland China is prohibited to reduce information security risks • Vulnerabilities shall be patched and updated regularly • The core information and communication system shall conduct a business continuity drill once a year • Social engineering drills shall be conducted twice a year • All core information and communication systems shall undergo a penetration test once a year • In the event of an information security incident, the "Cyber Security Incident Notification and Response Management Procedures" shall be followed 	<p>After review, the results for 2021 were normal, and there were no violations of laws or regulations</p>
 Customer Privacy Information	<ul style="list-style-type: none"> • The director and deputy director of the unit or interdepartmental organization shall be designated as responsible for advancing information security matters, 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 • 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 • 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 • Personnel with access to confidential or sensitive information shall be decentralized and rotated • The identification codes, access codes and permissions of transferred, departed or retired personnel shall be canceled immediately • Confidential information shall be handled in physical isolation 	<p>After review, the results for 2021 were normal, and there was no violations of laws or regulations</p>

6

Agent of Environmental Friendliness



◆ Development Vision

Business operations inevitably have an impact on the environment. 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 to pursue cleaner energy and a low-carbon transformation. The Company will continue to work with society and enterprises to seek more energy-efficient and eco-efficiency 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 the environmental impacts of various power facilities and work earnestly to live up to its commitment to environmental friendliness.

◆ Performance Highlights

- In 2021, the capital expenditure on environmental protection was approximately **NT\$4.217 billion**. Recurring expenses associated with environmental protection were about **NT\$3.688 billion**.
- In 2021, the reuse rate for coal ash production and desulfurized gypsum were **86.2%** and **98.6%** respectively.
- In 2021, Taiwan's power plant loads were voluntarily and autonomously reduced **1,200 times**.
- In 2021, the **energy management systems** of the Linkou and Talin Plants were certified by external verification.
- System demonstration sites for climate risk assessment were completed for generation, transmission and distribution units.
- One **power facility ecological integration project** was completed in accordance with 2021's Environmental White Paper.
- Approximately **1.2 million** fish fry were released into the sea near power plants and offshore wind facilities in 2021.

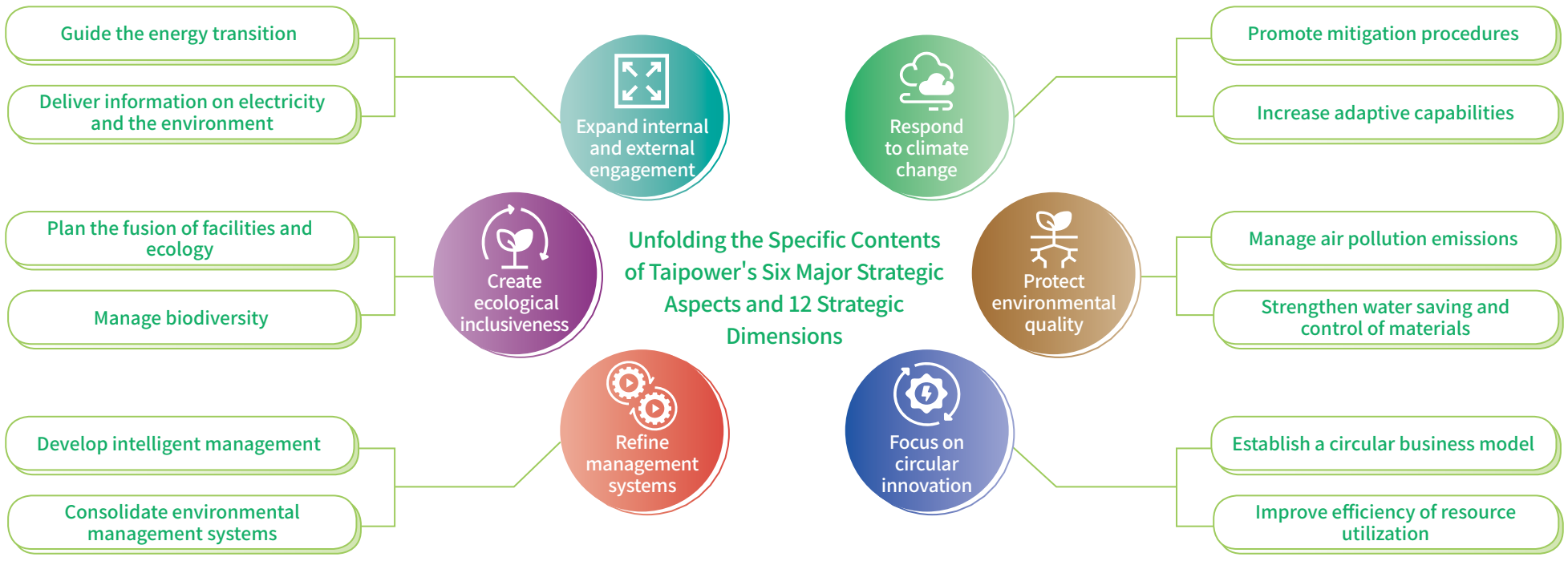
6.1 Strengthening Environmental Management

6.1.1 Environmental Policy and Goals 307

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 responds 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 a 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. It also presents a blueprint for environmental sustainability until 2030.







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.



Environmental Sustainability Strategy Refinement

Taipower conducts a range of activities that are both environmentally friendly and neighborly. These include beach cleaning, 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	2021 goal (Short-term goal)	Achievements in 2021	2022 goal	Medium-term goal (by 2025)	Long-term goal (by 2030)
 Respond to climate change	Promote mitigation procedures	Net emission intensity of thermal power units (greenhouse gas) will be reduced by 7% as compared to 2016 levels	Net emission intensity of thermal power units has been reduced by 6.3% as compared to 2016 levels ¹	Net emission intensity of thermal power units will be reduced by 7% as compared to 2016 levels	Net emission intensity of thermal power units (greenhouse gas) will be reduced by 25% as compared to 2016 levels	Net emission intensity of thermal power units (greenhouse gas) 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 30% compared to 2016	Air pollution emission intensity has been reduced by 65% compared to 2016 levels	Air pollution emission intensity will be reduced by 55% compared to 2016 levels	Air pollution emission intensity will be reduced by 60% compared to 2016 levels	Air pollution emission intensity will be reduced by 70% compared to 2016 levels
 Focus on circular innovation	Establish a circular business model	Inventory of potential circular materials and pilots of viable business models	Completed the Coal Ash Marine Engineering Application Manual and held a briefing session to encourage Taipower's on-site and industrial engineering units to promote the use of coal ash in marine engineering ²	Complete the pilot of a circular business model	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 52% (Including the cumulative deployment of smart meters in 1.5 million households, representing 69% of total national power consumption)	Intelligent management and service coverage reached 52% (Including the cumulative deployment of smart meters in 1.5 million households, representing 72% of total national power consumption)	Intelligent management and service coverage will reach 55% (Including the cumulative deployment of smart meters in two million households, representing 75% 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 81% of total national power consumption)
 Create ecological inclusiveness	Plan the fusion of ecology and facilities	Establish at least 1 ecologically inclusive plan for power facilities	Established 1 ecologically inclusive plan for power facilities	Complete the mid-term report for the second ecologically inclusive plan for power facilities	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 1.6 million 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

Note: 1. According to economic growth and excessively high temperature, demand of electricity increases significantly, causing net emission intensity of Taipower's thermal power generator increases.

2. The Coal Ash Marine Engineering Application Manual expand the applications of coal ash in maritime engineering and is a pilot version of the circular business model.

Implementing Environmental Impact Assessments

To ensure a stable power supply, Taipower continues to develop and renovate various electrical facilities throughout Taiwan to ensure that the 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 impacts 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. Please refer to the QR Code for information on Taipower's achievements with development projects and environmental impact assessment implementations in 2021.

Adaptation Strategy and Climate Change Action

Taipower's power plants and transmission and supply systems are distributed throughout mountainous, coastal, and riverine basins throughout 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 offshore islands) and for transmission, and distribution systems. Furthermore, the Company has voluntarily promoted and established demonstration sites showcasing adaptation strategies for power generation, transmission, and distribution systems since 2013. The 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 operation.

Taipower plans to expand the above-mentioned demonstration projects to each unit. For example, a parallel expansion plan for climate change adaptation of the generation system was launched in 2020. In the future, apart from continuing to cooperate with plans implemented by the Bureau of Energy, Taipower will launch relevant projects simultaneously and independently to enhance its capability for climate adaptation.

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 approach indicates that, in 2021, Taipower's environmental protection capital expenditure was approximately \$4.217 billion and its recurring environmental protection expenses were about \$3.688 billion. Taipower's EAS continues to be refined and optimized each year. In 2021, 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 mechanism 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 2021, and distributed the new environmental accounting code promotion items. Through multiple sessions of education and training, the Company enhanced the accuracy of the information gathered from the submission of environmental accounting code by employees.

6.1.2 Developing High-efficiency Thermal Power Generation 103-2 103-3 305-5

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

Transformation from coal to gas Elevated the proportion of gas and continued the pattern of primarily using gas with coal as support in 2021, making the gas ratio higher than that of coal

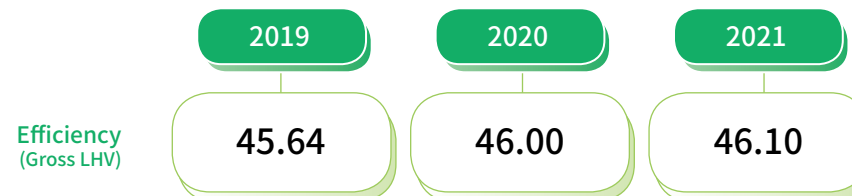
Coal-fired unit upgrade Gradually replacing coal-fired units with ultra-supercritical units that have better generation efficiency

Gas-fired unit upgrades Gradually phase out old gas-fired combined-cycle units and replace them with new-type combined-cycle gas-fired units that have better generation efficiency

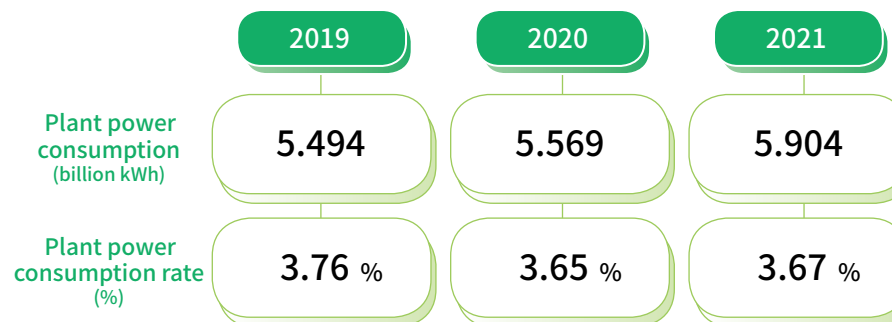
In-house Management of Thermal Power Plants

Taipower actively manages the power consumption in its plants. The Company sets annual consumption targets for its plants that do not exceed the average performances of the previous three years. Taipower is also gradually phasing out older units and replacing them with new ones. As it does so, it plans to introduce high-efficiency generating units and to enhance existing units through various operational and maintenance measures. Consequently, the efficiency of power generation has continued to improve in recent years, the current gross efficiency of lower heating values (LHV, gross) at thermal plants rose from 46% in 2020 to 46.1% in 2021. Taipower will continue to strengthen its international exchanges and cooperation efforts and to introduce related knowledge and technologies related to electricity and environmental protection.

The Efficiency (Gross LHV) of Taipower's Thermal Plants from 2019 to 2021 (%)



Power Consumption in Thermal Power Plants from 2019 to 2021



Sulfur Hexafluoride (SF₆) Reduction

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

6.2 Reducing Use of Energy and Resources

6.2.1 Fuel Usage Management 302-4

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

Taipower's Use of Fuels from 2019 to 2021

	2019	2020	2021
Gas (millions of cubic meters)	13,371	15,075	15,846
Coal (millions of tons)	27,443	26,937	28,295
Fuel oil (thousands of kiloliters)	1,103	758	961
Nuclear fuel (tens of thousands of pounds)	116.41	155.5	128.66

To reduce emissions in line with regulatory requirements, power plants need to add environmental protection equipment and facilities. 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 to upstream areas of its supply chain.

6.2.2 Enhancing the Energy Efficiency of Taipower's Operations

103-2
103-3
302-1
302-3
302-4
305-1

Management of Productive Resources

Taipower's primary sources of greenhouse gas emissions included thermal power generation, coal storage yards, fuel-consuming equipment such as vehicles and engines, insulation gas

for power switches, and refrigeration and air-conditioning equipment. Although there are no emission or disclosure regulations in Taiwan, the Company's has taken the initiative to limit greenhouse gas emissions by inviting relevant units to conduct inventories and internal verifications each year. Moreover, a third-party notary unit is invited to carry out external verification of thermal greenhouse gases and to publicly disclose the Scope 1 greenhouse gas emissions of Taipower and its thermal power units (coal, fuel, and gas). In 2021, emissions totaled 98.13 million tons of CO₂e.

In 2015, Taipower established an energy management system for its power plants. The Company has subsequently assisted six units, including the Taichung, Datan, Hsinta, NanPu, Dajia River, and Dagan plants, with successfully obtaining new verification certificates. Taipower also completed the setup of energy management systems for the NanPu, Dajia River, and Dagan plants. In 2020, the system was also installed in the Linkou and Talin plants. External validation was conducted in September and December 2021, and certificates were validated and obtained.

Taipower follows the methods and requirements for calculating greenhouse gases stipulated by the Environmental Protection Administration, and has completed its own Taipower's greenhouse gas calculation guidelines. The following emissions data were obtained from the GHG inventory and emission calculation statistics calculated by each unit of Taipower in accordance with those guidelines.

Greenhouse Gas Emissions from 2019 to 2021

	CO ₂	CH ₄	N ₂ O	SF ₆	HFC	PFCs	NF ₃
2019	9,082	25	31	10	2	-	-
2020	9,266	23	30	13	3	-	-
2021	9,808	26	32	8	3	0	0

Unit: 10,000 tons of CO₂e

Emissions of Thermal Power Units from 2019 to 2021

	2019	2020	2021
Emissions of coal-fired units	6,009	5,934	6,253
Emissions of oil-fired units	352	244	316
Emissions of gas-fired units	2,748	3,089	3,244

Unit: 10,000 tons of CO₂e

Non-Productive Resource Management

In 2021, Taipower continued to give impetus to power-saving in conjunction with the Executive Yuan's Electricity Efficiency Management Plan for Government Agencies and Schools by setting a goal of zero growth in annual power consumption compared to the previous year. Moreover, in accordance with the Ministry of Economic Affairs' Water Saving Normalization Action Plan, Taipower promoted water conservation. The General Management Office will coordinate these efforts while other branches and power plants will be driven through promotions to implement various measures that constitute a comprehensive energy-saving and carbon-reduction scheme. Taipower will also track its energy consumption (water, power, fuel, paper) on a monthly basis and conduct annual assessments to select units with excellent performance.

Taipower's Non-Productive Power Consumption from 2019 to 2021

	2019	2020	2021
Consumption (GWh)	119.6	118.1	112.9
Calculation Scope (The percentage of employees within the scope accounts for total employees of Taipower)	100 %	100 %	100 %

Taipower's Non-Productive Water Consumption from 2019 to 2021

	2019	2020	2021
Consumption (Tons)	1,302,211	1,328,077	1,236,818
Calculation Scope (The percentage of employees within the scope accounts for total employees of Taipower)	100 %	100 %	100 %

Taipower's Total Resource Recycled for Non-Productive Business Activities from 2019 to 2021

	2019	2020	2021
Consumption (Tons)	40,833.02	39,159.93	54,156.12

Note: 1. The statistical result of 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

2021 Measures



- Prioritizing the use of equipment with water efficiency labels was the first priority along with the effective use of rainwater resources (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 replacement of old, water-consuming equipment in offices, at construction sites, and in employee dormitories
- Promote water-saving measures at each unit such as water-saving advocacy, water management, pipeline facility leak inspection, and rainwater reclamation and reuse



- 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 combined with circulating fans to increase comfort levels while reducing the use of air conditioning
- 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



- 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
- Saved 6,025 liters of fuel in 2021 compared to 2020



- Continued to implement paper-reduction measures such as the electronic exchange of official documents and online approvals, with the performance reaching 70% and 85%, respectively
- Advocated for employee use of double-sided printing to save 2.48 million sheets of paper

6.3 Minimizing Environmental Impacts

6.3.1 Moving Towards Net Zero Emissions

An overview of the sectoral targets set in various countries that are moving towards net-zero emissions reveals that the energy and power sector is critical. The use of electricity accounts for about 56% of the Taiwan's greenhouse gas (GHG) emission and hence is a key item for carbon reduction.

As a state-owned power enterprise, Taipower is responsible for providing national power and promoting energy transition. Within a framework of "low-carbon first, zero-carbon next," Taipower is gradually moving from the three aspects of "supply side," "grid side," and "demand-side" towards net-zero emissions. By reducing coal combustion, increasing green energy and gas to achieve low-carbon, further maximize renewables, and developing carbon-free thermal generation technology, Taipower's goal is to complete the energy transition by 2030 and accomplish net-zero electricity emissions by 2050.

(I) Supply Side

To gradually achieve net-zero emissions in power generation, emerging carbon-free thermal power technologies are currently being developed internationally. Hydrogen and ammonia are being used to replace fossil fuels as a generation source. Carbon sequestration technology is being introduced to collect, store and reuse carbon dioxide emissions from the power generation process. Taipower is also planning to demonstrate and introduce co-firing hydrogen (gas-fired units) and ammonia (coal-fired units) and carbon capture, utilization, and storage (CCUS). Taipower will continue to work with leading international technology manufacturers to keep pace with the international community, deploy applications and introduce forward-looking technologies in advance. Taipower's short and mid-term strategy mainly responds to and implements the government's goals of promoting green energy, increasing the use of natural gas, reducing coal use, and eliminating the use of nuclear power. The long-term strategy is to develop revolutionary carbon-free thermal power technology, which is explained item by item as follows:

Promoting Green Energy

To achieve the goal of promoting green energy, Taipower aggressively promotes renewable energy and sets up 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 to encourage 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.

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 plant units 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 low carbon. To ensure a stable supply of natural gas, Taipower has pursued the construction of a third gas receiving terminal with CPC. 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 overall power supply economy.

Reducing Coal Use

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

Eliminating the Use of Nuclear Power

According to the "long-term power development plan diagram," Taipower is pushing forward the decommissioning work at nuclear power plants. At present, reactors 1 and 2 of the Nuclear Power Plant 1 (NPP1) have officially entered the decommissioning stage and their operating licenses expired in 2018 and 2019, respectively. Taipower expects to complete decommissioning work on NPP1, NPP2, and NPP3 in 2025, thus achieving Taiwan's sustainable development goal of (T-SDG 18) as a non-nuclear homeland.

(II) Grid Side

In addition to developing grid connections through existing systems for extensive future 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, 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 operation, where promotion and expansion are the primary tasks. The last stage is to effectively integrate and achieve wide application. According to the national net zero-emission goal of 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, 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. As of October 2021, Taipower has completed two energy storage batteries of 3.8MW (Kinmen) and 1.37MW (the Shulin Site of the Taiwan Power Research Institute). The Bureau of Energy, Ministry of Economic Affairs has also commissioned the Industrial Technology Research Institute to carry out a technology demonstration and validation plan for forward-looking regional energy storage equipment, and to complete the establishment of energy storage batteries with a total capacity of about 6MW at Taipower sites in Yongan, Longjing, Zhangbin, and other locations.

(III) 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

6.3.2 Promoting Circular Economies

In responding to energy transition and the government's 5+2 Innovative Industries Plan, Taipower has pledged to create efficient and sustainable energy resource utilization with a circular mindset, to establish circular economies, and to carry out two the dimensions of developing 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 circular economy strategic framework 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 2021:

R&D and Promotion of Coal Ash Reuse and Recycling

Taipower's coal ash output in 2021 reached approximately 2.34 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, since coal ash from coal-fired thermal power plants can be used to partially replace cement as a concrete cementing material. As a result, most of the Company's coal ash is sold for external reuse as a building material. It has become an excellent example of waste resource recycling.

In addition to improving the reuse rate and adding-value, the diversified reuse of coal ash is expected to be in line with the government's concept of reduction from source, recycling, and reuse.



Compilation and Promotion of the Coal Ash Marine Engineering Application Manual

To enhance the reuse rate of coal ash, Taipower has worked to promote the reuse of coal ash in industrial building materials and land reclamation. It has also fostered the use of coal ash as a controlled low-strength backfill material (CLSM) in pipe trench projects. Moreover, Taipower has compiled a Coal Ash Marine Engineering Application Manual as a reference that facilitates other applications of coal ash in various marine engineering projects.

The manual was reviewed and approved by the Industrial Development Bureau, Ministry of Economic Affairs in July 2021 and registered with the Public Construction Commission of the Executive Yuan. Subsequently, a briefing on the Coal Ash Marine Engineering Application Manual was held in October 2021 to explain the relevant coal ash applications in marine engineering and Taipower's actual field experience. Through exchanges and discussions with participating experts and scholars, Taipower gained valuable insights that will serve as reference in the Company's future application of various marine engineering products.

6.3.3 Response Measures to Air Pollution 103-2 103-3

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

The Actual and Regulatory Values of Major Air Pollutants from 2019 to 2021

	PM (kg/GWh)		SO _x (kg/GWh)		NO _x (kg/GWh)	
	Actual value	Regulatory value	Actual value	Regulatory value	Actual value	Regulatory value
2019	14	61	125	346	234*	283
2020	8*	60	102	303	203*	264
2021	6	60	98	309	188	254

*Note: Zhushan Power Plant is newly included in the category of air pollution statistics, so some historical data have been updated. This has created a discrepancy with data presented in last year's report.

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. When system supply is secure, coal-fired thermal power plants have undertaken environmental load reductions since 2015. Reductions include both voluntary and autonomous actions. In 2021, load reductions occurred 1,200 times, and the cumulative frequency of load reductions reached 4,382 times by the end of December 2021, with a total load reduction of 40,599.04 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 "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 according to 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 of "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 according to the order recommended by the EPA.
Mandatory Load Reduction	Following the issuance of air quality warnings or severe deterioration warnings by local authorities	When the national generating capacity available reaches 2.8 GWh and the reserve capacity ratio is more than 10%, the designated power plant must implement a certain percentage of production cuts or load reductions and issue emergency control measures following alerts of air quality deterioration.

Load Reductions due in 2021

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	1,114	679,315	646,334.8	1,325,649.8
Autonomous load reduction	86	20,221.1	21,283	41,504.1
Total	1,200	699,536.1	667,617.8	1,367,153.9

Medium-Term Actions

Adopting end-of-pipe reductions and adhering to emission standards for gas-fired generating units

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

Taipower will also 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 continuous automatic monitoring equipment for flue gas emissions. In addition, Taipower's air pollution control improvement plans for particulate pollutants (PM), nitrogen oxides (NO_x), and sulfur oxides (SO_x) are shown in the following table. Taipower will invest a total of \$69.229 billion between 2017 and 2025 in these initiatives. Together, the measures are expected to reduce particulate matter by 398 tons/year, sulfur oxides by 7,118 tons/year, and nitrogen oxides by 15,460 tons/year. For more information, please refer to the annual report of the Department of Environmental Protection.



Air Pollution Control and Improvement Plan

Air pollutant	Preventive measure
Particulate matter (PM)	<ul style="list-style-type: none"> • Install highly efficient electrostatic precipitators (EP) with a dust removal efficiency of 99.8% • Build dust-proof grids around coal yards and configure regular sprinkler systems • Use closed facilities for transportation and unloading of coal, frequently compact coal piles and clean roads
Nitrogen oxides (NO_x)	<ul style="list-style-type: none"> • Install low NO_x burners (LNB) and selective catalytic reduction (SCR) equipment
Sulfur oxides (SO_x)	<ul style="list-style-type: none"> • Install flue-gas desulfurization (FGD) equipment to remove more than 95% of sulfur oxide

Long-Term Action

A power source shift from "Primarily Coal with Gas as support" to "Primarily Gas with Coal as support"

The proportion of renewable energy has been increased in line with the national energy policy. In addition, the thermal generation structure has been adjusted from primarily coal with gas as support to primarily gas with coal as support. As a result, the future power generation fuel structure will be dominated by natural gas. According to the power development plan, all thermal plants, with the exception of the ultra-supercritical coal fired units at Linkou and Talin, will operate gas-fired units. Additional gas-fired units are being added at the Hsiehho, 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, which will have a positive effect on air quality.

Taipower is committed to reducing air pollution. Apart from measures such as renewing and reconstructing generating units, improving the generation efficiency, and strengthening the efficiency of air pollution control equipment, the move towards reducing coal and increasing gas is also 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 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 of 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 while achieving air pollution reduction.

Air Pollutant Emissions by Power Plants from 2019 to 2021

Unit: kg/GWh

Air Pollutant Type	2019	2020	2021
Nitrogen Oxides (NO_x)	234	203	188
Sulfur Oxides (SO_x)	125	102	98
Particulate Matter (PM)	14	8	6

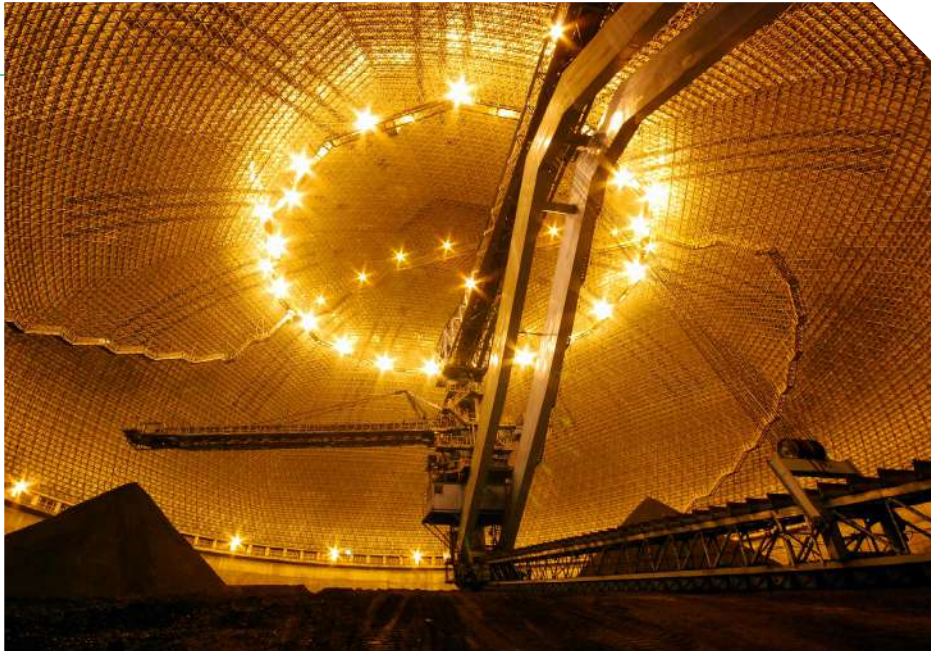
Management of Mobile Emission Sources

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 coal yards and construction sites. 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. The appendix to the guidelines, Environmental Protection Construction Regulations of Taiwan Power Company, require contractors to formulate Environmental Protection Management Plans and position environmental protection management personnel, who should be full-time and have the qualifications 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 upon completion.



6.3.4 Effluent Recycling 103-2 103-3

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 of 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 ISO14001 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 2021

Unit: m³

Power Plant	Volume of Tap Water	Volume of Desalinated Water	Total
Hsiehho	320,997	4,181	325,178
Linkou	532,320	0	532,320
Datan	382,263	0	382,263
Tunghsiao	562,315	0	562,315
Taichung	4,542,933	0	4,542,933
Hsinta	1,974,232	0	1,974,232
Talin	179,677	402,986	582,663
Nanpu	107,630	0	107,630
Jinshan	0	52,163	52,163
Tashan	0	24,584	24,584
Total	8,602,367	483,914	9,086,281

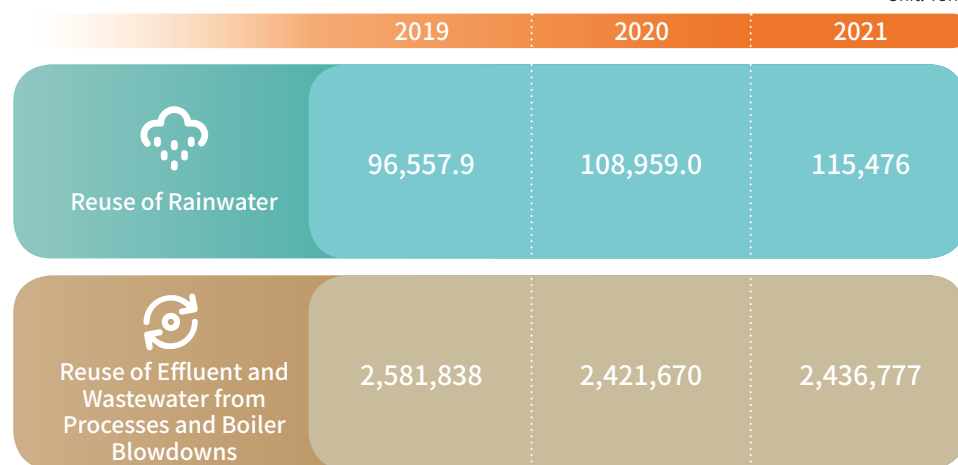


Wastewater Reuse

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. Through the utilization of various water-saving measures, the wastewater recovery results for 2021 are as follows:

Reclaimed and Reused Wastewater in Thermal Power Plants

Unit: Tons



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

Taipower's thermal power plants have implemented measures for rainwater reclamation and wastewater reuse for years. The main uses of the recycled water are green irrigation, furnace bottom sealing water, 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 advocates and implements water conservation. The Company encourages employees to sincerely cherish water resources and develop habits for water conservation.






Reclaimed Water Volumes of Taipower's Thermal Power Plants in 2021

Unit: m³

Power Plant	Reclaimed Volume of Rainwater	Reclaimed Volume of Wastewater	Total
Hsieh-ho	269	43,522	43,791
Linkou	722	303,317	304,039
Datan	1180.9	152,555	153,736
Tung Hsiao	0	191,564	191,693
Taichung	8,977	793,309	802,286
Hsinta	104,272	447,929	552,201
Talin	0	457,461	457,461
NanPu	55	42,597	42,652
Jinshan	0	4,392	4,392
Tashan	0	131	131
Total	115,476	2,436,777	2,552,382

6.3.5 Waste Management 103-2 103-3

Taipower has taken mitigation and improvement measures to minimize the impact of waste generated at various stages of power generation, transmission, distribution, and sale. The following outlines the measures exercised for each type of 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, such as 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, human health and may 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 must be disposed of properly	<ol style="list-style-type: none"> 1. Taipower has formulated an air pollution management strategy for thermal power plants. For example, coal-fired thermal power plants are equipped with dust collection equipment to remove particulate pollutants in their smokers, and flue gas desulfurization equipment is installed to remove sulfur oxides from flue gas and improve air quality 2. Sulfur oxides combined with a limestone slurry produce desulfurized gypsum ($\text{CaSO}_4 + 2\text{H}_2\text{O}$) through chemical reactions such as absorption, neutralization, oxidation, and crystallization. This can be reused in the cement and fireproof board industries
 Nuclear Power	Main wastes can be divided by high and low-level radioactivity. Low-level radioactive wastes include radioactive waste resins, waste liquids, residues, radiation protection clothing, and parts that are generated during regular operations, equipment maintenance, or improvement projects at the nuclear power plant. High-level radioactive waste refers to the used nuclear fuel withdrawn after the operation of the nuclear power plant	Radioactive material has a long half-life. If it is released carelessly, it may affect human health and pollute the surrounding environmental, soil and water resources	If radioactive waste is improperly disposed of, the degree of harm and the scope of its impact may be enormous. Moreover, because radioactive material has 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	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
 Wind Power				
 Solar Power				

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 the 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:

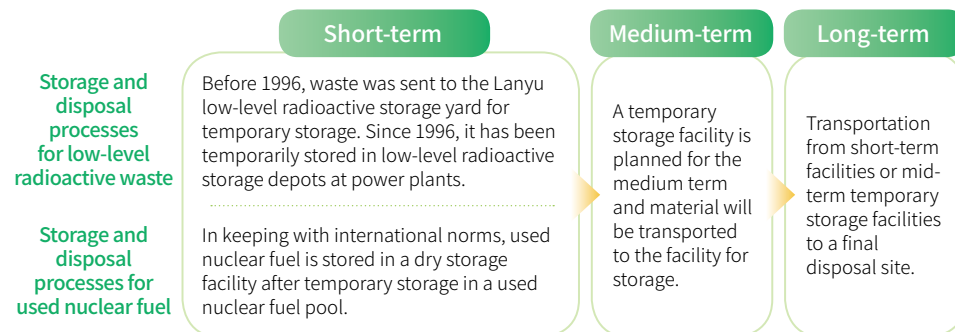
Diameter, Height, and Level of Fly Ash at Coal-fired Power Plants

Power Plant	Linkou	Taichung	Talin	Hsinta
Number of Silos	2	10	2	4
Diameter (m)	16.5	12~15	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 in 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



Utilization of Industrial Waste

Reuse of Coal Ash and Desulfurized Gypsum in 2021

Waste	Reuse Practice	2021 Production	2021 Reuse Volume	2021 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 materials.	2.34 million tons	2,018 million tons	86.2%
Desulfurized Gypsum	Desulfurized gypsum is by local cement and fire-retardant board makers.	302,700 tons	302,600 tons	99.5%

Other industrial wastes, such as waste wire and cables, or metal scraps generated during Taipower's operations, are recycled by waste disposal contractors that acquire the materials through an open bidding process. In accordance with regulations, bidders must be qualified Waste Disposal Organizations and perform their operations according to regulations to reduce the environmental risks involved in waste treatment.

Taipower's Industrial Waste Sales Volumes and Amounts from 2019 to 2021

Item	2019	2020	2021
Coal ash output (10,000 tons)	239	220	234
Coal ash sales volume (10,000 tons)	207	198	201.8
Sales volume of scrap cable and other metal (1,000 tons)	8.125	8.502	10.758
Sales amount of scrap cable and other metal (\$100 million)	9.634	9.679	18.345

6.3.6 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 cleaning, 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 communication 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."



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 construction, more than 6,000 native species of trees were planted to beautify the environment and enhance the stability of mountain slopes. Since then, the fishway ecology of the river dam has been continuously observed and recorded. 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 impact 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.



Linkou Plant – Lily Ecological Restoration

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



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

Taipower carries out fish fry releases in the adjacent seas near thermal power plants and offshore wind farms. A total of six releases were held in 2021, including activities in the waters near the Taichung, Datan, Linkou, Hsinta, and Tung Hsiao plants, as well as at offshore wind facilities. A total of about 1.2 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.

7

Practitioner of Corporate Social Responsibility



◆ 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 assets preservation and revitalization, and community care to create a brand image of Taipower as a practitioner of corporate social responsibility. Talent development is the cornerstone of the sustainable development of 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, disclosing necessary information under the principles of openness and transparency to meet stakeholders' expectations. 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, pursue a goal of zero disasters in occupational safety, and create a friendly, safe, and happy workplace for employees.

◆ Performance Highlights

- In 2021, the total number of participants in educational training reached **69,938**.
- In 2021, the total number of participants in health and safety training reached **30,762**.
- In 2021, **671** health and safety-related seminars were held for contractors, with a total of **29,138 attendees**.
- In 2021, **99.2%** of all employees were covered by the collective bargaining agreement.
- In 2021, approximately **NT\$97 million** was donated to community projects.
- In 2021, more than **NT\$600,000** was invested in artwork leases, exhibitions and performances.
- In 2021, **more than 2,000** cultural artifact inspections were conducted.

7.1 Personnel Management and Development

7.1.1 Human Resource Management Strategies and Structure 102-8

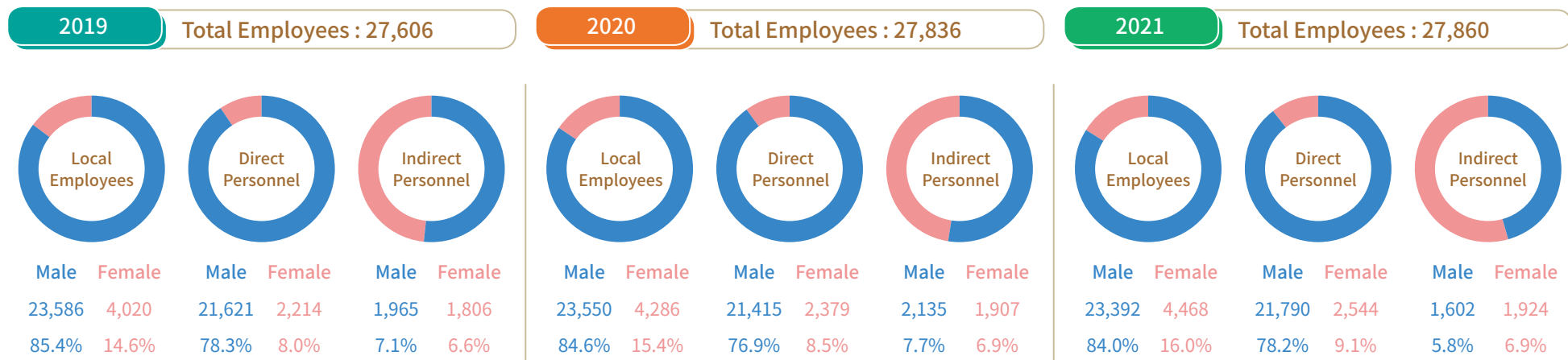
Human Resource Strategies

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.

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.



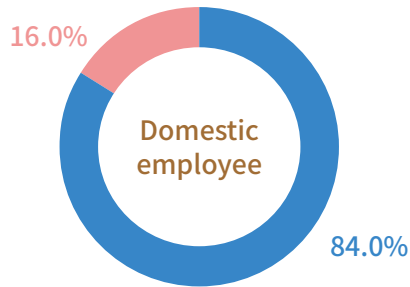
Note: 1. Data acquisition is based on the payroll dated to December 2021.

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 off.

4. Total employees = direct personnel + indirect personnel.

Statistics of Employee Category in 2021



Employee Category	Male		Female		Total	
	Number of employees	Ratio (%)	Number of employees	Ratio (%)	Number of employees	Ratio (%)
Permanent Employees	23,392	84.0%	4,468	16.0%	27,860	100%
Temporary Employees	0	0%	0	0%	0	0%
Full-Time Employees	23,392	84.0%	4,468	16.0%	27,860	100%
Part-Time Employees	0	0%	0	0%	0	0%
Employees Without Guaranteed Hours	0	0%	0	0%	0	0%

Note: 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 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 the labor pension funds.

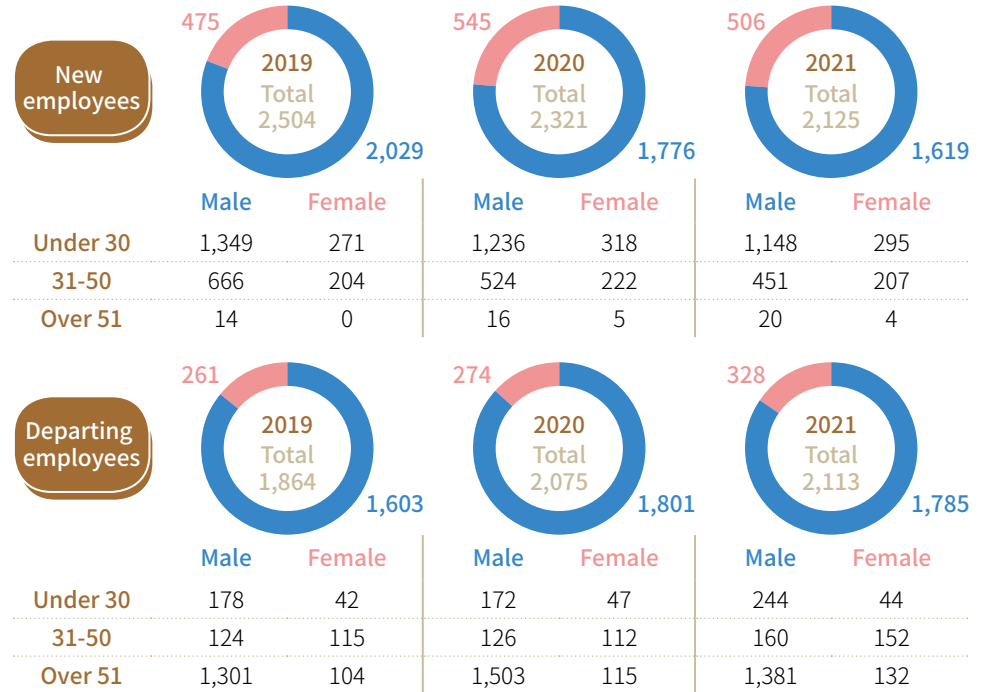
3. Full-time employees: According to Article 30, Paragraph 1 of Taiwan's Labor Standards Act, regular working hours may not exceed 40 hours a week and eight hours a day.

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 according to the proportion of 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 originally 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 2021.

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



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.

Outsourced Workforce

As of the end of December 2021, Taipower's outsourced workforce included both contracted service and labor contractors. In 2021, there were 1,100 outsourced workers working in jobs connected to cleaning, document processing, telephone operations, driving and other services.

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

7.1.2 Personnel Training and Assessment

Human Resource Training

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 2021)
 Development training	New dispatch personnel orientation training		0
	Fundamental development training		494
	Total		494
 On-the-job training	Professional training	Organized by the Training Institute	2,405
		Organized by other units	62,124
		External training	4,049
	Total		68,578
 Manager training	On-the-job training for managers		260
	Skill cultivation for managers		601
	Total		861
 Cooperative education	Recommendations for graduate school	Master's degree	5
	Total		5
Total			69,938

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. A total of 29 courses (of 14.8 hours each) were offered in 2021, with a total of 838 students studying for 12,402 hours.

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

7.2 A Sound Working Environment


7.2.1 Occupational Health and Safety 103-2 103-3 403-1 403-2 403-3 403-4 403-5 403-6 403-7 403-9


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 improving occupational safety strategy within its Sustainable Development Plan. Taipower also set short (2022), medium (2025), and long-term (2030) goals as a demonstration of its resolve to implement a safe and healthy workplace.

Occupational Health and Safety Management Policy

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 disasters, and ensure the health and safety of all colleagues.

Dimensions of Occupational Safety Management Bases and Practices

Dimension	Management Method	Management Bases/Practices
 Regulatory	Training	<ul style="list-style-type: none"> Procedures for Training and Utilizing Occupational Health and Safety Personnel from Affiliated Units
	Auditing and supervising	<ul style="list-style-type: none"> Management Enforcement of Procedures through Inspections by Supervisors at All Levels
	Operational safety	<ul style="list-style-type: none"> Enforcement Procedures for Operational Safety Standards Enforcement Procedures for Consultative Organizations in Joint Operations
	Personal protective equipment management	<ul style="list-style-type: none"> Management Procedures for Personal Protective Health and Safety Equipment
	Incident handling	<ul style="list-style-type: none"> Occupational Safety Accident Handling Procedures Guidelines for Assisting Employees in Handling Industrial Incidents
	Rewards and punishments	<ul style="list-style-type: none"> Procedures for Punishment of Health and Safety Regulation Violations Procedures for Rewarding Excellent Health and Safety Performance
	Contractor management	<ul style="list-style-type: none"> 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

Dimension	Management Method	Management Bases/Practices
 Onsite Execution	Before job task starts	<ul style="list-style-type: none"> Industrial safety communications and hazard notifications Pre-work training workshops Review lists for operating personnel
	During job progress	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 constantly follow 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 disaster occurs to 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 consider 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 an 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

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



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.

Occupational Health and Safety Management System

Taipower 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, contractors' 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 in the aftermath of accidents or following changes or additions to operation methods, the operating environment, infrastructure, equipment, or raw materials provided by Taipower 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 guidance for contractors, and all subordinate units shall cooperate. To enhance the 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 should be 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.

Employee Education and Training

Each Taipower unit's on-site manager or foreman distributes notices and organizes demonstrations and drills on operating procedures on both a regular and irregular basis in accordance with the Enforcement Procedures for Operational Safety Standards. Drills include emergency response training for fires at power plants and emergency response training for hydrogen leaks. Moreover, all units of Taipower conduct educational drills for emergency response to occupational accidents in accordance with the requirements of the Occupational Safety Accident Handling Guidelines to enhance emergency response capabilities. For example, nuclear power plants simulate induction and fall accidents during emergency response drills and also practice responding to disposal situations. In 2021, Taipower conducted 648 drills related to disaster prevention and emergency handling, with a total of about 17,306 participants. Additionally, more than 427 Zero Disaster Exercise classes, Interactive Hazard Identification Training and statutory training courses related to occupational health and safety (including training for occupational health and safety administrators and various other operational supervisors) were held at the Training Institute or at outsourced training institutions, with a total of about 13,456 participants.

In order to strengthen communication about and coordination of contractor occupational health and safety matters, a health and safety negotiation meeting is held before the delivery of each contracted project's engineering-related properties and services. A joint operation agreement event is also held, where the relevant personnel from the unit, the Company's other joint operation units, contractor and subcontractor leadership, and occupational safety personnel communicate and coordinate on the project. Depending on the effectiveness of health and safety implementation, occupational health and safety education training or lectures for a contractors' staff will be held, and relevant personnel will be asked to participate so as to help improve occupational safety knowledge among contractor staff. In 2021, Taipower conducted about 671 health and safety-related advocacy meetings for contractors, with a total of about 29,138 participants.

Occupational Health Services

Other than 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 unlawful infringement in the workplace prevention plan. Using labor health risk assessments, physical

and health examination data management, and high-risk work assessment 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, the 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 February 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 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 employees who are involve in performing tasks associated with special health hazards such as those described in Article 2 of the Regulations Governing the Labor Health Protection shall be subject to special health examinations under Article 18 of the Regulations Governing the Labor Health Protection and shall be subject to hierarchical health management under Article 21 of the Regulations Governing the Labor Health Protection. Currently, Taipower implements special health examinations for tasks involving high temperatures, noises, ionizing radiation levels, dust and n-hexane exposure. The Company also carries out special health examinations according to the employee's task category.

Work Type	Specific Physical Checkup Categories
Tasks involving high temperatures	Checks on work experience, lifestyle and conscious symptoms, past medical histories, current medications, and physical checkups on cardiovascular, respiratory, neurological, musculoskeletal, dermal systems, pulmonary function, etc.
Tasks involving noises	Checks on work experience, lifestyle and conscious symptoms, past medical histories such as injuries to auditory systems, neurological drugs, traumatic injuries, ear infections, hereditary hearing disorders, and the examination of the ear canal, audiometry, etc.
Tasks involving ionizing radiation	Checks on work experience, lifestyle and conscious symptoms. Checks on a past medical history of blood, skin, gastrointestinal, lung, eye, endocrine and reproductive system diseases, and mental health.
Tasks involving dust	Checks on work experience, lifestyle and conscious symptoms. Checks on a past medical history of tuberculosis, asthma, pneumoconiosis, and heart disease, and a physical check of the respiratory system, cardio-circulation, pulmonary function, etc.
Tasks involving n-hexane	Check on work experience, lifestyle, and conscious symptoms. Checks on a past medical history of skin, respiratory organs, liver, kidneys, and nervous system diseases, and physical checkup of neuro and skin.

Taipower provides health consultations and hygiene advocacy every month and conducts health promotion activities (such as health lectures, influenza vaccinations, four cancer screenings, physical fitness testing activities, etc.). About 988 health counseling and health promotion activities were held in 2021. Each Taipower worker is entitled to eight hours of free psychological counseling per year through the Heart-to-Heart program and can obtain professional guidance to relieve work pressure and improve quality of life.

In response to the COVID-19 pandemic, Taipower has formulated both a Prevention Contingency Plan and a Continual Operation Plan. The Company has requested that all units reinforce pandemic prevention training and drills so as to implement relevant measures of control that prevent the spread of the pandemic. Furthermore, in line with national pandemic prevention measures, Taipower's employees are given a day off for receiving a government-funded COVID-19 vaccination. Employees are also granted a compensatory leave for receiving a vaccination on holidays. Taipower also constantly request that all units reinforce advocacy and encourage colleagues to vaccinate to enhance herd immunity.

Strategy for Occupational Safety Performance and Refinement

In 2021, Taipower workers that experienced work related injury or disease 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 control, labeling/warning, management control, 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 2021

Worker Category		Employees			Construction Contractors
		Male	Female	Total	Total
Total number of work hours		49,031,546	9,339,342	58,370,888	42,324,282
Deaths caused by occupational injuries	Number of people	0	0	0	2
	Rate	0	0	0	0.009
Severe occupational injuries (Excluding deaths)	Number of people	4	0	4	12
	Rate	0.016	0	0.013	0.056
Recordable occupational injuries	Number of people	4	0	4	14
	Rate	0.016	0	0.013	0.066
False alarms	Number of people	5	0	5	3
	Rate	0.020	0	0.017	0.014

- 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 2021

Type of worker	Total	Contact with high or low temperatures	Hit by falling objects	Falls	Electric shocks	Collapses	Stabbing, cutting, scratching	Exposure to harmful substances	Struck	Explosion
 Employees	4 cases (4 individuals disabled)	1 case (1 individual disabled)	1 case (1 individual disabled)	0 cases	2 cases (2 individuals disabled)	0 cases	0 cases	0 cases	0 cases	0 cases
	Injury rate by accident category	25%	25%	0%	50%	0%	0%	0%	0%	0%
 Contractors	14 cases (2 deaths, 12 individuals disabled)	1 case (1 individual disabled)	4 cases (1 death, 3 individuals disabled)	1 case (1 death)	2 cases (2 individuals disabled)	1 case (1 individual disabled)	2 cases (2 individuals disabled)	1 case (1 individual disabled)	1 case (1 individual disabled)	1 case (1 individual disabled)
	Injury rate by accident category	7%	28%	7%	15%	7%	15%	7%	7%	7%

Note: 1. Contractor: Includes both contractor labor and self-employed workers

2. Disaster type injury rate = Number of casualties of the specific disaster type/Number of casualties of the entire year x 100%

3. 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



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



Implement training and education

- Pre-service training and drills
- Implementing qualification training
- Organizing awareness campaigns
- Organizing virtual reality (VR) simulation training for preventing falls. Eight sessions will be organized in 2022



Increase the level of punishment

- Violator re-education
- Progressively increasing fines



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 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



Third-party auditing

- Units and places with a high frequency of occupational accidents or potential occupational safety risks through the past five years or those that have risk items and blind spots identified through the third-party inspection mechanism and external occupational health and safety experts are given priority in inspection



Occupational safety care platform

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



Disaster prevention technology

- A smart occupational safety app has been piloted for high-risk projects since May 2021 and will continue to be rolled out to contractors at all units. It is expected that the usage coverage will reach 20% in 2022 and 50% in 2023
- The introduction of a mobile real-time image system (CCTV) and AI recognition is scheduled to have the ability to conduct worker safety attire recognition in 2022 and achieve composite AI image recognition in 2023

7.2.2 Labor-Management Communication and Collective Bargaining 102-41

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	2021 Performance
Labor-management conferences	Taipower holds regular labor-management conferences to foster effective communication. There were 7 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 5 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 should immediately resolve the doubts of the employees

Negotiations on Collective Agreement

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, and periodically discussed it at subsequent collective agreement meetings. A total of six meetings were held in 2021 to propose additional provisions for the chapter on benefits, training, and health and safety.

Number and Ratio of Employees Covered by the Collective Agreement

Item	2018	2019	2020	2021
Total employees	26,962	27,606	27,836	27,860
Number of employees in the union (people)	26,599	26,866	27,654	27,639
Number of employees in the union (%)	98.7%	97.3%	99.3%	99.2%

Note: The provisions of the Company's collective agreement on labor conditions offers protection to all employees and is 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:

- Employees who must adjust their job duties or be transferred to other departments, units, or regions due to personal or family reasons.
- Employees who have been going through major changes or crises with their families and require the Company's involvement.
- 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.
- 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 a complaint with the Personnel Difficulties and Matters of Grievance Processing Committee.

7.3 Promoting Social Co-prosperity

The power industry has promoted domestic industrial and economic development. In addition to supplying energy to Taiwan, Taipower has created a tangible historical architecture and immaterial collection of memories for Taiwan. In line with Taiwan's pursuit of social development and cultural awareness, the Company has integrated cultural preservation and creative thinking into its development-oriented growth model, promoting corporate humanism in business, public welfare, and the building of a cultural corporate image.

Taipower established 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 responsibilities and its 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, Operation and Maintenance Projects to 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 and the Company uses its Meeting on Important Cultural Heritage Preservation, Operation, and Maintenance Projects to promote preservation, research, and communication with society. Taipower adopted the strategies of research-before-education, phased development, and continuous adjustments for its review operations on cultural and historical data in accordance with different 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 the 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 has continuously carried out the inventory and preservation of cultural assets. In 2021, it conducted an inventory on the topics of Island Firepower and Transmission and Supply System. More than 2,000 internal cultural relics were inventoried. Experts and scholars were commissioned to archive and select about 904 examples, and 55 oral history interviews were conducted.

Publication of Literary and Historical Monographs

Two volumes of the Taiwan Power Cultural Assets series were compiled: the Beauty of Lanyang Water - Centennial Light and Gliding through the Light: Crossing the Space-time Promenade of Thermal Power. These volumes were donated them to related departments, universities, public libraries, experts and scholars.

Keynote Speeches and Forums on Cultural Asset

On September 27, 2021, Taipower held a presentation on the results of its cultural assets inventory in the transmission and supply system entitled Protecting Cultural Assets Is Up to Us. Exhibition panels and selected cultural relics were arranged on site to show the fruitful results of the inventory. Experts and scholars in the field of cultural assets, colleagues from all units of the Taipower Transmission and Supply Division, and retired personnel were invited to participate in the event.

Recognition Through Art and Business Awards

On November 29, 2021, the winners of the 15th Art and Business Awards of the Ministry of Culture were announced. Taipower won Standing Gold Award recognition of the Art and Business Awards for the third consecutive time for its Cultural Asset Preservation, Cultural Arts Exhibition and Promotion.



Cultivation of Innovative Design

In 2021, Taipower collaborated with the Taiwan Design Research Institute on Aesthetic Brand Integration and Design Center Planning. The collaboration aimed to explore Taipower's brand positioning and development direction. The Company carry out preliminary research, complete internal interviews, design force diagnosis, and public questionnaires, and further conducted workshops to introduce innovative design thinking to staff and to cultivate the energy of Taipower's design force as a driver of innovation.

From October 7-8, 2021, Taipower cooperated with the Taiwan Design Research Institute to conduct a workshop series on Design Force Driven Innovation and Co-creation. The workshop invited 40 employees with creative thinking potential from Taipower's key business units to participate. Through expert speakers, stage research and sharing, and co-creation discussion, innovative design thinking was introduced. Over the three workshops, different design tools were used for co-creation and the exchange of ideas across units with the aims of discussing and condensing Taipower brand profile and service schemes, designing the direction of innovative operations, and bringing the seeds of design back to the workplace so that they could be spread outward.



Co-creation Workshop: "Taipower Design for Innovation"



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 corporate image. TPCreative achieved the follow in 2021:

- TPCreative participated in 2021 Creative Expo Taiwan. Decommissioned wooden cross-beams, transformer boxes, and other electrical materials were used to create an exhibition area ("Za-Huo-Dian"). The exhibition area presented materials and creative products through a play on words ("Za-Huo-Dian" is a homophone of "grocery store" in Chinese). The highlight of the exhibition was the modification of high-voltage distribution boxes that was turned into a small grocery store model and attracted the interest of visitors and prompted further inquiry. During the exhibition, TPCreative interacted with several other design brands. The company persistently promoted its brand concept, and raised awareness within the public.
- In 2021, TPCreative focused on its decommissioned transformer box project. Using the material from the transformer boxes found on the street, TPCreative developed products such as Taipower Heat Pads, Storage Trays, and Landscape Badges that are practical in daily life. The Taipower Heat Pad was also used as a souvenir for the 2021 shareholders' meeting. The From Life-to-Life exhibition was held in the Taipower's lobby. In the exhibition, designers personally guided and explained the development process from transformer to materials to commodities. The exhibition allowed Taipower stakeholders to gain a deeper understanding of the practice of integrating design with decommissioned materials. Additionally, a special exhibition on transformer boxes was held in the glass house of Huashan 1914 Creative Park. There, the public experienced the transformer heat pad material and felt the charm of materials transformed into new applications for their lives.

Investment in Cultural and Art Activities

From 2019 to 2021, 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

		2019	2020	2021
 Painting Rentals	Number of items	54	74	72
	Amount (\$NTD)	329,000	351,471	467,248
 Art Gallery	Number of exhibitions	5	6	2
	Amount (\$NTD)	310,000	48,033	25,000
 Exhibitions and Activities in the Grand Hall	Number of exhibitions	18	14	13
	Amount (\$NTD)	518,747	60,000	109,000

Taipower expects to initiate planning for the Power Industry Cultural Path in 2022 and is hoping to consolidate the cultural asset preservation results accumulated over the years with the Taiwan Power Industry Cultural Path. Taipower hopes to connect industry-related cultural and social resources and allow people to experience historical places in depth while responding to contemporary life. The move will help to establish corporate image and community identity, and to facilitate support for the local economy. The cultural path planning will be based on the resource inventory of cultural assets. It will gradually construct a power industry cultural path discussion and propulsion framework, and explore potential positions for the industrial culture path. The initiative intends to plan a thematic, complete and developmental power industry cultural path network, and to strengthen resource integration and interaction from points, lines, and surfaces, to create a thematic cultural path that is unique to the Company, and can act as a driving force that fosters the sustainable preservation and operation of the power industry's heritage. It is hoped that by enriching the soft and hardware content of the local heritage exhibition hall the Company will connect with local cultural, historical and community groups and organizations. This will facilitate the integration of cultural assets from various power fields within the historical context of local development and will declare a clear value for preservation and maintenance, showcase education, value-added applications, etc. The initiative will subsequently form a path by connecting the local heritage exhibition halls in the north, middle, south, east, and other regions. Coupled with identification systems and indicators, tourism marketing can be conducted through curation, experiential activities, and education, thereby revitalizing local economies and tourism.

Management of Charitable Activities

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 D/S ONE (D/S ONE) is the nation's first renewable energy exhibition hall. The hall is connected to the Banqiao train station by pedestrian bridges and its space was redesigned based on international standards with the aim of creating the most important and interesting venue for renewable energy education in Taiwan. The name is derived from the facility's previous function as a Distribution Substation (D/S) and its street address (at #1). In the facility's current iteration, the acronym "D/S" is used to represent the principles of "Design" and "Sustainability." The hall reflects Taipower's ambition to recreate its brand. Through the establishment of the site, Taipower strengthened communication between the Company and external entities and demonstrated the Company's core values of being green, smart, and future-oriented. These values are defined as follows:

- Green: Clean, renewable and sustainable energy development
- Smart: Circular, smart, and innovative technologies
- Future: An electricity-powered life that coexists with nature

D/S ONE has been actively promoted to teachers and students of high schools, junior high schools, and elementary schools in Taipei, New Taipei, Keelung, and Taoyuan since its official opening in January 2020. The exhibition hall has become the Northern Green Energy Education Center and won a place in the Top Ten Science Bases at the Taiwan Science Festival as awarded by the Ministry of Education. It has also received the first prize for education promotion from the Global Views Corporate Social Responsibility Awards. Through multiple interactive displays in the physical exhibition hall and other Powerlab activities, D/S ONE strives to consolidate resources for schools and educational institutions in Taiwan, and hopes to become the "key driver of renewables education information integration and educational learning in Taiwan."

By the end of 2021, D/S ONE has attracted more than 80,000 visits and cultivated more than 24,000 Facebook fans. On the second anniversary of the opening of the exhibit center, in response to the interconnection of Taipower's Phase 1 of the Offshore Wind Power project, a special exhibition entitled Empowering Our Lives - Wind Power Fantasy was held, using nearly 100,000 building blocks to create a 5-meter-high revolving block turbine and the largest 3D block mural wall in Taiwan. Together with 13 parent-child workshops, it attracted more than 25,000 people during the special exhibition, with over 50 media exposures and 1.6 million views on social media. Public awareness of

offshore turbines was increased and people of all ages were enabled to better understand renewable development in Taiwan.

In the future, D/S ONE will continue to launch energy teaching aids and will continue cooperating with schools and educational institutions at all levels as well as major museums in Taiwan as it promotes energy on campuses across Taiwan and implements energy education through cross-domain cooperation to stimulate creative energy and create value.



Major Public Welfare Activities and Sponsorships

Taipower plays a crucial role in Taiwan's economic development. But the Company also works to enhance its partnerships within society and to promote coexistence and co-prosperity. The Company has consistently increased its investment in culture, art, and philanthropic activities to strengthen its image as a practitioner of corporate social responsibility. The Company's electricity construction projects have caused changes and impacts in local environments. Neighborhood work and interaction are therefore important to ensure ongoing co-prosperity with local communities. The Company's neighborhood work is focused on supporting local philanthropic activities. Taipower provides emergency relief, support for low-income households, benefits for the elderly and people with disabilities, education, culture, and other charitable causes. In 2021, there were 3,534 neighborhood work projects and approximately NT\$97 million in donations.



Purchasing Agricultural and Fisheries Products for Donation to Disadvantaged Groups

The COVID-19 pandemic affected society in diverse and widespread ways. In 2021, Taipower supported the government's relief policies by purchasing mango, grapefruit and grouper fish. The Company then donated its purchases to schools and disadvantaged groups across the country. The purchases helped farmers and fishermen weather financial difficulties and provided aid to disadvantaged groups thus benefiting all parties.



End-of-Year Care Program for Solitary Seniors

Since 2005, Taipower's power plants and district offices have invited isolated seniors to attend year-end dinner parties during the Lunar New Year. Each year, Taipower purchases New-Year supplies and distributes gifts to the residences of those who attend the events. The parties have helped senior citizens who live alone enjoy Lunar New Year and allowed Taipower to spread warmth and fulfill its social responsibilities. In order to reduce the risk of cluster infections during the pandemic, group events were replaced with efforts by staff to accompany the elderly to buy New Year goods, and by providing complimentary new year dishes, gift vouchers, and household staples. Participating staff also assisted in home cleanups. In 2021, events included 3,425 participants.



Seeds of Hope: The Hope Cultivation Project

Since 2005, Taipower has provided summer job opportunities for indigenous college students from Taitung, Hualien, and Pingtung. The jobs allow students to work in their hometowns and to reduce the burden of tuition and expenses. Each year, about 75 summer job opportunities are provided. Beyond providing students with opportunities for self-realization and growth, the program aims to help students bond with and help their hometowns. As the program enters its 17th year, more than 1,025 students have participated. Due to the Covid-19 pandemic in 2021, only the Pingtung area held the program as scheduled, but in that area alone, 36 college students served 364 school children.



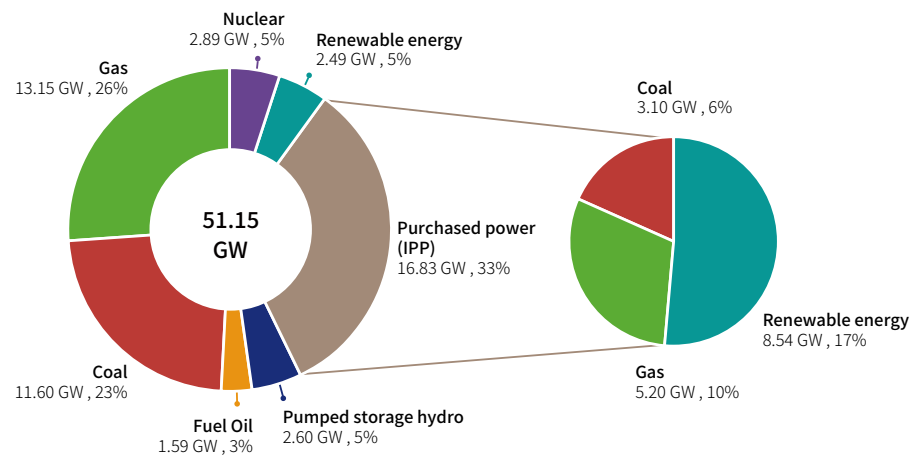
Reading Promotion: The Firefly Children's Reading Project

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 resources and help children improve their knowledge and skills. As an electricity company, Taipower has used its professional abilities to provide basic educational materials for each tutoring class to increase the students' power knowledge in daily life. This project was also affected by the Covid-19 pandemic this year, but about 4,400 people were still served in 2021.

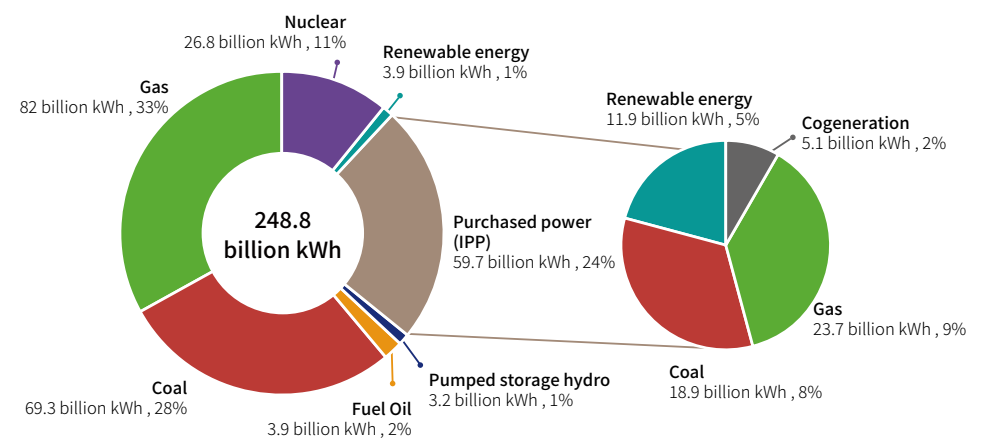


Appendix | Corporate Highlights

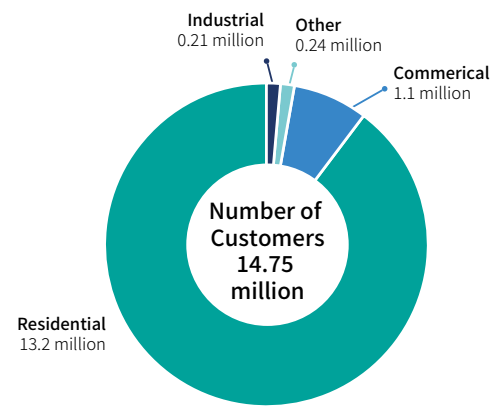
Installed Capacity in 2021



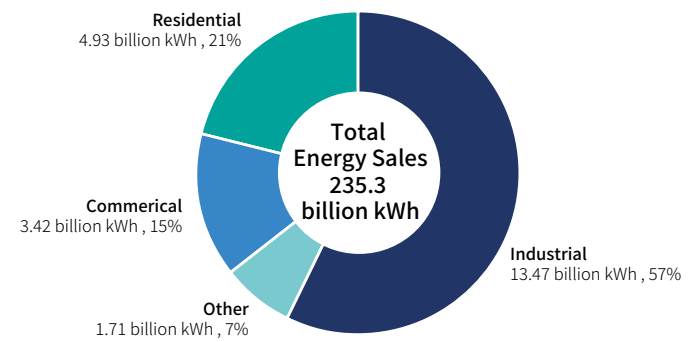
Net Generation and Purchase Power in 2021



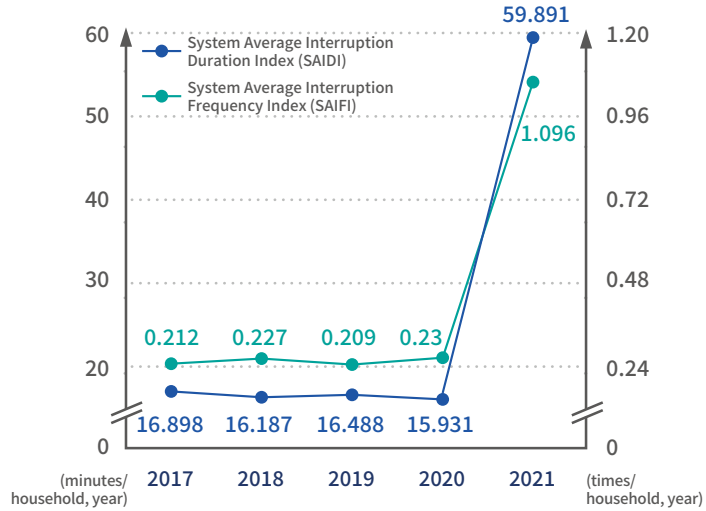
Number of Customers in 2021



Energy Sales in 2021

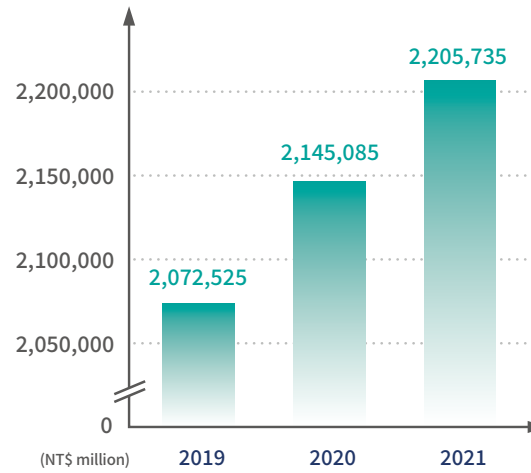


System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) from 2017 to 2021

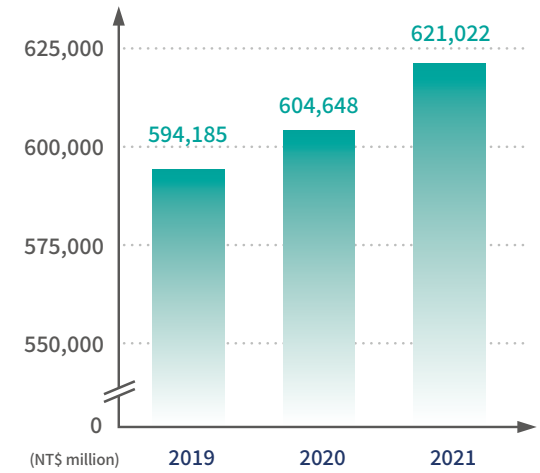


Note: Excluding power outage incidents on May 13 and May 17, the average interruption frequency per household in 2021 was 0.233 (times/household, year), and the average interruption duration per household was 16.376 (minutes/household, year)

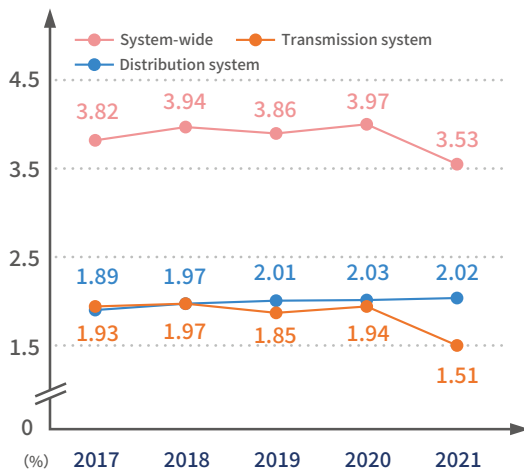
Total Assets



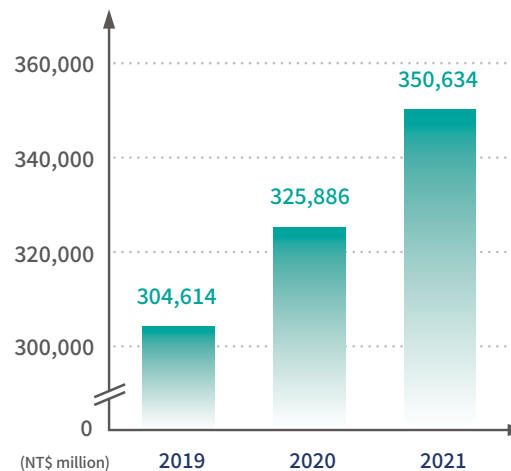
Operating Revenue



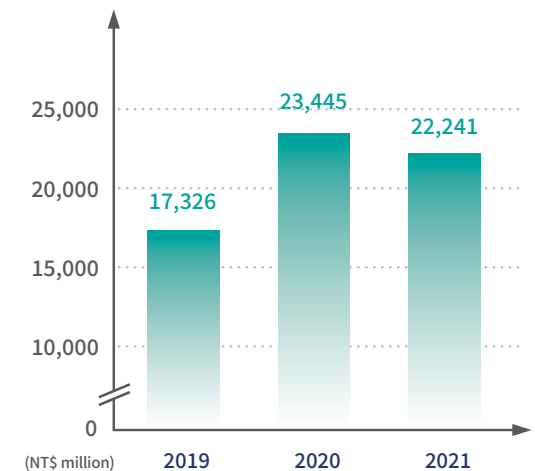
Line Loss Rate from 2017 to 2021



Stockholders' Equity



Net Profit/Loss Before Tax



Appendix | SASB Materiality Map for the Industry

Topics	Chapter	Accounting metric	Corresponding content
Activity metrics	Value chain	IF-EU-000.A	Total number of users: 14.75 million Customer power consumption (sold) by percentage: Industrial: 57% , Residential: 21% , Commercial: 15% , Others: 7%
	Value chain	IF-EU-000.B	User power supply: Industrial: 13.47 billion kWh , Residential: 4.93 billion kWh , Commercial: 3.42 billion kWh , Others: 1.71 billion kWh
	Value chain	IF-EU-000.C	In 2021, there were 17,995 circuit kilometers of transmission lines and 399,813 circuit kilometers of distribution lines.
	3.1.1	IF-EU-000.D	Total power generation of 18.91 billion kWh, thermal generation of 15.52 billion kWh (62.4%), nuclear generation of 2.68 billion kWh (10.8%), renewables generation of 0.39 billion kWh (1.6%), and pumped-storage hydropower generation of 0.32 billion kWh (1.3%)
	3.1.1	IF-EU-000.E	Total purchasing power of 5.97 billion kWh
Greenhouse gases emission and energy resource planning	6.2.2	IF-EU-110a.1	Scope 1 GHG emissions of 98.13 million tons, yet no regulations of emission limit and emission disclosure in the country
	Value chain	IF-EU-110a.2	CO ₂ e Emissions of 98.77 million tons of CO ₂ e in 2021
	6.2.2	IF-EU-110a.3	Regarding the short, medium, and long-term strategies and objectives of Taipower's management on scope 1 emissions, please refer to 6.2.2
	3.2.2	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	6.3.3	IF-EU-120a.1	(1) NO _x : 188 kg/GWh (2) SO _x : 98 kg/GWh (3) PM: 6 kg/GWh
Water resources management	6.3.4	IF-EU-140a.1	The total water consumption of thermal power plants was 9,086,281 cubic meters
	6.3.4	IF-EU-140a.2	No violation of water resources regulations by Taipower in 2021
	6.3.4	IF-EU-140a.3	Please refer to 6.3.4 for the Water resources management

Topics	Chapter	Accounting metric	Corresponding content
Coal ash management	6.3.2	IF-EU-150a.1	Total coal ash production in 2021 was 2.34 million tons, with a reuse rate of 86.2%
	6.3.5	IF-EU-150a.2	For the detailed status of coal ash accumulation, please refer to 6.3.5 Table of "Diameter, Height, and Actual Controlled Ash Level of Fly Ash Silo of Various Coal-fired Power Plants"
Energy affordability	1.1.2	IF-EU-240a.1	In Taiwan, it does not differentiate users based on 500MWh, 1000MWh, and provides the average retail electricity price of the following users: (1) residential 2.5110 (dollar/kWh), (2) commercial 3.1861 (dollar/kWh), (3) industrial 2.4592 (dollar/kWh)
	1.1.2	IF-EU-240a.2	
	3.1.2	IF-EU-240a.3	Taipower currently does not have statistics on the requirements for this metric, supplementing the 2021 System Average Interruption Duration Index (SAIDI) of 59.8917 minutes/household and the System Average Interruption Frequency Index of 1.0967 (SAIFI) times/household
	5.1.1	IF-EU-240a.4	External factors such as the COVID-19 pandemic and the breaking of the production reduction agreement in oil-producing countries affected the user's electricity affordability in 2021
Workplace health and safety	7.2.1	IF-EU-320a.1	(1) Total Recordable Incident Rate (TRIR) of 1.3%, (2) fatality rate of 0%, and (2) Near-Miss Frequency Rate (NMFR) of 0.17%
User efficiency and demand	NA	IF-EU-420a.1	Not applicable (LRAM is the profit calculation system adopted by the US power industry)
	4.1	IF-EU-420a.2	Smart meter mastered 72% of the country's electricity consumption information
	5.1.2	IF-EU-420a.3	A total of 0.149 billion kWh of electricity were saved in 2021
Nuclear safety and crisis management	NA	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
	3.1.1	IF-EU-540a.2	Regarding Taipower's measures to ensure nuclear energy safety, please refer to 3.1.1 for details
Grid resiliency	2.3.2	IF-EU-550a.1	Two labor penalties, 13 work safety penalties, and seven environmental protection penalties
	3.1.2	IF-EU-550a.2	(1) System Average Interruption Duration Index (SAIDI) of 16.376, (2) System Average Interruption Frequency Index (SAIFI) of 1.0967, and (3) the SAIDI/SAIFI formula of the Customer Average Interruption Duration Index (CAIDI) may not be synchronized with the power supply reliability, which cannot faithfully represent the performance of power supply reliability in use, so the evaluation is not adopted

Appendix | GRI Standards Index

102-55

GRI Standards	GRI Items	Reference	Page/URL
Organizational Profile			
GRI 102: General Disclosures 2016	102-1 Name of the organization	1.1.1 Taipower Profile	18~20
	102-2 Activities, brands, products, and services		
	102-3 Location of headquarters		
	102-4 Location of operation		
	102-5 Ownership and legal form		
	102-6 Markets served		
	102-7 Scale of the organization		
	102-8 Information on employees and other workers	7.1.1 Human Resource Management Strategies and Structure	97~98
	102-9 Supply chain	2.4.1 Supplier Management	46~50
	102-10 Significant changes to the organization and its supply chain	1.3.1 Transformation Planning 1.3.2 The Current Status of Promoting Transformation in Taipower 2.4.1 Supplier Management	25~26 46~50
	102-11 Precautionary principle or approach	2.2.1 Risk Management Manchenism 2.2.2 Risk Assessment and Identification 2.3.1 Ethical Management	36~40 42~43
	102-12 External initiatives	5.2 Stakeholder Communication	72~74
	102-13 Membership of associations		
Strategy			
GRI 102: General Disclosures 2016	102-14 Statement from senior decision-maker	Statement from the Chairman	3
	102-15 Key impacts, risks, and opportunities	2.2.2 Risk Assessment and Identification	38~40
Ethics and Integrity			
GRI 102: General Disclosures 2016	102-16 Values, principles, standards, and norms of behavior	2.3.1 Ethical Management	42~43


GRI Standards	GRI Items	Reference	Page/URL
Governance			
GRI 102: General Disclosures 2016	102-18 Governance structure	1.2.1 The Sustainable Development Commission 2.1.1 Organization Structure 2.1.2 Board of Directors	23~24 33~35
Stakeholder Engagement			
GRI 102: General Disclosures 2016	102-40 List of stakeholder groups	1.4.1 Identification of Stakeholders	27
	102-41 Collective bargaining agreements	7.2.2 Labor-Management Communication and Collective Bargaining	106
	102-42 Identifying and selecting stakeholders	1.4.1 Identification of Stakeholders	27
	102-43 Approach to stakeholder engagement		
	102-44 Key topics and concerns raised	1.4.2 Key Sustainability Issues	27~31
	102-45 Entities included in the consolidated financial statements	Reporting Principles	2
	102-46 Defining report content and topic boundaries		
	102-47 List of material topics	1.4.2 Key Sustainability Issues	27~31
	102-48 Restatements of information		
	102-49 Changes in reporting		
	102-50 Reporting period	Reporting Principles	2
	102-51 Date of the most recent report		
	102-52 Reporting cycle		
	102-53 Contact point for questions regarding the report		
	102-54 Claims of reporting in accordance with the GRI Standards	GRI Standards Index	116~120
	102-55 GRI content index		
102-56 External assurance	Assurance Statement		
GRI 103: Management Approach 2016	103-1 Explanation of major topic and its boundary	1.4.2 Key Sustainability Issues	27~31
Disclosure of Material Topics and Specific Topics			
Corporate Governance and Sustainable Management			
GRI 102: General Disclosures 2016	102-11 Precautionary principle or approach	2.3.1 Ethical Management	42~43

GRI Standards	GRI Items	Reference	Page/URL
GRI 103: Management Approach 2016	103-2 The management approach and its components 103-3 Evaluation of the management approach	1.1.2 Operational Performance 2.2.1 Risk Management Manchenism 2.2.2 Risk Assessment and Identification 2.3.1 Ethical Management	21~22 36~40 42~43
GRI 205: Anti-corruption 2016	205-1 Operations assessed for risks related to corruption	2.3.1 Ethical Management	42~43
	205-3 Confirmed incidents of corruption and actions taken	2.3.2 Compliance	44~45
GRI 307: Environmental compliance 2016	307 Environmental compliance		
GRI 419: Socioeconomic compliance 2016	419 Non-compliance with laws and regulations in the social and economic area		
Accessibility and Affordability of Electricity			
GRI 103: Management Approach 2016	103-2 The management approach and its components 103-3 Evaluation of the management approach	5.1.1 Demand Side Management Measures	69~70
GRI 203: Indirect Economic Impacts 2016	203-2 Significant indirect economic impacts	5.1.1 Demand Side Management Measures 1.1.2 Operational Performance	69~70 21~22
Stability and Reliability of Power Supply			
GRI 103: Management Approach 2016	103-2 The management approach and its components 103-3 Evaluation of the management approach	3.1.1 A Stable Power Supply and Generation System 3.2.1 The Transition to a New Generation of Energy 3.2.2 Renewables Development	53~56 59~63
GRI 203: Indirect Economic Impacts 2016	203-1 Infrastructure investments and services supported	3.1.2 A Robust Transmission and Distribution System	57~58
	203-2 Significant indirect economic impacts	3.1.1 A Stable Power Supply and Generation System 3.2.1 The Transition to a New Generation of Energy	53~56 59~61
Transforming into a Power Utility Group (Specific Topic)			
GRI 103: Management Approach 2016	103-2 The management approach and its components 103-3 Evaluation of the management approach	1.3.1 Transformation Planning	25
GRI 102: General Disclosures 2016	102-10 Significant changes to the organization and its supply chain	1.3 Promoting Corporate Transformation	25~26
Power Industry Reform and Fair Competition (Specific Topic)			
GRI 103: Management Approach 2016	103-2 The management approach and its components 103-3 Evaluation of the management approach	1.3 Promoting Corporate Transformation	25~26

GRI Standards	GRI Items	Reference	Page/URL
Management and Financial Performance			
GRI 103: Management Approach 2016	103-2 The management approach and its components 103-3 Evaluation of the management approach	1.1.2 Operational Performance	21~22
GRI 201: Economic Performance 2016	201-1 Direct economic value generated and distributed		
Technological Research and Innovation			
GRI 103 : Management Approach 2016	103-2 The management approach and its components 103-3 Evaluation of the management approach	1.3.1 Transformation Planning	25
GRI 102 : General Disclosures 2016	102-10 Significant changes to the organization and its supply chain	1.3.1 Transformation Planning 1.3.2 The Current Status of Promoting Transformation in Taipower	25~26
Renewable and Clean Energy Development			
GRI 103 : Management Approach 2016	103-2 The management approach and its components 103-3 Evaluation of the management approach	3.2.1 The Transition to a New Generation of Energy 3.2.2 Renewables Development 4.1 Smart Grid General Planning 4.2 Smart Grid Application- Vehicle-to-Grid Bi-directional Charging System	59~63 65~67
GRI 203: Indirect Economic Impacts 2016	203-1 Infrastructure investments and services supported	3.2.2 Renewables Development	61~63
	203-2 Significant Indirect economic impacts	3.2.1 The Transition to a New Generation of Energy	59~61
Climate Change and Low-Carbon Strategies			
GRI 103: Management Approach 2016	103-2 The management approach and its components 103-3 Evaluation of the management approach	4.2 Smart Grid Application- Vehicle-to-Grid Bi-directional Charging System 6.1.2 Developing High-efficiency Thermal Power Generation	67、82
GRI 302: Energy 2016	302-4 Reduction of energy consumption	6.2.1 Fuel Usage Management 6.2.2 Enhancing the Energy Efficiency of Taipower's Operations	83~84
Air Quality (Specific Topic)			
GRI 103: Management Approach 2016	103-2 The management approach and its components 103-3 Evaluation of the management approach	6.3.3 Response Measures to Air Pollution	88~90
Energy Efficiency			
GRI 103: Management Approach 2016	103-2 The management approach and its components 103-3 Evaluation of the management approach	6.2.2 Enhancing the Energy Efficiency of Taipower's Operations	83~84
GRI 302: Energy 2016	302-1 Energy consumption within the organization	6.2.2 Enhancing the Energy Efficiency of Taipower's Operations	83~84
	302-3 Energy intensity		
	302-4 Reduction of energy consumption	6.2.1 Fuel Usage Management 6.2.2 Enhancing the Energy Efficiency of Taipower's Operations	83~84

GRI Standards	GRI Items	Reference	Page/URL
Demand Side Management and Energy Conservation			
GRI 103: Management Approach 2016	103-2 The management approach and its components 103-3 Evaluation of the management approach	4.1 Smart Grid General Planning 5.1.1 Demand Side Management Measures	65~67 69~70
GRI 203: Indirect Economic Impacts 2016	203-2 Indirect economic impacts		
Power Plants Renewal and Decommissioning			
GRI 103: Management Approach 2016	103-2 The management approach and its components 103-3 Evaluation of the management approach	3.2.1 The Transition to a New Generation of Energy 3.2.2 Renewables Development	59~63
GRI 203: Indirect Economic Impacts 2016	203-1 Infrastructure investments and services supported	3.2.2 Renewables Development	61~63
	203-2 Significant indirect economic impacts	3.2.1 The Transition to a New Generation of Energy	59~61
Worker's Health and Safety			
GRI 403: Occupational Health and Safety 2018	403-1 Occupational health and safety management system	7.2.1 Occupational Health and Safety	100~105
	403-2 Hazard identification, risk assessment, and incident investigation		
	403-3 Occupational health services		
	403-4 Worker participation, consultation, and communication on occupational health and safety		
	403-5 Worker training on occupational health and safety		
	403-6 Promotion of worker health		
	403-7 Prevention and mitigation of occupational health and safety impacts directly linked by business relationships		
	403-9 Work-related injuries		
Other GRI-corresponding items			
GRI 418: Customer privacy 2016	418-1 Substantiated complaints concerning breaches of customer privacy and losses of customer data	5.3.2 Guarding Information Security	77
Industry-Specific Topics of the Electric Utilities			
G4 - Industry-Specific Topics of the Electric Utilities	G4-EU10 Planned capacity against projected electricity demand over the long term, broken down by energy source and regulatory regime	3.1.2 A Robust Transmission and Distribution System	57~58
	G4-EU11 Average generation efficiency of thermal plants by energy source and by regulatory regime	6.2.2 Enhancing the Energy Efficiency of Taipower's Operations	83~84
	G4-EU28 Power outage frequency	3.1.2 A Robust Transmission and Distribution System	57~58
	G4-EU29 Average power outage duration		

Appendix | Assurance Statement 102-56



ASSURANCE STATEMENT

SGS TAIWAN LTD.'S REPORT ON SUSTAINABILITY ACTIVITIES IN THE TAIWAN POWER COMPANY'S SUSTAINABILITY REPORT FOR 2021

NATURE AND SCOPE OF THE ASSURANCE/VERIFICATION
 SGS Taiwan Ltd. (hereinafter referred to as SGS) was commissioned by Taiwan Power Company (hereinafter referred to as TPC) to conduct an independent assurance of the Sustainability Report for 2021 (hereinafter referred to as the Report). The scope of the assurance, based on the SGS Sustainability Report Assurance methodology, included the sampled text, and data in accompanying tables, contained in the report presented during verification (12/ May/ 2022~ 14/ Jun/ 2022). SGS reserves the right to update the assurance statement from time to time depending on the level of report content discrepancy of the published version from the agreed standards requirements.

INTENDED USERS OF THIS ASSURANCE STATEMENT
 This Assurance Statement is provided with the intention of informing all TPC's Stakeholders.

RESPONSIBILITIES
 The information in the TPC's Sustainability Report of 2021 and its presentation are the responsibility of the directors or governing body (as applicable) and management of TPC. SGS has not been involved in the preparation of any of the material included in the Report.

Our responsibility is to express an opinion on the report content within the scope of verification with the intention to inform all TPC's stakeholders.

ASSURANCE STANDARDS, TYPE AND LEVEL OF ASSURANCE

The SGS ESG & Sustainability Report Assurance protocols used to conduct assurance are based upon internationally recognized assurance guidance, including the Principles contained within the Global Reporting Initiative Sustainability Reporting Standards (GRI Standards) 101: Foundation 2016 for report quality, and the guidance on levels of assurance contained within the AA1000 series of standards and guidance for Assurance Providers.

The assurance of this report has been conducted according to the following Assurance Standards:

Assurance Standard Options and Level of Assurance	
A.	SGS ESG & SRA Assurance Protocols (based on GRI Principles and guidance in AA1000)
B.	AA1000ASv3 Type 1 Moderate Level (AA1000AP Evaluation only)

TWLPP 5008 Issue 2201

SCOPE OF ASSURANCE AND REPORTING CRITERIA
 The scope of the assurance included evaluation of quality, accuracy and reliability of specified performance information as detailed below and evaluation of adherence to the following reporting criteria:

Select specific reporting criteria included in the contract

Reporting Criteria Options
1. GRI Standards (Core)
2. AA1000 Accountability Principles (2018)

- AA1000 Assurance Standard v3 Type 1 evaluation of the report content and supporting management systems against the AA1000 Accountability Principles (2018) at a moderate level of scrutiny; and
- evaluation of the report against the requirements of Global Reporting Initiative Sustainability Reporting Standards (100, 200, 300 and 400 series) claimed in the GRI content index as material and in accordance with.

ASSURANCE METHODOLOGY
 The assurance comprised a combination of pre-assurance research, interviews with relevant employees, superintendents, SD committee members and the senior management in Taiwan; documentation and record review and validation with external bodies and/or stakeholders where relevant. In response to COVID-19 pandemic situation the assurance process was conducted via Microsoft Teams.

LIMITATIONS AND MITIGATION
 Financial data drawn directly from independently audited financial accounts, and SASB related disclosures has not been checked back to source as part of this assurance process.

STATEMENT OF INDEPENDENCE AND COMPETENCE
 The SGS Group of companies is the world leader in inspection, testing and verification, operating in more than 140 countries and providing services including management systems and service certification; quality, environmental, social and ethical auditing and training; environmental, social and sustainability report assurance. SGS affirm our independence from TPC, being free from bias and conflicts of interest with the organization, its subsidiaries and stakeholders.

The assurance team was assembled based on their knowledge, experience and qualifications for this assignment, and comprised auditors registered with ISO 26000, ISO 20121, ISO 50001, SA8000, RBA, QMS, EMS, SMS, GPMS, CFP, WFP, GHG Verification and GHG Validation Lead Auditors and experience on the SRA Assurance service provisions.

FINDINGS AND CONCLUSIONS

VERIFICATION/ ASSURANCE OPINION
 On the basis of the methodology described and the verification work performed, we are satisfied that the specified performance information included in the scope of assurance is accurate, reliable, has been fairly stated and has been prepared, in all material respects, in accordance with the reporting criteria.

We believe that the organization has chosen an appropriate level of assurance for this stage in their reporting.

TWLPP5008 Issue 2201

AA1000 ACCOUNTABILITY PRINCIPLES (2018) CONCLUSIONS, FINDINGS AND RECOMMENDATIONS

Inclusivity

TPC has demonstrated its commitment to stakeholder inclusivity through formalised commitment from the highest governing body. A variety of engagement efforts such as survey and communication to employees, customers, investors, suppliers, CSR experts, and other stakeholders are implemented to underpin the organization's understanding of stakeholder concerns.

Materiality

TPC has established effective processes for determining issues that are material to the business. Formal review has identified stakeholders and those issues that are material to each group and the report addresses these at an appropriate level to reflect their importance and priority to these stakeholders. It's recommended to use appropriate criteria and thresholds to determine the significance, likelihood, and present and expected future impact of identified material sustainability topics.

Responsiveness

The report includes coverage given to stakeholder engagement and channels for stakeholder feedback. Communications with stakeholders on an ongoing and timely manner are recommended to be delivered reasonable and viable responses.

Impact

TPC has performed processes to recognize and manage the organization's impacts that are applied across the organization under the governance of senior management. It's recommended to defined methodology to present impacts as quantitative or monetized measurement results.

GLOBAL REPORTING INITIATIVE REPORTING STANDARDS CONCLUSIONS, FINDINGS AND RECOMMENDATIONS

The report, TPC's Sustainability Report of 2021, is adequately in line with the GRI Standards in accordance with Core Option. The material topics and their boundaries within and outside of the organization are properly defined in accordance with GRI's Reporting Principles for Defining Report Content. Disclosures of identified material topics and stakeholder engagement, GRI 102-40 to GRI 102-47, are correctly located in content index and report. For future reporting, it is recommended to have more descriptions on the mechanisms and results for evaluation the effectiveness of the management approach for material topics reported on which are not covered by the GRI Standards.

Signed:

For and on behalf of SGS Taiwan Ltd.



Stephen Pao
 Knowledge Deputy General Manager
 Taipei, Taiwan
 06 July, 2022
WWW.SGS.COM



