Taiwan Power Company

2021 Sustainability Report

Reporting Principles

This is the 15th issue of the 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 the report and disclosing information. This report has been verified by SGS Taiwan to ensure it meets the requirements of the Core option of the GRI Standards and is consistent with the AA1000 Accountability Principles (Type 1 Moderate Level of Assurance). The Report was approved by the unit managers, the President and Chairman before publication.

In response to international energy transition and digitalization, and reflects the Company's aim of incorporating the concepts of circular economics, the 2021 Taipower Sustainability Report has adopted the theme of a "Sustainable Circular Economy and Smart Taipower." We integrate the five major themes for the sustainable development of Taipower into the contents of each chapter, including "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" to demonstrate Taipower's role in the sustainable development of the power industry.

Reporting Period

The report covers the period from January 1 to December 31, 2020. To ensure complete disclosure and comparability, the report includes past data as well as information from 2021. 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 and 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.

Taiwan Power Company

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Taipower Official Website

Taipower Sustainable Development Section Website

Contact Taipower

Taipower has set up a “Taipower Sustainability” section on its website to fully explain its performance results on various sustainability issues to stakeholders. Taipower 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 2022. Please feel free to contact us.

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Annual Sustainability Reports

Sustainability Performance

Environment

- Protected air quality by voluntarily reducing loads ***872*** times
- Taipower plans to invest more than NT$***418 billion*** in renewable energy from 2015 to 2030
- Taipower's Power-Saving Service Teams visited ***5,410*** customers in 2020 and are expected to potentially save ***96.41 million*** kWh of electricity
- The wastewater recycling ratio of thermal power plants exceeded the original target (73%) and reached ***79%***
- Taipower integrated the product life cycle concept and established the ***"Circular Economy Strategy Blueprint"***

Society

- Number of participants in health and safety training in 2020: ***54,049***
- In 2020, ***831*** briefings on occupational health and safety were held for contractors with a total of ***31,721*** attendees
- In 2020, Taipower's 1911 customer service hotline received approximately ***2.15 million*** calls; ***95.89%*** of the incoming calls were answered by designated personnel within 20 seconds
- ***5,588*** employees took part in Taipower's charitable activities in 2020 and recorded ***20,714*** total service hours
- Taipower donated approximately NT$***112.53 million*** in community support in 2020

Governance

- ***Ranked first in the corporate governance evaluation*** of state-run enterprises for ***five consecutive years***
- In preparation for smart grid development, Taipower set up ***65*** kilometers of optical cables and ***94*** fiber optics communication systems while providing ***773*** communication circuits in 2020. Taipower has installed ***29,621*** high-voltage AMIs and ***1,096,869*** low-voltage AMIs as of the end of 2020
- Awards received at the ***2020 Taiwan Corporate Sustainability Awards (TCSA)***: Corporate Sustainability Report Platinum Award, Top 50 Corporate Sustainability Award, Social Inclusion Award, Creativity in Communication Award, Growth Through Innovation Award and Climate Leadership Award
- Placed 26th in the large enterprises category of the ***2020 CommonWealth Magazine Corporate Citizenship Awards***

Statement from the Chairman

In 2020, the COVID-19 pandemic has been a shock to both domestic and foreign enterprises. When faced with multiple natural and man-made risks, entrepreneurs are reminded that they should not only consider "short-term survival" or "seeming victory." Instead, businesses must pursue sustainability and increase “corporate resilience.” Taipower has been the driving force behind Taiwan's industrial development. We actively develop renewable energy and innovation in response to the government’s energy policy and the "5+2 Innovative Industries Plan." As Taipower balances traditional and diverse emerging sources of electricity, it also utilizes 5G, AI and big data technologies to expand the applications of the smart grid. The Company is also committed to promoting data applications, digital transformation, and technological innovation. In addition, as a leading power company in Asia, Taipower established a "Circular Economy Strategy Blueprint" this year. The blueprint incorporates the unique features of the power industry in each phase of the product life cycle, and develops future strategies to promote the concept of a circular economy.

Promoting Energy Transition and Developing Low-Carbon and Clean Energy

The international community has formed a consensus around reducing carbon emissions. In 2020, both Japan and Korea announced their plans to become carbon neutral by 2050. The International Energy Agency (IEA) pointed out that 90% of the newly installed power generation capacity in 2020 consisted of renewable energy. In response to Taiwan’s energy policies and regulations, Taipower shall prioritize the development of renewable energy, low-carbon gas power generation, and upgrading coal-fired power units. Being central to the global supply chain, Taiwan’s high-tech and manufacture industries have also established renewable energy targets to meet the requirements of major international companies.

In response to these global trends and requirements, Taipower not only should actively promote energy transition, but should also uphold its commitments to reducing coal, pollution, and carbon. To reduce the use of coal, Taipower adopted the most advanced ultra-supercritical technology and load reduction strategy during the peak air pollution season. It implemented rotations and backup management for generators to attain optimized management. It invested in high-efficiency air pollution prevention equipment that drastically reduces carbon emissions. In addition, Taipower produced an “Environmental White Paper” that established short, medium and long-term carbon emission targets. The Company also deployed advanced carbon capture and sequestration technologies ahead of schedule to achieve long-term carbon reduction targets.

Taipower is actively developing green power. In addition to its century-old hydropower capabilities, the Company has developed comprehensive plans for solar power, land-based and offshore wind power, etc. To achieve Taipower's target of 7.3 million kW of installed renewable energy capacity by 2030, Taipower has also invested in geothermal and biomass energy generation.

Empowering Digital Transformation and Developing the Smart Grid

The intermittent nature of renewable energy sources creates system load disparities. As the proportion of renewable energy increases, more flexible dispatch mechanisms are needed to stabilize the electric grid and ensure ongoing power quality. Taipower uses 5G, AI, IoT, blockchain and other forward-looking technologies to integrate decentralized energy from a power system optimization viewpoint. Through the digital integration of power resources, Taipower is building a digital energy internet with smart grid as its core.

Taipower's smart grid development is divided into three stages. Smart Grid 1.0 is an infrastructure plan which is currently underway. Smart Grid 2.0 is a practical operation model. Smart Grid 3.0 will encompass an electricity market that is open to the effective integration of energy sources and reaches a wide range of applications. Taiwan is currently in the second stage of its smart grid development. This phase emphasises ensuring stable operation of the power system, enhancing the quality of supply, and encouraging customers to save energy.

Taipower is also applying AI and big data analysis technologies in preventive maintenance and renewable energy generation forecasting. Preventive maintenance applications are now available to optimize operations and reduce costs for thermal power units. In terms of wind and solar power, a model that predicts the correlation between power generation capacity and the amount of insolation can be created. It will provide wind and solar power generation forecasts for the entire system over the coming 48 hour period. The information can also be used as a reference for system dispatch and unit operation schedules.

Adopting a Circular Economy and Developing New Business Opportunities

In order to combine stable power generation with environmental sustainability, Taipower has adopted the principles of a circular economy. With a new mode of thinking and new rules for action, the Company is breaking the traditional linear mindset of “excavate,” “produce,” “use,” and “discard.” Through its commitment to creating a circular economy, Taipower is promoting the transformation of the power industry with the concept of resource sustainability. The key factors for power generation can be generally divided into energy and resources. Due to the nature of these factors, which operate both independently and codependently, the circular economy of the power industry must be conceptualized based on all stages of the product life cycle. We need to think systematically in constructing a cycle that encompasses planning, energy resource procurement, power industry infrastructure, power supply sales, services and waste treatment in order to make good use of energy and resources.

In terms of energy, Taipower specializes in optimized power production and efficiency in power transmission and distribution. It also continues to develop electricity reclaimed from cold/heat energy recycling technologies. In terms of resources, as power facilities are Taipower's most important assets, the concept of circular economy must be adopted for the design/procurement, construction, maintenance and use of related infrastructure to attain modularized designs and make full use of the shared platform concept. In the future, Taipower aims to achieve value co-creation within the industry under the framework of the Government Procurement Act.

The development of the power industry must adhere to future trends and challenges. Important issues such as energy transition, digital transformation, and the circular economy must be incorporated into Taipower's sustainability DNA. Hence, they can be expanded horizontally into all units of the Company and be used to develop targets and action plans. Taipower’s adoption of circular concepts of innovative technology applications and digital transformation will enhance its resilience in the face of emerging risks and opportunities. The Company is also pursuing sustainability with a long-term and macroscopic view of becoming an indispensable partner for the people and companies of Taiwan. Taipower shall continue to advance as it becomes a world-class, sustainable power company.

Chairman Wei-Fan Yang

Taipower's Value Chain and Operational Elements

Mission, Vision and Core Values

Mission

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

Vision

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

Core Values

Integrity, Care, Service, Growth

ESG and Sustainable Development Profiles

Governance

Environment

Society

Provider of Sustainable Power

Leader of Smart Grid Development

Provider of Services for Smart Living

Agent of Environmental Friendliness

Practitioner of Corporate Social Responsibilities

Resource Input

Financial Capital

Capital of Taipower: NT$330 billion

Total expenditures: NT$593.5 billion

Human Resources Capital

Total number of employees: 27,836

Number of contracted workers: 1,100

Number of temporary workers: 130

Equipment Capital

Power plants in operation: 23
(including thermal, hydroelectric and nuclear)

Total installed capacity of thermal power plants: 26,340 MW

Total installed capacity of nuclear power plants: 3,870 MW

Total installed capacity of renewable energy power plants: 2,390 MW

Installed capacity of pumped-storage hydroelectricity: 2,600 MW

Installed capacity of thermal power plants: 7,760 MW

Installed capacity of purchased renewable energy: 6,810 MW

R&D Capital

Number of research projects for the year: 422

R&D investment:
R&D expenditure of NT$4.4 billion in 2020
(Including NT$3.5 billion in expenditures and NT$900 million in capital expenditures)

Natural Capital

Natural Gas: 15,075 million cubic meters

Coal: 26.937 million metric tons

Fuel Oil: 758 thousand kiloliters

Nuclear Fuel: 1,555,000 pounds

Recurrent environmental protection expenditure: 3.63 billion

Environmental protection capital expenditure: NT$4.75 billion

*Actual value in 2020.

Social Capital

Number of users: 14.56 million

Power development promotion and assistance fund: NT$2.764 billion

Capacity of demand response: 2,530 MW

Power supply partners:
9 Independent Power Producers (IPPs), 49 cogeneration power providers and 34,997 contracts for renewable energy
(including solar power, wind power, hydro power and others)

Power Generation ▶ Transmission and Distribution ▶ Electricity Retailing

Power Generation

T & D

Electricity Retailing

Taipower electricity generation in 2020

- **Thermal power generation:** 146.97 billion kWh
- **Renewable energy:** 3.42 billion kWh
- **Pumped-storage hydro-electricity:** 3.15 billion kWh
- Nuclear power: 30.34 billion kWh

Electricity purchased from external sources in 2020

- **Privately-owned thermal power plant:** 40.6 billion kWh
- **Cogeneration:** 4.1 billion kWh
- **Renewable energy:** 10.4 billion kWh

Total length of power transmission lines: 17,790 circuit kilometers

Total length of distribution lines: 389,119 circuit kilometers

Number of substations: 618

Total number of users: 14.56 million

	Percentage of electricity used (sold) by users	User power supply (billion kWh)
Industry	56%	126.1
Residential	21%	46.7
Commercial	15%	34.5
Others	8%	17.5

Outputs

- **Earnings before tax:** NT$23.4 billion
- **Electricity fee income:** NT$584.2 billion

- **Net amount of generated and purchased power:** 238.9 billion kWh
  - Power generated: 183.8 billion kWh
  - Power purchased: 55.1 billion kWh
- **Total power sold:** 224.8 billion kWh
- **Facility utilization rate:** 80.5%
- **Line loss rate:** 3.97%

- **Greenhouse gas emissions:** 91,518 kt CO_2e
- **Air pollution emissions** (kg/GWh):
  - Emissions of particulate pollutants: 14
  - Sulfur oxide emissions: 125
  - Nitrogen oxide emissions: 158

- **Number of new employees:** 2,321
- **Total number of education and training participants:** 78,385
- **Incidents of work-related injuries:** 10
- **Ratio of work-rated injuries:** 0.035%

- **Number of research reports:** 189
- **Number of papers published:** 118
- **Number of patents/intellectual property cases:**
  - 55 in the Republic of China
  - 1 in the United States

- **Customer satisfaction rate:** 95.7 points
- **Number of charity events:** 936

Digital Transformation with Smart Taipower

As it faces the challenge of energy transition, Taipower is actively strengthening its energy management capabilities by introducing 5G, AIoT and big data technologies, building a smart grid and promoting demand-side management. The Company also uses machine learning and other technologies to obtain real-time demand and supply information in order to tackle the intermittent nature of renewable energy generation. By effectively integrating operational procedures with customer experiences, Taipower is creating new value while improving the power supply's stability and efficiency.

Traditional Power Supply

- Large-scale, centralized power generation
- One-direction output
- Accumulated abundant predictive data for load analysis and experience in power supply, operations and dispatch.

Stable Supply of Renewable Energy

Real-Time and Diverse Data Sources

Consolidation of Demand / Supply Resources

Smart Power

- Use 5G, AI and IoT technologies to develop green energy applications
- Consolidate power resources digitally
- Create a digital energy internet with a smart grid as its core.

Solution

Mobile digital technology, AI and AMI big data must be combined to learn about electricity consumption. The supply of electricity must be based on demands to save energy and limit electricity expenditures.

Solution

Digital systems must be integrated and new forms of power trading must be developed through equipment, business models and customer interactions.

Solution

Due to the intermittent nature of renewable energy generation, a flexible smart grid is needed. Flexible scheduling can stabilize the quality of the grid's power supply and ensure the stability of the power system.

Case Study

Setting Up A Smart Grid and Developing A New Power Supply Chain

Kinmen has been designated a smart, low-carbon demonstration island. Taipower has designed three lines of defense to significantly improve the stability of the island's power system: 1. Tashan Power Plant's No. 9 and 10 high-efficiency, low-emission units provide a stable power supply for the system; 2. Two energy storage systems respond at different speeds to support each other. They reduce the impact of fluctuations caused by renewable energy supply; 3. The real-time offload demand response program can temporarily disconnect the power supply to major electricity consumers who voluntarily shut down during system emergencies, protecting the system and the general public's electricity consumption. In addition, an energy management system, an advanced distribution management system, fiber optics around the island, an information security upgrade, comprehensive smart meter adoption, Taipower App promotion, and citizen power plants are all important projects.

Case Study

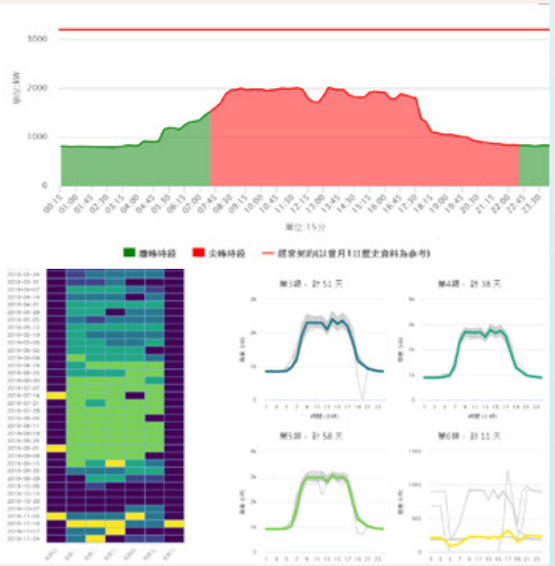
The Taipower App

Taipower combined mobile digital technology and AMI big data applications to upgrade the "Taipower E-counter" app with a new "Taipower App." The app has new functions, such as electricity prepayment, electricity consumption management, electricity consumption information and tendencies, and timely reporting of power outages, which increase the convenience of electricity consumption for the public.

Case Study

Digital Technology Applications: Plan, Design and Create New Business Models

Taipower completed the installation of 1.1 million smart meters in 2020. With the smart meters, Taipower provides customers with electricity consumption data and visualized electricity consumption analysis charts. These encourage users to reduce power usage of their own accord by providing them with their real-time electricity consumption information.



Energy and Resource Recycling for a Sustainable Future

From Environmental Policy to Circular Economic Strategy

In response to international trends in energy transition and the government's 5 + 2 industrial innovation plan, Taipower has made developing a circular economy one of the key items for its sustainable operations. In its 2019 Environmental White Paper, Taipower pledged to create efficient and sustainable uses of energy and resources with a circular mindset, and to implement the concept of a circular economy. By developing the two strategic dimensions of establishing of a circular business model and improving resource usage efficiency, the Company promotes various circular economic measures with the aim of shifting from a linear economic development mindset to a circular economy model that supports sustainable development.

Electricity is Taipower's product. The process of power generation requires raw materials and the input of two key factors: power infrastructure and equipment. This model creates the potential for establishing a recycling loop in the product life cycle.

Core: Taipower and Stakeholders

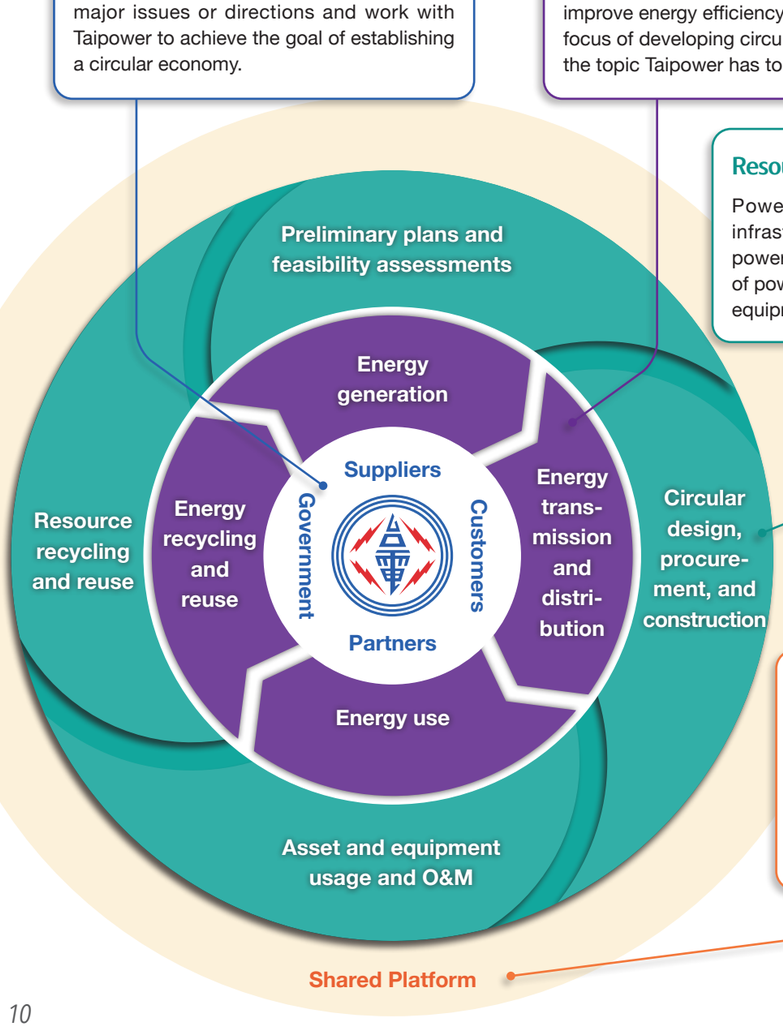
Through communication and cooperation, stakeholders will respond to Taipower's major issues or directions and work with Taipower to achieve the goal of establishing a circular economy.

Energy Sphere: Recycling Energy

How to enhance energy recycling and improve energy efficiency is the strategic focus of developing circular energy. It is also the topic Taipower has to face.

Resource Sphere: Recycling Resources

Power generation equipment and power infrastructure are important assets for the power industry, so the concept of recycling of power infrastructure and power generation equipment must be included.



External Sphere: A Shared Platform

At each stage of its life cycle, Taipower can develop a cooperative model of sharing energy resources with its stakeholders to obtain the ESG benefits of a circular economy.

Taipower's 2020 Circular Economy Highlights

Energy Sphere

Energy Recycling - Smart Energy Storage

Taipower successively completed the construction of two energy storage systems in 2020. Both systems have been integrated into the grid for dispatch and are subject to scheduling to enhance the stability of the power system. The systems will implement automatic frequency controls to assist in increasing the frequency stability of the system during normal circumstances. They also transfer a significant amount of solar power generated during daytime for nighttime use. When there is an abnormal shutdown in the grid, one system can immediately provide the full load within 0.2 seconds to support the grid. If the other system is being charged, it can stop charging immediately and effectively improve the grid's operating allowance.

Resource Sphere

TPCreative - Instilling New Life into Resources

TPCreative is a Taipower initiative that pursues environmental sustainability through the circular economy. All materials are sourced from production byproducts, such as soot produced in power generation or discarded equipment. The effort gave new life to these byproducts by creating "manhole cover soot coasters," "soot aroma stone notebooks," "wooden LED bedside reading lamps," "insulator lamp holders," and other cultural and creative products. More than 15,000 cultural and creative products have been sold earning a revenue of NT$3.82 million.

Resource Recycling and Reuse

To improve air quality, Taipower has installed flue gas desulphurization equipment in coal-fired power stations to remove the sulfur oxides from the flue gas. It also uses the limestone-gypsum process to convert sulfur oxides to desulfurized gypsum that can be used in cement and fireproof panels. Taipower's desulfurized gypsum production volume in 2020 was approximately 296,000 metric tons. In addition, Taipower has installed rainwater and wastewater recycling systems at all power plants, and the proportion of wastewater recycling has reached 78%. An "Intelligent Water Resource Recycling System" has been introduced in the General Management Office and has reclaimed 9,000 tons of water since 2018.

External Sphere

Marine Pasture

Taipower's Marine Pasture uses the warm water discharge from power plants for aquaculture (fish farming). The project is currently being implemented at the Linkou power plant and has been farming multiple species, such as giant groupers, milkfish, and whiteleg shrimp. The project has passed heavy metal content and fish disease tests, and there are no food safety concerns. In addition to warm water discharge, Taipower's microalgae-based carbon sequestration technology uses microalgae to absorb carbon dioxide from flue gas, achieving carbon reduction and making algae into fish feed.

Future Prospects

By establishing the strategic blueprint, Taipower will continue to take a comprehensive inventory of its value chain from top to bottom, establish management mechanisms and indicator tracking systems. It will also facilitate cross-department communication and gradually expand the scale and scope of its circular economy in all aspects of business operations. Taipower organized the Return Home Special Exhibition in May 2021 to communicate Taipower's corporate values and resolve to promote a circular economy. In the future, the Company will continue to promote environmentally sustainable practices with the goal of establishing an international benchmark for sustainable power generation. Through the process of benchmarking, stakeholder communication and cooperation, it will keep abreast of the latest trends in the development of circular economies, receive feedback from the public, and review and refine its results year by year.

Taipower Supports Pandemic Prevention with a Stable Electricity Supply for Face Mask Factories

When the COVID-19 pandemic first broke out in early 2020, the number of confirmed cases rose rapidly across the world. The government in Taiwan worked with the private sector and adopted multiple emergency response measures. The requirement for mandatory wearing of face masks was announced during Chinese New Year when work in all industries was suspended. As the domestic face mask supply was insufficient to meet public demand, people grew increasingly anxious about their availability.

Taiwan's "National Face Mask Production Team" was born under these circumstances and Taipower immediately provided a stable electricity supply to support the manufacturing plants. A face mask rationing system was created, which became the envy of many countries, and it quickly relieved the pressure of the domestic pandemic and the psychological pressure on the public. Taipower has taken the three following approaches to providing a stable electricity supply:

Enhance maintenance of power supply equipment

Approach

The government announced the requisition of masks at the onset of the COVID-19 outbreak. Taipower sought to ensure a stable electricity supply for face mask factories and has strengthened its electricity supply circuit maintenance for face mask factories since February 2020. Taipower actively assigned personnel to conduct inspections of internal and external circuits, and implemented infrared inspections to enhance maintenance. The Company helped to inspect users' equipment, measured the capacity of circuits and suspended scheduled power outages. It also established direct contact people to help factories quickly respond to related requests. Taipower mobilized 1,000 personnel from 18 branch offices to ensure the stable supply of electricity. The Company hoped to make use of its expertise to ensure the stable supply of electricity during the production of more than 10 million face masks per day, and took practical actions to support the expansion of production in factories producing pandemic prevention supplies.

Actual Cases

Taipower's Changhua Branch Office is responsible for an area with nearly 30 face mask factories. They account for 25% of the requisition and material supply of face masks and are important members of the National Mask Production Team. Taipower has assigned more than 400 personnel to inspect the face mask factories and ensured a stable electricity supply. It also helped the face mask factories to modify their electrical circuits. It assigned dedicated staff to actively process the new electricity consumption necessary for production expansion, and the supply was done within one week. The branch office also adopted several practical support measures, such as increasing the number of preventive electricity supply circuit inspections, preparing emergency repairs and alternative electricity supplies to respond to emergencies, temporarily suspending planned power outages, and establishing contact persons with each factory to resolve electricity consumption issues.

- Mobilized ***1,000*** personnel from ***18*** Branch Offices, across Taiwan
- Enhanced preventive inspections and implemented prompt repairs
- Prepared for emergency repairs and alternative electricity supply solutions
- Assisted in adjusting and rerouting circuits
- Temporarily suspended planned power outages
- Established direct contact persons

Electricity bill reduction for face mask factories

Approach

The government announced the requisition of face masks to prevent the spread of the pandemic and the Ministry of Economic Affairs instructed the factories of the "National Face Mask Production Team" to operate 24 hours a day. Taipower promptly reduced the additional electricity fees that resulted when increased production drove electricity demands that exceeded the original contract capacities. From January 24, 2020, Taipower calculated charges for electricity consumption in excess of the maximum demand based on the unit prices stipulated in the originals contract with no additional fees collected.

Actual Cases

Taipower implemented measures to reduce commercial electricity fees for factories responsible for producing pandemic prevention supplies. For instance, the Company reduced fees for a factory in Changhua by NT$15,000, and reduced fees for a factory in Taoyuan by nearly NT$18,000. With Taipower's strong support, the face mask production capacity increased from 1.88 million pieces per day in January to 20 million pieces per day in May. The production capacity met public demand and made it possible for Taiwan to implement its unique mask diplomacy during the pandemic.

- As of the end of 2020, the electricity bill reduction for face mask factories totaled approximately NT$***7.6 million*** and benefited approximately ***70*** companies.
- Electricity bill reduction relief: NT$***26.4 billion***
- Assisted in increasing the face mask production capacity in Taiwan to ***20 million*** pieces per day

Regular visits and heartwarming services

Approach

In response to the demand for additional production lines in face mask factories, the Directors of each Taipower branch office personally visited the person-in-charge of each factory to help them apply for additional electricity supply. The Sales Departments of each branch office also actively assigned personnel to conduct regular inspections of the face mask factories to contribute to the pandemic prevention in Taiwan for the benefits of ourselves and others.

Actual Cases

In February 2020, the Director of Taipower's Keelung Branch Office visited a mask factory in the area to understand the need for additional power capacity. When the factory was installing additional machines, the service director of the Keelung Branch Office brought an additional electricity consumption registration form and assisted the customer in completing the application procedures. The inspections were completed and electricity supply was increased on the same day. In early March, the manufacturer was going to add a new factory to expand its production line in accordance with the policy, so it needed to shut down and replace its equipment to increase electricity consumption. To avoid affecting the production of masks, Taipower made use of the lunch break of the mask factory during weekends to reduce the construction time of the power outage to within one hour and shorten the power supply process to one week. Taipower took the initiative to understand the needs of the factories and provided assistance to achieve the national mask production target together with the mask manufacturers.

- Assisted in applying increase electricity consumption and reducing the time spend in power outage
- Shortened the electricity re-supply procedures

Performance Highlights

- Formulated **"Taipower's Sustainable Development Plan"** and established short, medium and long-term goals for sustainable development
- Taipower supports its transformation into a **parent holding company with subsidiaries for Power Generation Company and Transmission, Distribution and Retail Company (TD&R Co.).** Taipower will be transformed from a comprehensive electricity enterprise to a power industry group; the first transformation of its kind among government-owned enterprises.
- Awards received at the **2020 Taiwan Corporate Sustainability Awards (TCSA)**: the Corporate Sustainability Report Platinum Award, a Top 50 Corporate Sustainability Award, the Social Inclusion Award, the Creativity in Communication Award, the Growth through Innovation Award and a Climate Leadership Award
- Awards received from **Enterprise Asia at the 2020 Asia Responsible Enterprise Awards**: the Social Empowerment Award and the Circular Economy Leadership Award

1 Taipower and Sustainability

The Implication of a Sustainable Taipower

Taipower takes on the critical responsibility of ensuring a stable power supply and plays a pivotal role in Taiwan's energy transition. To accomplish this, it is necessary to have a sound, sustainable governance structure. Taipower will continue to refine its environmental, social, and governance (ESG) policies to promote and enhance sustainability. In addition, Taipower will communicate and cooperate with both internal and external stakeholders to lay the foundation for its transformation. Moreover, it will plan for sustainable management and develop a long-term vision.

Major Investments

- Established the Sustainable Development Commission (SDC) and formulated the "Sustainable Development Plan" to review the yearly status of the targeted achievements.
- Adopted "Strengthening the Foundation" and "Seeking Development" as core philosophies as it transforms into a power holding group.
- Focused on stakeholder communication channels to strengthen the quality and frequency of communications.

Future Plans

Taipower seeks to become an outstanding and trustworthy world-class power business group. While integrating sustainable governance in its business model and promoting its transformation into a holding company, Taipower is committed to overcoming the challenges of transformational change within the power industry. It will develop supporting measures to meet these transformational needs and plan the transformation to a power generation, transmission and distribution, and electricity retailing utility. Taipower is also adopting a parent-subsidiary control and group financial management model. In the process of its corporate transformation, Taipower will strengthen communication and cooperation with its stakeholders and will internalize the suggestions and feedback from them into its operations while gradually developing the next generation of the power industry.

Primary Awards

Sustainable Development

- Awards received at the **2020 Taiwan Corporate Sustainability Awards (TCSA)**: the Corporate Sustainability Report Platinum Award, a Top 50 Corporate Sustainability Award, the Social Inclusion Award, the Creativity in Communication Award, the Growth through Innovation Award and a Climate Leadership Award
- Awards received from **Enterprise Asia at the 2020 Asia Responsible Enterprise Awards**: the Social Empowerment Award and the Circular Economy Leadership Award
- Ranked 26th place in the large enterprises' category of the **2020 Commonwealth Magazine Corporate Citizenship Awards**
- Certified as a 2020 Sports Enterprise by the Sports Administration of the Ministry of Education (MOE), and awarded the **2020 Sports Activist Award**. Won three major awards including the Gold Award in Sponsorship, the Long-term Sponsorship Award, and the Gold Award in Promotion. The awards were presented by the ROC's President.

Operations Management

- Ranked 1st place in the **Ministry of Economic Affairs' Corporate Governance Evaluation of State-owned Enterprises** for five consecutive years
- Won two prizes in the **17th National Brand Yushan Awards**, including the National First Prize and Outstanding Enterprise
- Nine units of the Company received **2020 Occupational Health and Safety Excellent Unit Awards from the Ministry of Labor**
- Ranked 9th place globally on the "Getting Electricity" evaluation item in the **Doing Business 2020 report** published by the World Bank

Engineering Innovation

- Awarded Innovative Power Technology of the Year, Smart Grid Project of the Year, Information Technology Project of the Year, Environmental Upgrade of the Year, and Power Plant Upgrade of the Year at Asia Power Magazine's **2020 Asian Power Awards**
- Awarded the Excellence Award at **the 20th Public Construction Golden Quality Awards** from the Public Construction Commission of the Executive Yuan
- Four patented works were nominated in the **2020 Taiwan Innotech Expo Invention Contest**. These received three gold prizes and one silver prize.
- The Kuosheng **Nuclear Power Plant's Unit 1 Fuel Transmission Pool Backing Plate Restoration project** received the 2020 Technology Transfer Award from the Electric Power Research Institute (EPRI) of the United States

Social Co-Prosperity

- **The Lighting the Remains of the 13 Levels** initiative received the Red Dot Design Award in Germany, the Good Design Award in Japan, and the MUSE Design Award in the United States
- Received two awards at **the Seventh Public Art Awards** of the Ministry of Culture including the Excellence Award for the Head Office Public Art Installation Plan and the Education Promotion Plan Award for the Taichung Public Art Installation Plan
- Ranked on the **2020 Taiwan Design Best 100 List**: Taipower D/S ONE – "An Interactive Venue for Refreshing Taipower's Image" received the Brand of the Year Award. TPCreative – "Circular Economy with All Materials Sourced from Power Generation Process" received the Social Care and Friendly Environment Awards

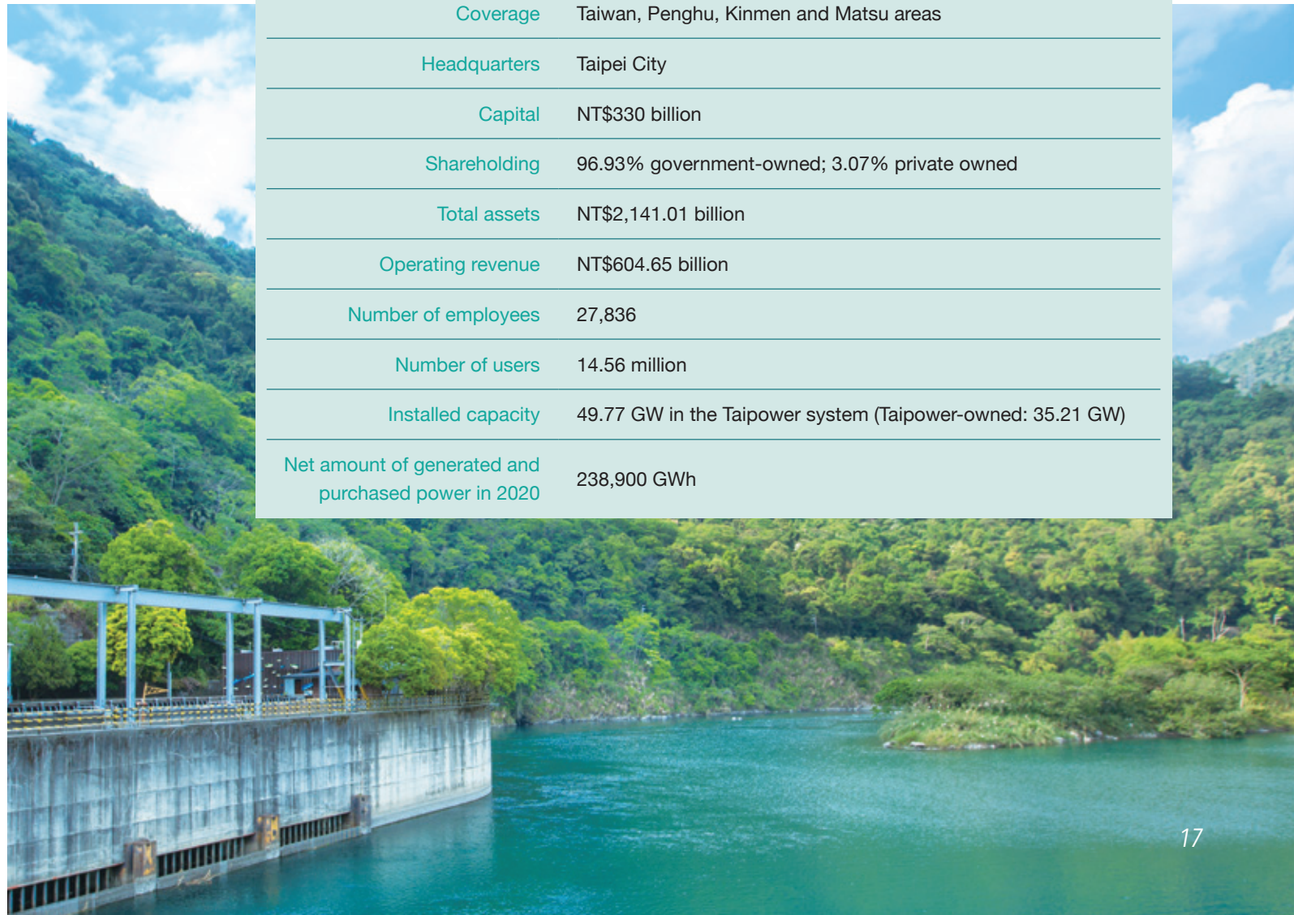
1.1 Taipower Business Overview and Strategy

1.1.1 Taipower Profile

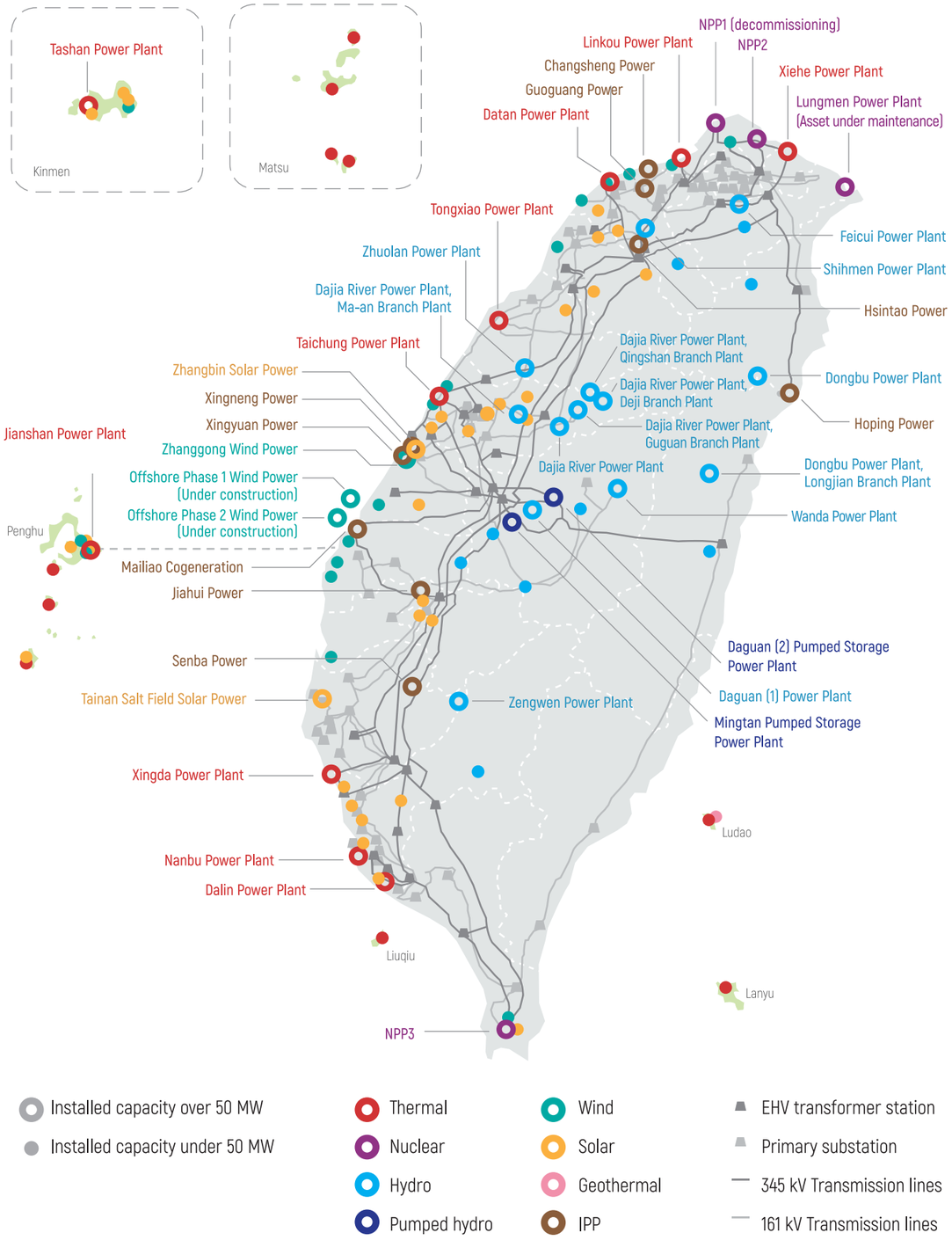
Established on May 1, 1946, Taipower operates in generation, transmission, distribution, and the sale of electricity. According to the Electricity Act, Taipower is responsible for providing a stable electricity supply. Revenue from electricity sales accounted for 95% of the total revenue in 2020. As of 2020, the installed capacity in the Taipower System (including independent power producers) was 49.77 GW, which consists mainly of thermal power generation with hydroelectricity and renewable energy.

In recognition of the global trends toward sustainability and the development of future electricity markets, Taipower has been promoting an organizational transformation in recent years. 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 have adopted policy centralization and management decentralization, in an effort to transform from a government agency into a highly efficient enterprise. In the future, Taipower will 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
Headquarters	Taipei City
Capital	NT$330 billion
Shareholding	96.93% government-owned; 3.07% private owned
Total assets	NT$2,141.01 billion
Operating revenue	NT$604.65 billion
Number of employees	27,836
Number of users	14.56 million
Installed capacity	49.77 GW in the Taipower system (Taipower-owned: 35.21 GW)
Net amount of generated and purchased power in 2020	238,900 GWh



Taipower's Power Plants and Power Grid



1.1.2 Mission, Vision and Core Values

The energy trilemma of energy security, environmental sustainability, and affordable price must be taken into account in the operation of the power industry. In response to the trend of global climate change, domestic energy transition, and the competition resulting from the liberalization of the electricity market, Taipower revised its mission, vision, and core value 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 superior and sustainable power business group.

Our Mission | **To supply stable electricity for the diversified development of society in an environmentally friendly and reasonable-cost manner**

Our Vision | **To transform into a prestigious, trustworthy world-class power utility group**

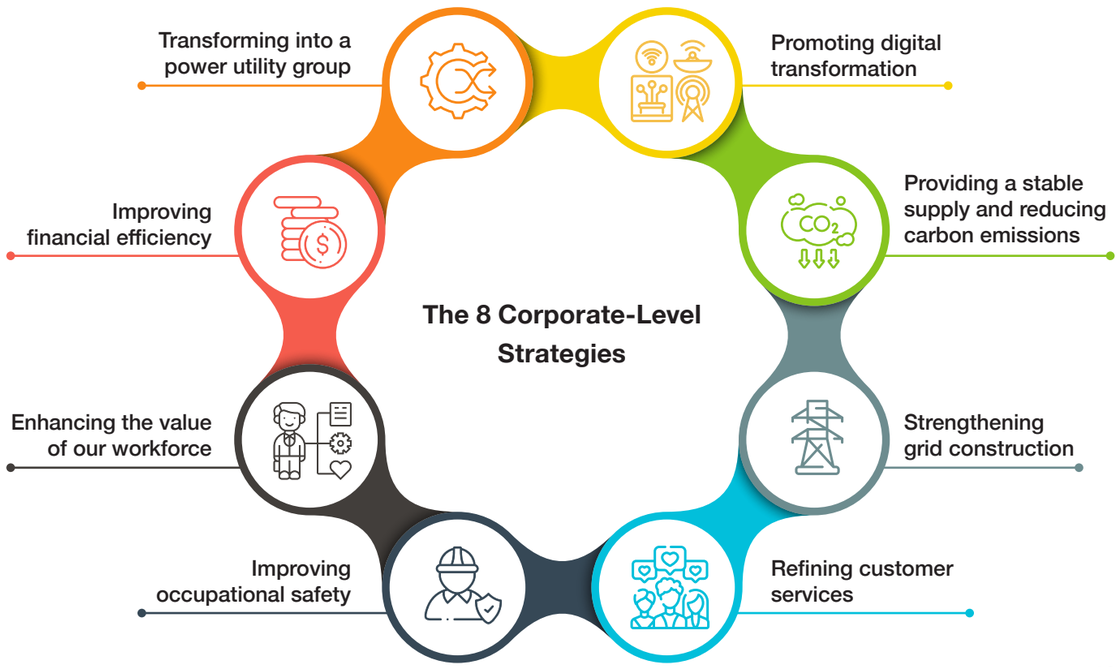
Core Values | **Integrity, Care, Service, Growth**

Mission, Vision and Core Values

1.1.3 Overall Strategy

Management Strategy

As a state-owned enterprise, Taipower must provide reliable power and be eco-friendly while implementing national energy policies that meet business and household needs. To comply with the Electricity Act and ensure stable, sustainable development while pursuing green energy, carbon reduction and energy conservation, Taipower has conducted a careful review and analysis of its current operations. After analyzing and summarizing important factors affecting operations, the Company developed eight strategies which will provide direction for the next five years.



In order to promote and implement these strategies, specific action plans were discussed after the “overall strategy” was formulated by the CEO and the Vice President of each business unit and system. Subsequently, the Company has set 28 corporate goals (see QR Code below) that are classified according to key performance indicators. The implementation status of each goal will be 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 will be made to enhance the growth of Taipower’s sustainable operations.

Corporate Goals

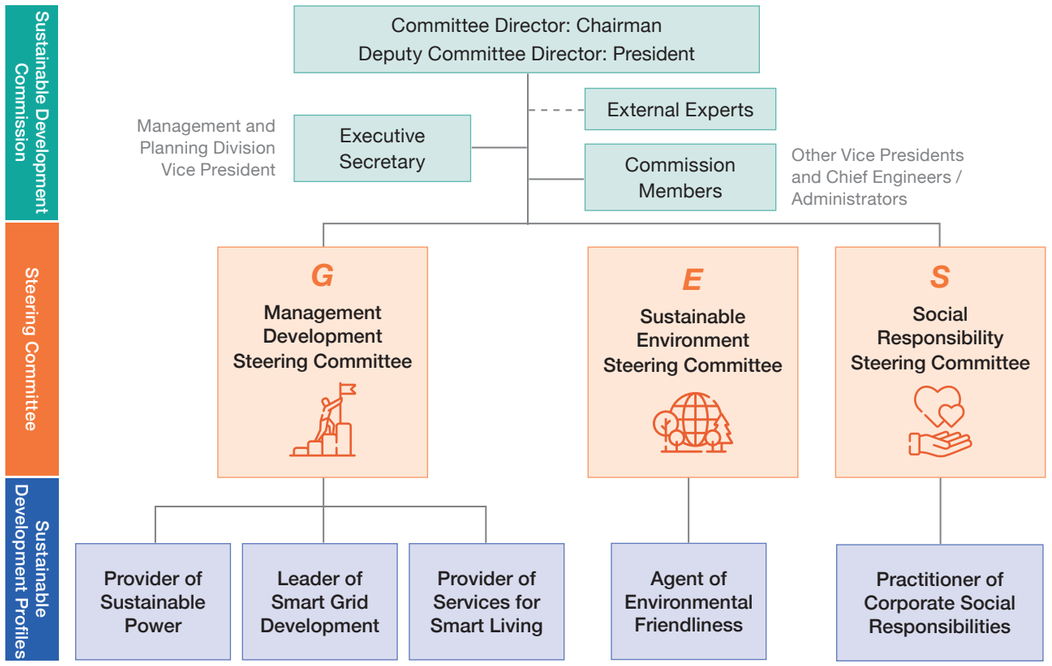
1.2 Implementing Sustainable Development

The Sustainable Development Commission’s Organizational Structure

In 2009, Taipower established a Sustainable Development Commission (SDC). The Chairman, one of the highest-level positions at Taipower, is in charge of the Commission and responsible for hosting SDC meetings and guiding the Company's sustainable development. The SDC has three subordinate promotion teams: the Management Development Promotion Team, the Sustainable Environment Promotion Team, and the Social Responsibility Promotion Team. As coordinators, Vice Presidents are responsible for planning and promoting sustainable development.

The SDC focuses on Taipower's future development. The Company created a Sustainable Development Plan with five major sustainable development profiles, including 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 also aligned itself with the United Nations Sustainable Development Goals (SDGs) by establishing sustainability strategies with short, medium and long-term goals. Continuous reviews and improvements are implemented each year as key tasks for Taipower's sustainable development.

Structure of the Sustainable Development Commission



Operating Mechanisms and Achievements of the SDC

Through three steering committees, the SDC is able to track the results of Taipower's 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 strategies for sustainable development 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, Taipower will hold ad hoc meetings to discuss across committees. For example, the recent international trend of carbon neutrality, carbon management and disclosure, and climate change risk response have become emerging issues. Taipower will pay attention to the international trends, industry dynamics and conduct continuous reviews. Currently, Taipower focused on climate-related risks and current phase results have been disclosed in 2.2.3 Environment and Climate Change Risks.

Actual Performance in 2020

Name of Meeting	Responsibilities	Actual Performance in 2020
Sustainable Development Commission Meeting	Planned the Company's long-term sustainable development, established material topics and approved the Company's Sustainable Development Blueprint	• Convened 1 meeting
Steering Committee Meetings	Formulated the Sustainable Development Plan and short, medium and long-term goals	• Convened 5 meetings
Sustainable Development Profiles Meetings	Executed and followed up on short-term goals	• Meetings were convened when necessary

Under the Chairman’s guidance, Vice Presidents and external experts have reviewed and provided feedback on the Sustainable Development Plan and materiality topics proposed by the steering groups. The results of sustainable development will be reported to the Board of Directors in 2021.

Key Tasks of the SDC

Management Development Steering Committee

Taipower focuses on planning management direction and transformation execution. The management direction is achieved by establishing visions, management structures and by implementing business plans. In terms of the structure of the Company, plans have been implemented for energy transition, organizational transformation, digital transformation, and diversification management.

Sustainable Environment Steering Committee

Creates a green corporate image and promotes low-carbon environmental development in order to fulfill Taipower'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

Strengthens Taipower's corporate humanism and social welfare. Implements Taipower's people-oriented business philosophy and corporate citizenship action. Through cultural and employee assistance activities, Taipower demonstrates its commitment to social responsibility. Taipower is committed to expanding its social involvement and proactively reaching out to the public.

Taipower Sustainable Development Plan

Sustainable Development Profiles	SDGs	Taiwan SDGs	Strategy	Corresponding Targets	2020 Goal	Actual Performance Value (as of 2020)	Short-Term Goals (Until 2021) ▶	Medium-Term Goals (Until 2025) ▶	Long-Term Goals (Until 2030)
Provider of Sustainable Power	7 AFFORDABLE AND CLEAN ENERGY	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**	2,494MW	2,390MW	2,526MW	3,108MW	3,928MW
				Grid connection capacity of the Taipower system	10,807MW	8,582MW	13,025MW	29,602MW	34,962MW
			Promote low-carbon energy, such as gas-fired power generation to ensure stable power supply	**Cumulative total capacity**	13,149MW	13,149MW	13,149MW	19,945MW	25,924MW
			Improve the power generation efficiency of traditional thermal power-generating units, reduce consumption of fossil energy through recycling, improve the quality of the living environment	**The average power generation efficiency of Taipower's own thermal power-generating units (Excluding externally purchased power)**	Higher than 40%	Higher than 41%	Higher than 40.3%	Higher than 45%	Higher than 47%
	3 GOOD HEALTH AND WELL-BEING	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	**Self-produced proportion of power generation (Renewable energy) in the Taipower System**	7.1% (Approximately 17.4 billion kWh)	5.8% (Approximately 13.78 billion kWh)	9.2% (Approximately 22 billion kWh)	19.6% (Approximately 51.1 billion kWh)	24.1% (Approximately 68 billion kWh)
	13 CLIMATE ACTION	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**	Collect actual data on renewable energy power generation and extreme climate events in the past five years. Complete quantitative assessments of the impact of renewable energy on power supply due to climate change	Completed climate risk (storm and flooding) assessments for 17 of the Company's hydro and thermal power generation units (Excluding offshore islands)	Complete an in-depth risk assessment of the Company's power generation system (Hydro and thermal power plants)	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)
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 rapid auxiliary services for procurement	**Cumulative storage capacity built on owned sites**	Reach 24MW storage capacity (9MW of Self-built + 15 MW of Procured; Continuous adjustment)	Reached 26.5MW storage capacity (11.5 MW of Self-built + 15 MW of Procured; Continuous adjustment)	1. Donglin P/S (10MW) energy storage equipment grid connection 2. Add 15MW of qualified capacity for energy storage in auxiliary services	Reach 590MW storage capacity (160MW of Self-built + 430MW of Procured; Continuous adjustment)	The capacity of energy storage can be increased with the improvement of performance and economy value. Taipower shall implement flexible and continuous reviews based on generation capacity and load conditions
	7 AFFORDABLE AND CLEAN ENERGY 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	T-SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all	Strengthen information security, build a cloud data center, andimprove backbone/regional fiber optic communications capabilities	**Information security protection**	Complete the construction of three pilot sites that integrate all the operations offices in the six power supply regions into the Security Operation Center (SOC) for monitoring	Completed the installation of two intrusion detection systems (IDS) at the Yunlin District Office and the Taichung Power Supply District Office. Construction subsequently will be completed for Taichung Power Plant and it will be included in SOC monitoring	Complete the plans for 32 sites, evaluate the installation sequence of IDS sites and include them in SOC monitoring. Evaluate the benefits of 3 pilot sites and formulate improvement plans	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	Build big data analysis and data sharing platforms	Tender awarded in November 2020	Begin trial operations on the big data analysis and data sharing platform in June 2021. Provide access to the entire company. Taipower will continue to review results and complete construction by the end of November.	Complete the construction of two cloud data centers (Yuan-Hsin and Changhua), which can accommodate 600 cabinets	Complete the construction of a third cloud data center (Taichung), which can accommodate 1,200 cabinets
		T-SDG 8: Promote stained, inclusive and sustainable economic growth, full and productive employment, and decent work for all	Promote applications of big data and AI on operation and maintenance information for transmission systems to reduce the System Average Interruption Duration Index value	**Reduce the national power outage time (SAIDI value)**	16.8 minutes per consumer per year	15.9307 minutes per consumer per year	16.7 minutes per consumer per year	15.7 minutes per consumer per year	15.5 minutes per consumer per year

Taipower Sustainable Development Plan

Sustainable Development Profiles	SDGs	Taiwan SDGs	Strategy	Corresponding Targets	2020 Goal	Actual Performance Value (as of 2020)	Short-Term Goals (Until 2021)	Medium-Term Goals (Until 2025)	Long-Term Goals (Until 2030)
Provider of Services for Smart Living	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	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**	Complete the deployment of a total of 1 million smart meters	Completed the deployment of a total of 1.09 million smart meters	Complete the deployment of a total of 1.5 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
	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	T-SDG 12: Ensure sustainable consumption and production patterns	Refinement of customer services	**Taipower App Memberships**	Reach 300,000	Reached 293,484	Reach 360,000	Reach 600,000	Reach 900,000
				The number of transactions via new technology payment channels for each period	Reach 330,000 for each period	Reached 702,000 transactions	Reaches 630,000 transactions for each period	Reaches 800,000 transactions for each period	Reaches 1,200,000 transactions for each period
				Cloud-based services	Complete function development for cloud payment system	Taipower App provides relocation settlement function and provides a PDF payment certificate download service	Increase cloud certificate download services	Number of downloads of cloud payment receipts reach 100,000	Number of downloads of cloud payment receipts reach 300,000
				Advanced value-added services on the high-voltage user service portal	Increase at least two advanced value-added services on the High-Voltage User Service Portal	Completed two enhanced value-added services on the High-Voltage Customer Service Portal, "Electricity Dashboard" and "Electricity Warning Setting"	Increase at least one advanced value-added service	Accumulate at least four additional advanced value-added services	Accumulate at least six additional advanced value-added services
				Number of visits to the Power Consumption Examination Center website	Number of visits to the website of the Power Consumption Examination Center reach 15,000	As of the end of 2020, website services were used approximately 15,700 times	Number of visits reach 16,000	Number of visits reach 20,000	Number of visits reach 25,000
Agent of Environ-mental Friendliness	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	T-SDG 12: Ensure sustainable consumption and production patterns	Establish a circular business model	**The proportion of wastewater recycled at thermal power plants**	73%	79%	75%	80%	85%
				Circular product supply model	Complete a manual on coal ash use for marine engineering	Manual of coal ash for marine engineering delivered to the Industrial Development Bureau for review	Inventory of potential circular materials and feasibility trial of developing business models	Complete at least one circular product supply model	Complete at least three circular product supply models
	13 CLIMATE ACTION	T-SDG 13: Take urgent action to combat climate change and its impact	Improve mitigation and adaptation capabilities	**Net decrease of emission intensity of thermal power-generating units (Greenhouse Emissions) from 2016**	Decrease by 5.3%	Decreased by 6.52%	Decrease by 7%	Decrease by 15%	Decrease by 20%
				Climate adaptation action	Complete climate risk assessment for each generation, transmission and distribution unit	Kaohsiung District Office became a demonstration site for the electricity retail system	Complete the risk assessment of the Company's power generation system (Hydro and thermal power plants)	Complete climate risk strategies and action plans for major transmission and distribution units	Complete the Company's overall climate risk assessment report and communications
	14 LIFE BELOW WATER	T-SDG 14: Conserve and sustainably use the marine ecosystems, and prevent the degradation of marine environment	Conduct marine ecological restoration and coastal environmental cleaning	**Marine ecological restoration, conservation and develop marine pasture**	Implement one marine ecological restoration and conservation project and conduct marine pasture research	Plan the Linkou Marine Pasture	Execute one project in marine ecological restoration and conservation, and conduct marine pasture research	Complete the construction on one marine ecological restoration project, and select marine pasture sites	Complete the construction of one marine pasture around a power plant to facilitate marine ecological restoration
	15 LIFE ON LAND	T-SDG 15: Conserve and sustainably use terrestrial ecosystems to ensure the persis-tence of biodiversity and prevent land degradation	Ecological restoration and environmental maintenance in the areas around power facilities	**Ecological integration plan for power facilities**	Complete the inspection plan for ecological integration at power facilities, and put forward specific visions for ecological restoration and environmental maintenance in the areas around the facilities	Completed surveys of potential sites and implemented the sequence evaluation indicator system for ecological sites	Plan and construct at least one ecologically inclusive plan for a power facility	Complete at least three ecological integration plans around power facilities to promote ecological restoration and environmental maintenance at power facilities	Complete at least five ecological integration plans around power facilities to promote ecological restoration and environmental maintenance at power facilities

Taipower Sustainable Development Plan

Sustainable Development Profiles	SDGs	Taiwan SDGs	Strategy	Corresponding Targets	2020 Goal	Actual Performance Value (as of 2020)	Short-Term Goals (Until 2021)	Medium-Term Goals (Until 2025)	Long-Term Goals (Until 2030)
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**	NT$600 million, 70,000 people	Invested NT$539.73 million and reached 36,835 people	Invest NT$550 million, reach 50,000 people	Invest NT$3.6 billion, reach 450,000 people	Invest NT$6.6 billion, reach 800,000 people
				Cumulative investment in electricity discounts for disadvantaged Groups; Number of beneficiary households	NT$87 million, 160,000 beneficiaries	Discounts of NT$91.78 million, 161,871 beneficiaries	Discounts of NT$91 million, 160,000 beneficiaries	Discounts of NT$550 million, 1 million beneficiaries	Discounts of NT$1 billion, 1.8 million beneficiaries
				Cumulative investment in Power Development and Assistance Fund and number of benefited townships/districts	NT$2.5 billion, 100 townships / districts	Total investment of NT$2.17945 billion, 101 beneficiary townships / districts	Total investment of NT$2.18 billion, 101 beneficiary townships / districts	Total investment of NT$15 billion, 600 beneficiary townships / districts	Total investment of NT$27.5 billion, 1,100 beneficiary townships / districts
		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**	500,000 people	Approximately 840,000 people	600,000 people	3 million people	6 million people
				Cumulative number of people reached by online promotions	20 million people	Approximately 25 million people	120 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 electricity industry cultural assets	**Sharing of electricity industry cultural assets**	Conduct more than 1,000 cultural relic inspections at relevant units in 2020 under the four major themes of nuclear energy, distribution technology evolution, sale (purchase) of electricity, and the electric industry on outlying islands	The 2020 project survey resulted in the registering 1,675 artifacts	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	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	Five events, 30,000 participants	Organized one "Charged with Electricity" special exhibition of artifacts; One session of the "Dialogue between Foot Steps and Buildings - 2020 Taiwan Power Company Cultural Asset Forum"; Seven new book launch events / seminars. A total of Nine events were organized for approximately 22,000 participants	Organize one book sharing session on the theme of thermal power on the island. (No special exhibition planned for 2021)	Accumulate 15 events or more than 100,000 participants	Accumulate 25 events or more than 150,000 participants
				Electricity industry cultural assets preservation sites		Carried out preliminary onsite operations in accordance with the accepted operation period of the North District Department of Construction	Carry out the preliminary onsite operations in accordance with the accepted operation period of the North District Department of Construction	Launch the Taiwan Power Cultural Relic Research Center on the 4th floor of the multi-purpose building in Wan-Lung D/S in the second half of 2022 to promote the research and restoration of cultural relics	• Launch the Yuan-Hsin Literature and History Library in 2026 a professional site for research and the display of promotions and preservation of cultural assets by the parent company and subsidiaries • Establish permanent exhibition halls for electric 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 space (museum complex)
		T-SDG 8: Promote stained, inclusive and sustainable economic growth, full and productive employment, and decent work for all	Improving occupational safety	**Employee injury rate**	≦ 0.22	0.17	≦ 0.15	≦ 0.15	≦ 0.1
				Contractor labor injury rate	≦ 0.4	0.42	≦ 0.37	≦ 0.28	≦ 0.18
			Establish a happy workplace culture	**Employee satisfaction with internal communications**	≥55%	56.61%	≥60%	≥60%	≥65%
				Rate of participation in each Employees' Heart-to-Heart assistance programs to care for employees (81 in total)	≥37%	37%	≥38%	≥40%	≥50%

Taipower formulated the "Taipower Sustainable Development Plan" in 2020 and has been implementing it for more than a year. However, due to the rapid changes in sustainability issues, in order to incorporate emerging sustainability issues into the five major sustainability development profiles, Taipower will establish a continuous adjustment mechanism in order to review emerging and major sustainability issues comprehensively. Regarding the emerging sustainable issues that Taipower is concerned about this year, such as COVID-19, digital transformation, and circular economy, have been included in the special issue for futher explanation. For the emerging biodiversity issues in recent years, please refer to 6.4.5 "Power Facilities Coexisting with Ecology" section.

1.3 Promoting Corporate Transformation

1.3.1 Core Transformation Concept

An amendment of the Electricity Act was promulgated by presidential decree on January 26, 2017. According to Article 6 of the Act, "The Electricity Transmission and Distribution Enterprise may not engage in the generation or retailing of electricity." This effectively means that before the provision comes into effect in January 2023, Taipower must transform into a parent holding company with separate subsidiaries for Power Generation Company and Transmission, Distribution and Retail Company (TD&R Co.). The electricity industry's regulatory authority may submit a request for a postponement to the Executive Yuan based on its assessment of the development and condition of the electricity market. However, postponement can only be made to January 2026 at the latest.

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 national policy objectives of a stable power supply, energy transition, a nuclear-free homeland, air pollution reduction, and electric industry development. As subsidiaries of the Taipower Group, the Power Generation Company and the 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 option for users to purchase electricity from renewable energy sources. As more private operators enter the electricity market in the future, Taipower Group must consolidate its existing business operations and open up new areas for growth. To do this, Taipower needs to combine 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.

1.3.2 Planning Direction

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:

- **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 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 shall follow to the model of Tokyo Electric Power Company Holdings by retaining the nuclear power businesses in the parent company along with the responsibility for nuclear power decommissioning and nuclear waste disposal.

- **Power Generation Company:**

  The 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.

- **Transmission, Distribution and Retail Company (TD&R Co.):**

  The 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 transition goals. The electricity retailing utility department will organize the purchase and sale of electricity based on the needs of public utility customers. It will bear the legal responsibility for the reserve power supply capacity and electricity carbon emission factor. Meanwhile, Taipower has progressively improved its customer management and services, and enhanced the added value of its businesses through innovative applications.

1.3.3 The Methodology for Promoting and Achieving Transformation

Since the amendment of the Electricity Act in 2017, Taipower has learned from 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 various related task forces. Through intense discussions, these task forces are actively planning and preparing the organizational, financial, and operational aspects of transformation. The results as of 2020 are as follows:

Organizational

Taipower's four existing business groups will be assigned to companies based on the businesses they operate. The Nuclear Power Division will be placed under the parent company; the Power Generation Division will be placed under the Generation Company; and both the Distribution and Service Division, and the Transmission System Division will be placed under the TD&R Company. The Company has file proposals for its 19 non-business units on a case-by-case basis with the Company's Transformation Promotion Commission. This process started in 2019 and was completed in May 2020. The organizational structures of the parent holding company and the subsidiaries are currently being discussed.

Financial

In 2020, the Company formulated principles for the division of the real estate assets of the Group. The Company will also consider issues such as the transfer of corporate bonds, taxation, asset handling for the Lungmen Power Plant (NPP4), decommissioning expenses, and repurchase of dissenting shares. Furthermore, the company will conducted financial evaluations in order to build a stable financial structure for the parent and subsidiary operations.

Operational

In 2020, Taipower initiated a study of the Group's governance structure and management system. It also planned a trial run of the Group's administrative mechanisms to confirm the feasibility of financial flow plans and the smoothness of business operations before the transformation.

1.4 Stakeholders and Key Sustainability Issues

1.4.1 Identification of Stakeholders

Taipower has spared no effort in building mechanisms to develop mutual trust and to 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 Identification of Material Topics

In compiling each annual report, Taipower takes into account the key sustainability reports on the power industry for that year and the previous year, and incorporates them into the materiality reference at its discretion. Taipower also refers to the Sustainability Accounting Standards Board's (SASB) newly released industry materiality map. The map integrates material topics in the energy and power industry, solar power, wind power, and biomass fuel industries into considerations of sustainability issues. Taipower also refers to the four major themes "climate and energy", "people and communities", " "biodiversity", "circular economy"" from the "SDG Sector Roadmap for the Electric Utilities Sector" report published by World Business Council for Sustainable Development (WBCSD) in March 2021. After comparing with Taipower's materiality topic list, it was confirmed that "Circular economy" and "Climate and energy" correspond to the new materiality topic of "Climate change and low-carbon strategies". "People and community" corresponds to the original materiality topic of "Talent management and development" and " Stability and reliability of power supply", and "Biodiversity" corresponds to " Ecological friendliness".

To identify materiality topics that relate to sustainable operations and stakeholders, the Company uses the GRI Standards for materiality analysis to review and identify concerns relevant to Taipower. In addition, Taipower established the Circular Economy Strategy Blueprint this year and will conduct continuous discussion. Taipower will also evaluate the addition of "circular economy" to the list of materiality topics in line with the international trend. In identifying material topics for 2021, Taipower collected 122 copies of the questionnaire from its employees, including 34 from senior executives and 88 copies from other stakeholders. A total of 210 copies were collected.

Identification Process for Material Topics

Review and Identification

- Reviewed key sustainability issues from the previous year.
- Reviewed relevant major domestic and international sustainable development trends, such as SASB and domestic regulation amendments
- Reviewed content including issues of Taipower management, power industry benchmarks, internal/external stakeholder opinions and major news events
- Identified 27 sustainability issues

Evaluation and Prioritization

- Considered the impact of the issue on Taipower and the extent and degree of its impact on different stakeholders; the 88 employee questionnaires were used to determine the extent of impact on the economy, society and environment; the 34 senior management questionnaires were used to determine the materiality of each topic for business operations; the 88 questionnaires, which covered various other types of stakeholders were used to analyze the extent to which the issues affected the evaluation and decision making of stakeholders.

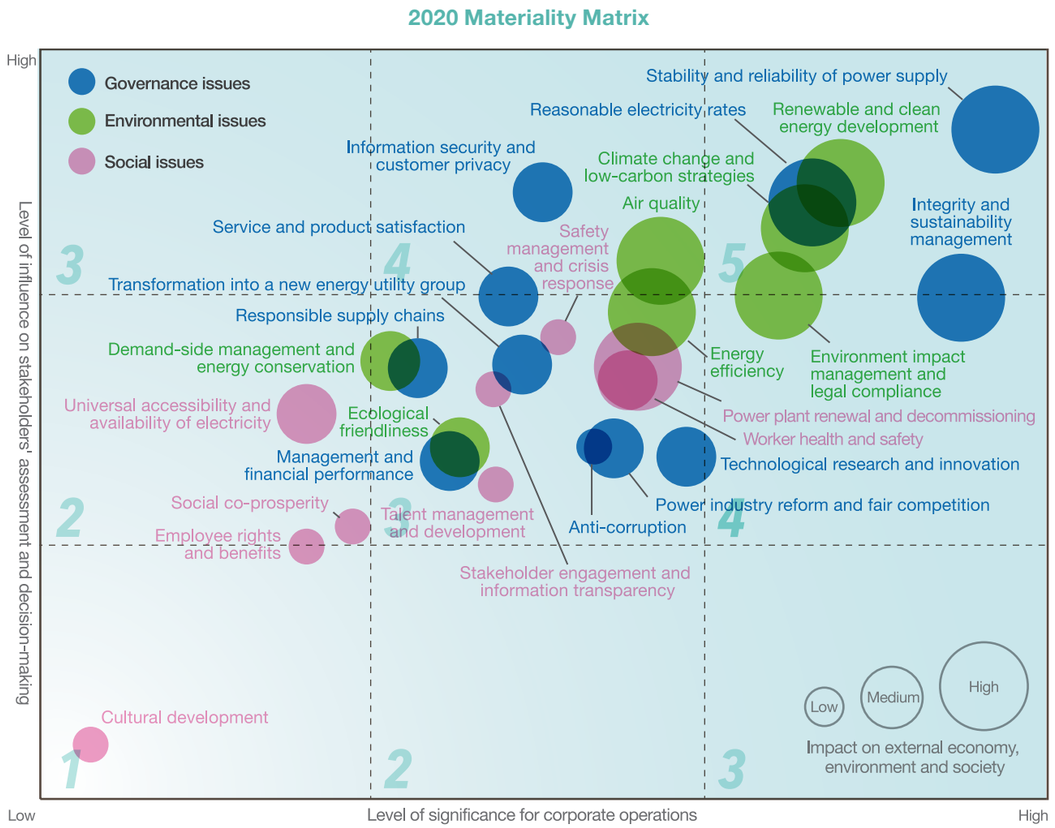
Validation

- Confirmed the matrix of material topics by ranking the products of materiality and engaging Taipower's internal entities
- Determined the contents and structure of Taipower's Sustainability Report based on the results of the analysis.

Based on the above identification process and taking relevant trends and incidents into account, Taipower's list of material topics has been identified and adjusted as follows for this year's sustainability report:

Original Material Topics	New Material Topics	Reasons for Adjustments
Climate change response strategies	Climate change and low-carbon strategies	Low carbon transformation action was implemented in response to national policies and climate change. It includes the national adaptation plan and carbon reduction goals, and was conducted in accordance with Taipower's Environmental White Paper Strategy to promote greenhouse gas reduction.

1.4.3 Identified Results of Material Topics



Based on the results of the materiality matrix, the Company has compiled a list of relevant sustainability issues that are weighted based on their significance to Taipower. Taipower classified all the issues located in Block 5 (of the matrix) as material topics regardless of the extent of their external impact (represented by the size of their bubbles). Issues in Blocks 3 and 4 have medium or higher external impacts, while issues in Block 2 that have significant external impacts are also classified as material topics. The materiality of the topics was also ranked on the product of the X, Y and Z axes. The stakeholders identified 14 material topics within the scope of this report. The material topics adhere to domestic and international sustainability trends.

In terms of governance, integrity and sustainable management have always been key concerns for Taipower. Stability and reliability of power supply, reasonable electricity rates, innovation, technological development and transforming into a new energy utility group are also important issues for the operation and future transformation of the power industry. As the main supplier of electricity for the public and enterprises of Taiwan, it is important for Taipower to protect users' privacy in the digital age. Therefore, information security and customer privacy are also key issues for governance.

In terms of the environment, the Company must actively address issues such as renewable and clean energy development, climate change and low-carbon strategies, energy efficiency, demand-side management and energy conservation. Companies must pay close attention to the environmental impacts of their operations. Therefore, environment impact management and legal compliance have become basic skills for the power industry. At present, Taipower still relies heavily on thermal power generation (coal-fired and gas-fired) and air quality is therefore a top priority due to the current energy structure.

Material Topics	Location of economic/environmental/social impact						Relevant GRI Standards	Management policy and corresponding chapters
		Business relationship		Other social relationships				
	Within Taipower	Partners	Users	Private organizations	Government units	Residents/general public		
Integrity 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
Transformation into a new energy 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
Reasonable electricity rates	✓				✓		Economic: Indirect Economic Impacts	2.4 Operational Performance 5.1 Smart Electricity Service
Stability and Reliability of Power Supply	✓	✓			✓		Economic: Indirect Economic Performance	3.1 Providing Quality Electricity Service 3.2 Planning for New Sources of Energy
Renewable and clean energy development	✓	✓			✓		Economic: Indirect Economic Impacts Environmental: Emissions	3.2 Planning for New Sources of Energy 4.2 Tracking Smart Grid Achievement
Power plants renewal and decommissioning	✓				✓		Economic: Indirect Economic Performance	3.2 Planning for New Sources of Energy
Technological research and innovation	✓				✓		Economic: Indirect Economic Performance	4.1 The General and Action Plan Structures for the Smart Grid 4.2 Tracking Smart Grid Achievement
Demand-side management and energy conservation	✓		✓				Economic: Demand-Side Management Environmental: Energy	4.1 The General and Action Plan Structures for the Smart Grid 5.1 Smart Electricity Service
Climate change and low-carbon strategies	✓				✓		General Disclosures: Governance Economic: Indirect Economic Impacts Environmental: Emissions, Energy	4.2 Tracking Smart Grid Achievement 6.1 Strengthening Environmental Management 6.2 Toward the Goal of Low-Carbon Electricity
Environment impact management and legal compliance	✓			✓	✓		Environmental: Effluence and Waste, Energy Social: Local Communities	6.1 Strengthening Environmental Management 6.4 Minimizing Environmental Impacts
Energy efficiency	✓		✓		✓		Environmental: Energy, Emissions	6.3 Reducing Use of Energy and Resources
Air quality	✓						Environmental: Emissions	6.4 Minimizing Environmental Impacts
Worker health and safety	✓	✓					Social: Occupational Health and Safety	7.2 A Sound Working Environment

Note: The field of "Location of economic/environmental/social impact" only partially lists stakeholders. Other stakeholders who, after evaluation, were determined to not directly cause ESG impact were omitted.

1.4.4 Stakeholder Communication Performance

The Results of Stakeholder Communication

Taipower communicates with stakeholders through multiple channels and pays close attention to stakeholder voices. In addition to listening to and collecting suggestions on the sustainable development of Taipower, the Company incorporates input into its management measures and operational behavior optimization when appropriate. Taipower actively responds to the appeals and expectations of its stakeholders.

Stakeholder	Main Issue of Concern	Frequency and Method of Engagement	Engagement Results	Actions
Board of Directors	• Transformation into a new energy utility group • Integrity and sustainability management	• Convening regular board meeting and hold a functional review team meeting once a month • Convening at least one Audit Committee meeting every quarter • Conducting Director training (Including independent directors) • Annual performance assessment for the Board of Directors • Regular project/written reports	• Convened 12 meeting of the Board of Directors, 8 meetings of the "Investment Plan and Business Plan" Review Committee, and 8 meetings of the "Land" Review Committee • Convened 6 meetings of the Audit Committee • Totaled 49 participants and 139.5 hours of Professional training on corporate governance for Directors (including independent directors) • Conducted Performance Review for 2020 in accordance with the Performance Evaluation Guidelines for Boards of Directors; results are available on Taipower's official website • Summary report on Taipower transformation implementation status	• Regular summary reports are provided in the quarterly meetings of the Board of Directors • Project report on "Taipower's transformation into a parent holding company with subsidiaries"
Shareholders	• Integrity and sustainability management • Transformation into a new energy utility group • Technological research and innovation	• Shareholders' meetings • Taipower's official website, and Market Observation Post System (MOPS)	• The general shareholders' meeting was convened on May 22, 2020 • Relevant information is disclosed on the MOPS and the corporate governance/shareholders section on Taipower's official website	• Information on communication with shareholders is disclosed in the annual general shareholders meeting's minutes
Employees	• Transformation into a new energy utility group • Integrity and sustainability management • Worker health and safety	• On-the-job training • Labor-management meetings • Lectures and seminars • Organization of information sessions on corporate transformation	• Organized orientation training for 2,321 new employees; Total of 78,385 participants in on-the-job training at the Training Institute, unit training sessions, and at external training • Convened 9 labor-management meetings • Organized four subject lectures	• Organized company-level labor-management meetings and labor-management communication seminars for each system. Proposals were collected and implemented after discussions with decisions made by union member representatives and regional directors.
Partners	• Renewable and clean energy development • Worker health and safety • Climate change and low-carbon strategies	• Meetings are convened when necessary	• Currently in the preliminary stages of consultation	• Communicated during contract renewals to increase investment in equipment improvements, cost and useful life, signing of capacity-only contracts and whether environmental impact assessments are required
Government / competent authority	• Stability and reliability of the power supply • Reasonable electricity rates • Renewable and clean energy development • Power plant renewal and decommissioning • Climate change and low-carbon strategies	• Board of Directors meetings • Official correspondence • Submission of reports on the progress of various projects • Cooperation in meetings (e.g., smart power generation and dispatch meetings and special communication meetings)	• Important issues to be reviewed during the monthly Board meetings are submitted to the competent authorities in advance • Submission of power supply reliability data to the Bureau of Energy on a monthly basis • Participation in meetings of government agencies and with legislators from time to time	• Provided information and attended review meetings in accordance with government regulations and requirements
Public represent-atives	• Climate change and low-carbon strategies • Air quality • Renewable and clean energy development • Power plant renewal and decommissioning	• Participation in committee meetings at the Legislative Yuan • Coordination meetings and public hearings • Offering relevant materials and information on the Company's operations • Visiting legislators	• Senior managers (ranked Vice President or higher) attended 32 sessions at the Legislative Yuan • Supervisors and employees took 996 coordination meetings and public hearings organized by the staff of legislators • Senior managers (ranked Vice President or higher) convened 170 communication meetings with legislators	• Senior executives were assigned to meet with public representatives to explain important business operations in order to establish good communication channels and mutual trust • The Company actively responded with written information to questions raised by public representatives in a timely manner. The information meets the requirements of public representatives in supervising policy implementation • Attended public hearings and communication meetings to explain the Company's business operations. This created a good atmosphere for discussion for the purpose of maximizing the effectiveness of communication

Stakeholder	Main Issue of Concern	Frequency and Method of Engagement	Engagement Results	Actions
Media	• Transformation into a new energy utility group • Renewable and clean energy development • Environment impact management and legal compliance • Stability and reliability of the power supply • Air quality	• Press releases • Printed press • Public hearings / information sessions • On-site visits / visits by designated personnel • Taipower's corporate website • Market Observation Post System (MOPS)	• Published 91 press releases and 20 immediate clarifications on issues related to power supply, demand, renewable energy development, new power source projects, environmental protection, and major emergencies in order to provide prompt and immediate information to the media. Taipower has also taken the initiative to issue press releases to the media for additional dissemination of information • Proactively released positive press releases (i.e., promoting renewable energy, energy-saving measures, conservation of power-related historical artifacts and recruitment of new employees, etc.) to demonstrate the Company's active support of the energy transition, the development of green energy, and the transition of the power utility industry • Improved the spokesperson system by offering immediate responses. Publicized Taipower's key policies in response to issues that are closely related to the livelihoods of the general public.	• In response to the important businesses promoted by the Company, Taipower actively released complete news materials for media reporting, showing the Company's specific actions in response to government policies and social expectations. • Promptly clarified misunderstandings, issues press releases and real-time clarifications when necessary to promptly communicate information related to emergencies or issues of concern such as power supply and energy policy, air pollution, and the Taichung Power Plant, regional blackouts and major incidents, etc. • Actively assisted in arranging media coverage of diverse issues to improve the Company's positive corporate image
Private organizations	• Air quality • Energy efficiency • Power plant decommissioning and renewal	• Organization of information sessions • Initiation of visits • Participation in relevant forums and activities • Taipower's corporate website • Taipower publications	• Visits based on project needs • The Taipower Journal is published every month • The Company discloses management information about the Company in the "Corporate Governance Section" of the website	• Visited private organizations based on project requirements to gain insights on social values and needs of the public and to engage stakeholders. • Published the Taipower Journal to communicate with government institutions, relevant business entities, Taipower employees (including retired employees) and tertiary education institutions
Users	• Information security and customer privacy • Demand-side management and energy conservation	• Customer suggestion mailbox • Visits from designated personnel • Brochures and pamphlets (ad hoc)	• The user opinion mailbox received 4,702 letters in 2020 • Organized a total of 1,559 events in 2020 to promote energy conservation and the effective use of high-efficiency household appliances; these events were attended by approximately 250,000 people • Held awareness campaigns to promote energy conservation for nine consecutive years • Taipower's Power-Saving Service Teams visited 5,410 customers in 2020 and the visits are expected to potentially save 96.41 million kWh of electricity.	• Implementation of user interview services: Taipower has established preliminary and repeated interview mechanisms for users with contracted capacity of more than 100kW. • Power-Saving Service Teams conduct customer efficiency visits: The number of visits is set annually. Each district sales office is responsible for conducting an inventory of potential energy savings and promoting demand response measures to achieve the benefits of visits.
Residents / general public	• Reasonable electricity rates • Environment impact management and legal compliance • Integrity and sustainability management • Transformation into a new energy utility group	• The Taipower Facebook page • Relevant information disclosed on the corporate website	• Posts published on Taipower's Facebook page in 2020 were viewed more than 22 million times • The Information Disclosure Section of Taipower's website discloses information on the Company's operations and tariffs. In addition, Taipower has also setup an independent website on sustainable development to provide information about the company's sustainability performance and development • Disclosure of financial information and corporate governance information are in the Corporate Governance Section	• The Taipower Facebook page promoted topics such as electricity knowledge, safety, and saving that are useful for daily life. It also provided information on the latest convenient services and activities. In terms of the Company's policies, we used graphics and text to explain key issues of concern to external entities such as the replacement of coal with natural gas as fuel for the Taichung Power Plant.

Material External Communication Policy

Media Communications

Taipower takes the initiative of releasing complete press information for media coverage to demonstrate its specific actions in response to government policies and social expectations. To clarify misunderstandings, when necessary, Taipower promptly issues press releases and real-time clarifications on issues of concern such as emergencies, air pollution, nuclear energy, regional blackouts, and other major incidents. In addition, Taipower actively assists in arranging media interviews to attract more media coverage and positively shape its corporate image.

Communication with Legislators

Legislators are at the front lines of communication for public concerns, policy direction and planning. Taipower actively responds to legislators' questions and seeks support for policy planning. Company representatives attend various committee meetings, public hearings and press conferences related to business issues and explain Taipower's policies and implementation practices and to achieve two-way communication. In addition, the Company actively seeks to establish communication and to meet with legislators. Taipower takes the initiative in establishing good relationships and building mutual trust and communication by assisting in handling business-related service cases. Through adopting various ways of engagement, Taipower learns about the concerns of the public representatives, and develops solutions to achieve the goals of both parties.

Communication with the Customers and the General Public

Taipower actively maintains honest communication with its customers and the general public. Being open and transparent is a core principle for the Company. Through the Company's various district offices and diverse media channels, the public can express opinions in a quick and effective manner. At the same time, Taipower can actively establish an image of positive corporate citizenship. In recent years, Taipower has actively sought to communicate about issues in advance. This generally entails the release of information related to company actions and performance in business, environment and society. This allows the general public to engage in deeper interactions with Taipower, and establish sustainable social relations.

Membership in Associations

The power industry is a highly specialized industry with rapidly-evolving technologies. Taipower actively participates in major technical and networking organizations in the energy industry. In 2020, Taipower engaged with a total of 129 external organizations, including 24 international organizations, 74 academic organizations and 31 professional organizations. These organizations include the World Association of Nuclear Operators (WANO), the Business Council for the Sustainable Development of Taiwan, the Industrial Safety and Health Association of the R.O.C., the Taiwan Wind Industry Association, the Taiwan Climate Change and Energy Sustainability Association, the Taiwan Electrical Industry Association, and other academic and professional associations. The issues discussed include energy transition, clean energy technologies, sustainable governance, energy economy, and occupational health and safety.

2 Corporate Governance

The Implication of Corporate Governance

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 upholds the spirit of integrity to ensure the stable operation and long-term development of the organization. It is also continuing to strengthen information disclosure and work with suppliers to create a responsible value chain.

Major Investments

- Implemented three lines of defense for internal control to ensure integrity management
- Implemented risk assessment and response planning to ensure operational stability
- Promoted digital transformation of the supply chain to advance from automation to intelligence

Performance Highlights

- **Ranked first in the corporate governance evaluation** of state-run enterprises for five consecutive years
- Established a **risk management framework** and a **Risk Management Commission** to identify potential risks, conduct analyses and propose control measures
- The average attendance rate of board meetings was 96% for directors and 94% for independent directors
- Established **systems for Enterprise Resource Planning** (ERP), **Supply Chain Management** (SCM), and **Warehouse Management** (WMS)

Future Plans

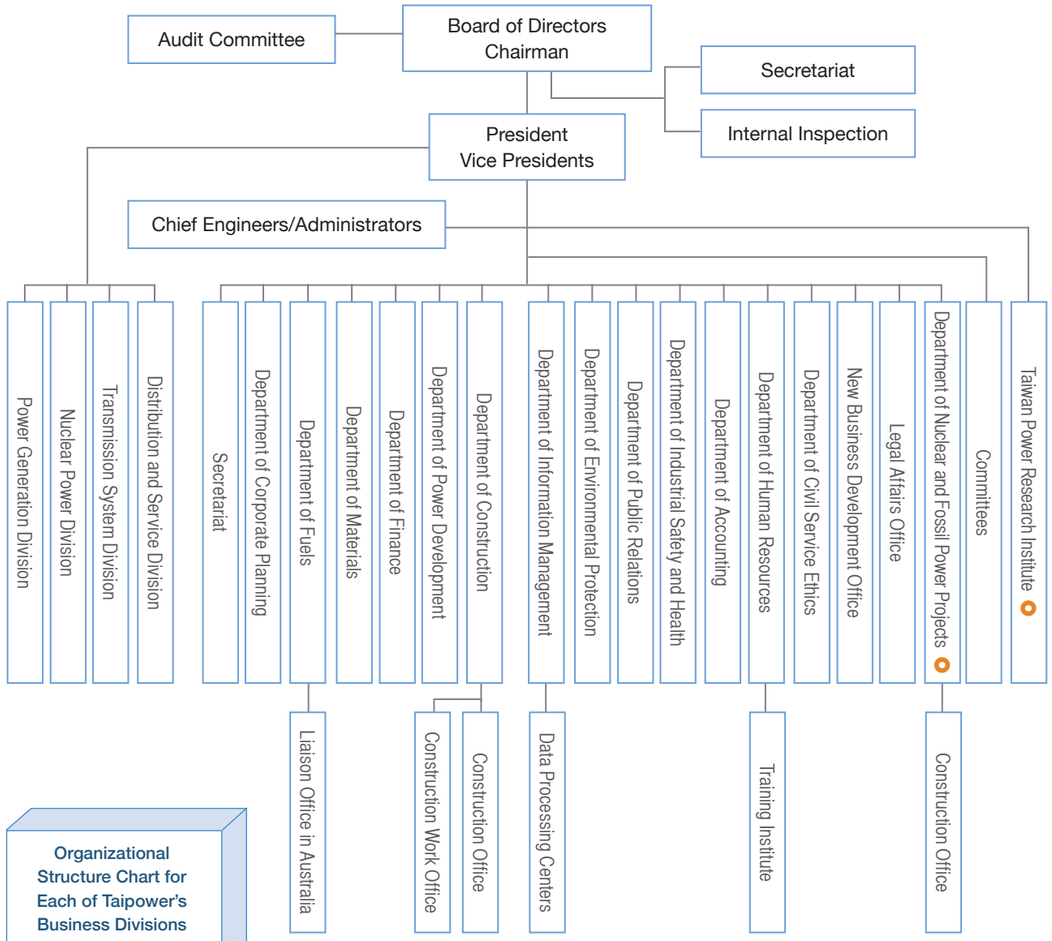
Taipower will continue to enhance its financial efficiency by refining operational efficiency, developing diversified businesses, improving fuel procurement performance, and controlling its operating expenses. Taipower will continue to uphold the spirit of integrity and compliance, implement corporate responsibility, and enhance the value of sustainable supply chains through cooperation with suppliers.

2.1 Taipower's Organizational and Governance Structures

2.1.1 Organizational Structure

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. Taipower has also established various subordinate units and committees to meet its business needs, such as 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



Organizational Structure Chart for Each of Taipower's Business Divisions

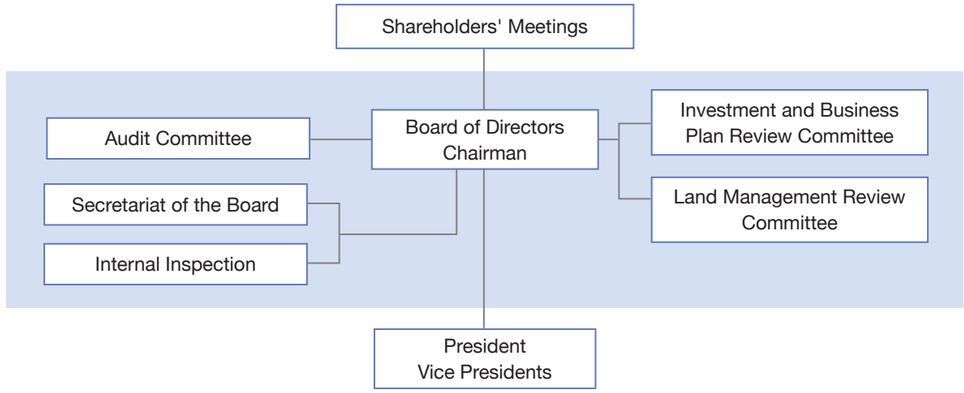
Note: 1. Denotes units that are not located at the headquarters.
2. The Taiwan Power Research Institute reports to the President directly.

2.1.2 Board of Directors

The Structure of the Board of Directors

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 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 (June 2019 to June 2021) are as follows:

- **Professional background:** In addition to the basic qualifications of the industry, many new areas of expertise have been added to the board of directors to meet the medium and long-term strategic needs of energy transition. These areas of expertise include smart grids, intelligent technologies, big data, green energy, energy, environmental protection, sustainability, electrical and mechanical engineering, civil engineering, economics, IT, finance and accounting, and 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:** The Company currently has two female directors, an increase of one female director from the previous term. This represents a breakthrough from having only one female director in the past. In the election of the directors in July 2021, the Company has achieved the goal of having no less than one-third of our directors of either gender (5 female directors).

Members of Taipower's Board of Directors in 2020

Information accurate as of December 31, 2020

Title	Name	Concurrent Position
Chairman (Managing Director)	Yang, Wei-Fuu	Chairman of Taipower
President (Managing Director)	Chung, Bin-Li	President of Taipower
Managing Director	Lin, Faa-Jeng	Chair Professor, Department of Electrical Engineering, National Central University
Managing Director	Chang, Tien-Chin	Professor, Institute of Environmental Engineering and Management, National Taipei University of Technology
Managing Director (Independent Director)	Fang, Liang-Jyi	Member of the Atomic Energy Council, Executive Yuan
Director (Independent Director)	Hsu, Jyh-Yih	Professor, Department of Management Information Systems and Department of Applied Economics, National Chung Hsing University
Director (Independent Director)	Liu, Chi-Chun	Professor, Department of Accounting, National Taiwan University
Director	Liu, Pei-Ling	Distinguished Professor, Institute of Applied Mechanics and Director of the Center of Innovation and Synergy for Intelligent Home and Living Technology, National Taiwan University
Director	Lin, Tze-Luen	Associate Professor, Department of Politics, National Taiwan University and Deputy CEO of the Office of Energy and Carbon Reduction, Executive Yuan
Director	Chiang, Ya-Chi	Associate Professor, Graduate Institute of Intellectual Property and Patent Licensing and Technology Transfer Center, National Taipei University of Technology
Director	Cheng, Eng-Two	Head of Division, State-Owned Enterprise Commission
Director	Chuang, Ming-Chih	Head of Planning Division, Bureau of Energy, Ministry of Economic Affairs
Director (Labor Director)	Peng, Chi-Tsung	Inspector, Department of Power Supply, Taipower
Director (Labor Director)	Liao, Chan-Ping	Technical Specialist, Taitung Branch Office, Taipower
Director (Labor Director)	Lu, Te-Sheng	Technical Specialist, Mingtan Power Plant, Taipower

Function and Effectiveness of the Board of Directors

The Board of Directors leads Taipower towards its goal of "transformation into a prominent, trustworthy world-class power utility group." The Board is committed to stakeholder accountability by leading Taipower's operational strategies, supervising management direction and actions, and implementing the spirit of integrity management and sustainable governance. In recent years, Taipower has gradually strengthened the Board of Directors' supervision of environmental, social, and governance (ESG) issues in accordance with the FSC's Corporate Governance Roadmap 3.0. The Company have arranged for the relevant departments to report to the Board of Directors regularly on implementation status, including sustainable development strategies and implementation, ethical management policies and annual work overview, and risk management and strategies. Taipower will continue to follow the policies of the supervisory authorities and relevant regulations of the Ministry of Economic Affairs to strengthen the functions of its Board of Directors in accordance with the Company's business requirements. The operations and effectiveness of the Board of Directors are explained below:

The Board of Directors

As a principle, the Board of Directors holds a regular meeting once a month, and ad hoc meetings are convened when necessary. In 2020, twelve Board meetings were held. The average attendance rate of directors was 96%. The records of the Board meetings are disclosed on both Taipower's intranet and its official website. All decisions resolved at the meetings are recorded and statuses are tracked on a case-by-case basis by respective divisions.

Managing Directors Meetings

Managing directors are required to assemble and exercise their powers as directors in accordance with pertinent regulations, the Articles of Association, shareholders' meeting resolutions, and Board meetings resolutions during recesses of the Board of the Directors. Five Managing Directors Meetings were convened in 2020. The average attendance rate of the managing directors was 100% as they effectively supported the Board of Directors in performing its functions.

Functional Committees

The Audit Committee

Taipower's Audit Committee is solely comprised of independent directors. The committee is responsible for the review, revision and effectiveness of Taipower's internal control systems, acquisition and disposal of assets, major loans, the appointment or dismissal of heads of finance, accounting, internal audit, and financial reporting, among other significant matters. A total of six Audit Committee meetings were convened in 2020. The independent directors actively participated in the operations of the Audit Committee with an average attendance rate of 94%. Pursuant to the Securities and Exchange Act, if the independent directors raise dissenting or qualified opinions at Board meetings, the said opinions shall be duly noted in the meeting minutes, and published on the "Market Observation Post System" (MOPS). There were no dissenting or qualified opinions from the independent directors in 2020.

The Investment and Business Plan Review Committee

The Committee is a functional organization established by Taipower to meet the needs of major investment projects and other business requirements. Prior to the Board meetings, this committee is required to submit preliminary reviews and detailed opinions on important proposals to the Board of Directors. Proposals include the Company's major construction investment projects, operating budget, business operations and management, additions and amendments to important articles of association, and performance evaluations of the investees. A total of eight meetings were held in 2020.

The Land Management Review Committee

The Committee was set up by Taipower for land purchases and sales. Prior to Board meetings, the committee is required to submit preliminary reviews and detailed opinions on important proposals to the Board of Directors. Proposals include the Company's land purchases and sales, exchanges of property rights, joint developments, participation in urban renewals, creation of superficies, feedback on changes in urban planning, land valuations, and land use plans. A total of eight meetings were held in 2020.

Effectiveness of the Shareholders' Meeting

Taipower's Board of Directors convenes a general shareholders' meeting every year in accordance with the Company Act and the Securities and Exchange Act to discuss mandatory motions and to elect directors. Taipower held its Shareholders' Meeting on May 22, 2020. At the meeting, the Company reported to the shareholders, acknowledged and discussed specific matters with participants. The following topics were discussed: the presentation of the 2019 Business Report, the Audit Committee's 2019 Financial Statement and Loss Appropriation Report, the 2018 Closure of Accounts and Loss Appropriation Report that was also reviewed and certified by the National Audit Office, the 2020 Partial Adjustments to Property, the Plant and Equipment Durability Report and the 2019 Corporate Bond Report. The meeting record was disclosed on both the Company's official website and MOPS.

Performance Assessment of the Board of Directors

Taipower established the Taiwan Power Company Board of Directors Performance Assessment Criteria in 2016 to implement corporate governance and increase the effectiveness of the Board of Directors. The assessed entities include the Board of Directors as a whole and as individual directors. The Company also implemented continuous reviews in 2020 and added assessment items to strengthen the assessment indicators for each functional committee.

With regard to the performance assessment of the Board of Directors as a whole, the assessment includes the Board's participation in the operations of the Company, improvement of the quality of the Board of Directors' decision making, composition and structure of the Board of Directors, election and continuing education of the Directors, and internal controls. At the end of each year, the Company's Board of Directors (including the Audit Committee, the Investment and Business Plan Review Committee, and the Land Management Review Committee) conducts a performance assessment in accordance with the assessment procedures and indicators described above. The results of the performance assessment are reported during the Boarding meeting at the end of March of the following year. The results of the performance assessment of the Board of Directors and functional committees for 2020 were excellent, and they were duly disclosed in the "Corporate Governance/Board of Directors" section on Taipower's official website.

The performance assessments of individual directors are implemented in accordance with related regulations in the Operational Guidelines for the Implementation of the Independent Director System by Subordinate Units under MOEA and 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 Private-Run Businesses and Foundations. The assessments include the directors' understanding of the Company's targets and missions, knowledge of their duties as directors, participation in the Company's operations, management of internal relations and communications, professionalism and continuous education as directors, and internal controls. Individual directors shall provide a self-assessment in accordance with the procedure at the end of each year and submit results to the Ministry of Economic Affairs as the basis for evaluation and nomination.

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 other functional committees is 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. For more information on Taipower's corporate governance results, please scan the QR Code.

Corporate Governance Section

Mechanism to Avoid Conflicts of Interest

Pursuant to Taipower's Board of Directors Meeting Bylaws, directors are required to declare any conflicts of interest they may have regarding issues on the agenda for Board meetings. Directors must recuse themselves from participating in and voting on matters in which they have conflicting interests. The recused directors are also not allowed to represent other absent directors in such votes as their proxies. 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 MOEA. They may not collect the same remuneration as other directors. In 2020, the remuneration for Taipower directors (including the chairman, independent directors, and labor directors) constituted 0.0712% of the Company's net income after tax.

Other Corporate Governance Information

2.2 Risk Management Mechanisms and Control Measures

2.2.1 Risk Management

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. Regarding the Paris Agreement, the implementation of Taiwan's Nuclear Free Homeland Policy, amendments to the Electricity Act, referendums in 2021 on reactivating the Longmen Nuclear Power Plant and algal reef protection, and other international and domestic sustainable development trends, Taipower has identified, ranked, and responded to potential internal and external risks with a sound risk management system and has begun to identify and seize potential opportunities as a new turning point for the sustainable development of Taipower.

Risk Management Policies

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

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

Risk Management Structure

Under Taipower's risk management structure, the Chairman acts as a supervisor, and 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, and Construction & Engineering, and Digital Development). The Chief Engineers/Administrators are also members of the commission. The Commission operates through subordinate risk management promotion teams, which are comprised of first-tier units that are responsible for the identification of potential risks and the establishment of risk management policies and corresponding responses. Scan the QR code for the risk management organization structure.

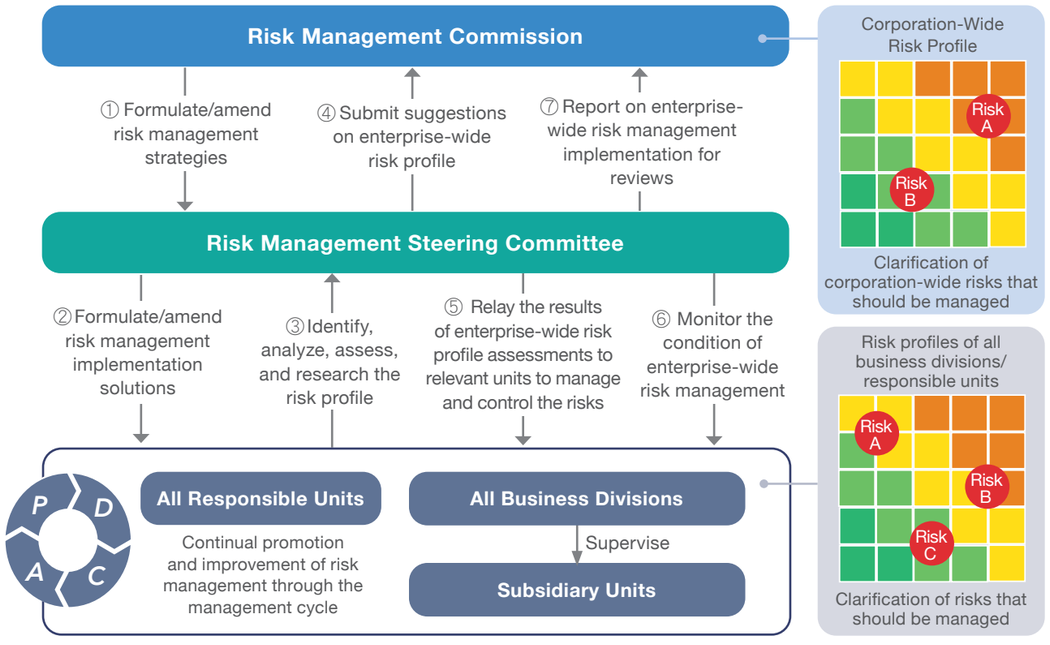
Risk management organization structure

The Risk Management Process

Taipower's risk management process begins with strategies established by the Risk Management Commission. Subsequently, the Risk Management Taskforce 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 Risk Management Taskforce 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.

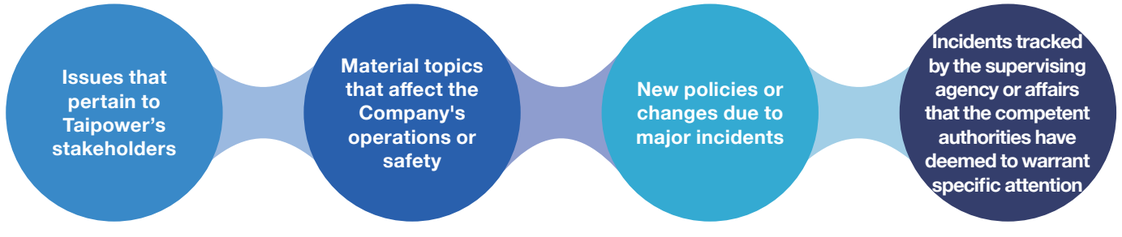
The Risk Management Taskforce is also responsible for monitoring company-wide risk management status and reporting periodically to the Risk Management Commission. Each year, the Risk Management Taskforce reports on risk handling and control results. These reports are reviewed by the Risk Management Commission. Risk management policies are reviewed and revised depending on changes in the internal and external environments.

Risk Management Process



2.2.2 Risk Assessment and Identification

During the process of risk identification and profile analysis, 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 before 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.

Taipower identified 14 potential risk incidents in 2021, and planned corresponding control measures for each risk incident based on predetermined risk conditions. Taipower also conducted continuous reviews of the effectiveness of its control measures and the changes in risks to increase the effectiveness of both prevention before incidents and of response after incidents. Taipower analyzed risks and sustainability issues through systematic risk management to enhance risk awareness, capitalized on opportunities, and achieved its vision of sustainable management.

Risk Category	Risk Identified
Strategic and Financial Risks	Accrual of losses resulting in greater impacts to the Company's operations Failure to meet policy targets as a result of insufficient grid connection of renewable energy projects Failure to complete the transformation within the legal time frame which leads to penalties imposed by the competent authority
Legal Compliance and Issue Risks	Safety or health incidents at the Company that result in casualties or losses of assets Negative publicity from risk incidents that has an adverse impact on the image of the Company Incidents of employee corruption Outbreaks of labor-management disputes and employee protests
Operational Risks	A high turnover rate of employees or failure to develop the Company's electricity enterprise and digital transformation technologies that prevents the smooth progression of core businesses Power supply shortages, affecting system stability and safety Paralysis of the IT system Delayed power plans, affecting the Company's power supply capabilities Progress of grid construction falling behind, affecting grid power supply
Environment and Climate Change Risks	Environmental impact caused by environmental incidents Natural disasters, causing damage to power facilities

2.2.3 Environment and Climate Change Risks

Taipower supports global sustainable development trends and refers to the World Economic Forum's Global Risks Report when taking climate change and environmental risks into account. Taipower identified two major environmental and climate change risk events, including environmental impact caused by environmental incidents and damage to power facilities caused by natural disasters. The Company conducts risk assessments and responses for different risk scenarios and implements continuous reviews of changes in external environmental risks to adjust relevant control measures with the aim of mitigating the impact and effects of environmental and climate change.

Risk Incident and Scenario	Main Management and Control Measures (Excerpts)
▶ Environmental impact caused by environmental incidents	
Failure to meet statutory environmental control targets, resulting in the violation of environmental regulations	· Monthly review of power generation and greenhouse gas emission results · Promote demand response measures · Conduct training on environmental protection regulations and inspection to strengthen awareness
Pollution or ecological incidents	· Implement the "Ecological Audit Operation Plan" · Implement environmental monitoring plans and maintenance of monitoring equipment
▶ Damage to power facilities caused by natural disasters	
Climate change causes unexpectedly severe natural disasters	· Conduct risk assessments and research to identify power facilities with high risks of climate impacts · Conduct a comprehensive climate risk assessment of plants and take actions to improve the resilience of the power facilities to reduce the probability of damage to facilities
Electricity transmission equipment damaged and unable to operate normally	· Inspect transmission lines and substation equipment for typhoon and flood prevention preparation · Establish an emergency response center based on the scale of the disaster · Implement natural disaster drills and report conditions in operation units
Distribution equipment damaged and unable to operate normally, which causes power outages for customers	· Conduct a detailed inventory of emergency repair manpower, vehicles, and equipment for each area and office (including contractors) · Establish Mutual Support Mechanisms for Extraordinary Disaster Areas to create mutual support capabilities between different areas and offices · Organize regular disaster prevention and rescue drills and power repair drills to strengthen emergency response capabilities
Hydroelectric equipment damaged and unable to operate normally	· Reduce the risks of damage to hydroelectric equipment and generators in accordance with the Principles for Hydroelectric Generator Operations during Typhoons and Floods · Formulate disaster response measures for equipment safety, emergency evacuation and life support response measures for possible damages caused by concentrated heavy rainfall and extremely heavy rainfall
Thermal power generation equipment damaged and unable to operate normally	· 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
Wind power generation equipment damaged and unable to operate normally	· Build a big data analysis system for wind farms to track the status of wind turbines, improve equipment maintenance, and optimize maintenance schedules · Implement regular inspections of wind turbines
Solar PV power generation equipment damaged and unable to operate normally	· Process the damage in accordance with the Solar PV Equipment Maintenance Procedures of the Department of Renewable Energy · Strengthen training for disaster prevention, rescue operations, and incident reporting
Emergency at a nuclear power plant	· 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
Radiation released from nuclear waste facilities	· Perform relevant response operations in accordance with the Typhoon Prevention Procedures, Flood Prevention Procedures, and other relevant natural disaster response procedures · Implement related reporting procedures in accordance with the corresponding incident

2.3 Integrity and Compliance

2.3.1 Ethical Management

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 procurement 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. Taipower has implemented the Ministry of Economic Affair's 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 2020, a total of 18 units were inspected and 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 the Integrity Work Plan, as well as performing consultation, supervision, and evaluation of the subsequent implementation of the ethical operations. For the details on the conference, please refer to the Ethics Conference section of Taipower's official website.

The Ethics Conference section

Taipower's Anti-Corruption regulations

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 organized regular meetings and visits, invited prosecutors to give speeches, and held business transparency seminars to ensure smoother business operations for Taipower. In 2020, a total of 70 Taipower units visited local prosecutors or chief prosecutors in their districts. Taipower invited prosecutors to give 15 lectures and held three seminars to promote business transparency at the Taipower Headquarters, the Taichung District Office, and the Dalin Power Plant. 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.

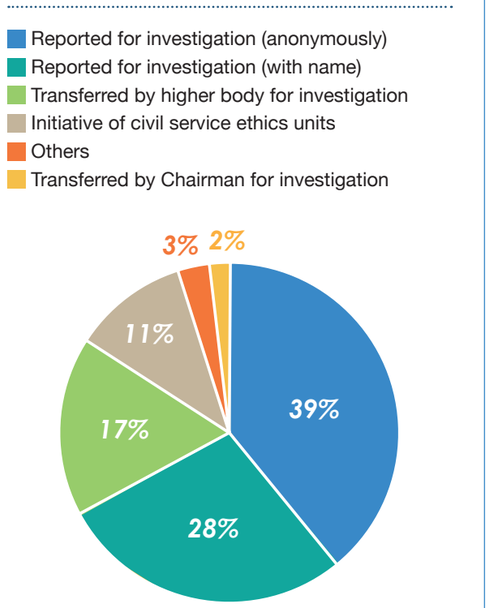
Promotion of Anti-Corruption Campaigns

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 2020 included an Integrity Promotion Seminar for New Employees, a Supplier Integrity Seminar for suppliers and procurement personnel, publication of a monthly integrity e-newsletter, and the arrangement of 1-2 hour integrity promotion courses and on-the-job training courses (including training courses for supervisors at all levels).

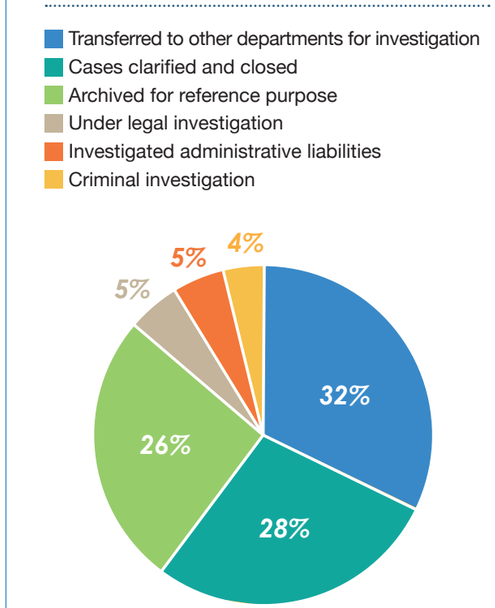
Cases Investigated in 2020

A total of 418 ethics-related cases were closed in 2020. The figures below show the breakdown of cases by reporting source. The percentage of anonymous reports is still relatively high at 39.23%, but Taipower processes all reports that include concrete and verifiable information or data in a prudent and unbiased manner, regardless of the form of submission.

Sources of Corporate Ethics Cases in 2020



Handling of Corporate Ethics Cases in 2020



Cases in Which Employees Are Charged with Regulatory Violations

In 2020, there were two cases in which employees were prosecuted for corruption. Both cases were filed based on the intent to accept bribes in the line of duty. The District Prosecutor's Office filed public suits against the employees for violation of the Anti-Corruption Act. Both were charged with accepting bribes from a contractor on a procurement project to facilitate smooth contract performance.

In 2020, there was one case in which an employee was sentenced for corruption. The employee had cooperated with a contractor to forge documents and received bribes from a supplier. The employee violated professional obligations by accepting the bribes and was also a co-conspirator in causing a public official to make false entries on a public document. The case was finalized without appeal, and the employee was sentenced to imprisonment for four years and ten months. The employee has been sent to jail for the sentence.

Internal Risk Control

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 the Economic Affairs, Taipower's Internal Inspection Office of the Board of Directors devised and executed an Annual Inspection Plan in 2020. The inspected items in 2020 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.

Taipower's 2020 Annual Inspection Plan included each unit's civil service ethics department in the scope of inspection. These departments were engaged in patrol inspections to audit the actual implementation of the operation and to ensure the effectiveness of the three lines of defense.

Three Lines of Defense for Internal Auditing and Control

In 2020, patrol inspections took place at 62 units. There were also an additional 24 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 2020 Annual Internal Control System Statements. Future improvements in internal auditing are proposed as follows:

- **Strengthening inspections for preventative management and increasing the value of inspections**
  Coordinate with the Company's key future businesses in the areas of industrial safety, environmental protection, smart grids, project progress, organizational transformation, and other goals. All units will be assisted with preventive management and improving operational efficiency. Consulting services will be actively provided to all units, to create win-win situations and increase the value of auditing.

- **Assisting in strengthening all departments' attention to internal controls**
  Implement a rotation program between senior auditors in the Auditing Office, the Board of Directors and managers of various departments. This will aid auditors in maintaining familiarity with the Company's operation. The program will also promote internal controls through managers from various departments that return to their original departments after their rotations. Training on internal controls will continue to be implemented.

- **Expanding auditing expertise in response to organizational transformation**
  The auditors will continue to take relevant internal audit courses to enhance their auditing skills. This will help to facilitate the smooth transformation into a parent-subsidiary company and promotion business audits.

2.3.2 Compliance

Taipower is a state-owned public utility and its operations are governed by the Company Act, Securities and Exchange Act, and other general laws and regulations, in addition to the Administrative Law for State-Owned Enterprise and the Electricity Act. Therefore, the establishment of Taipower's organization, accounting, auditing, budgeting, business planning, utility rates, and its 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

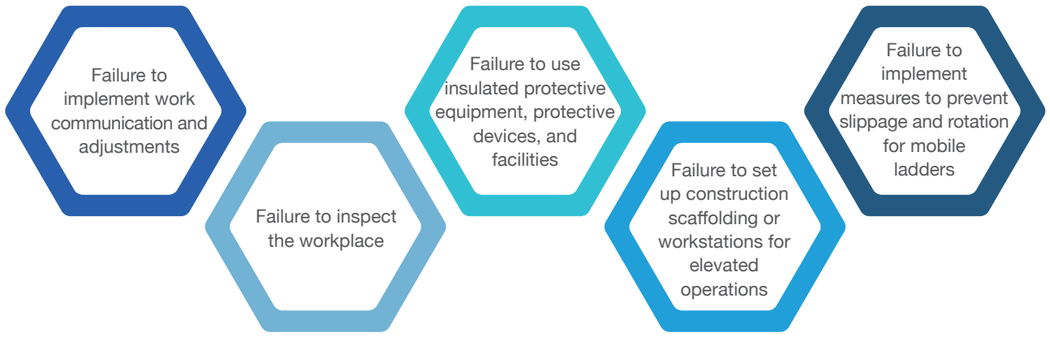
In an effort to boost employee awareness of the Company's legal affairs and to ensure compliance, the Legal Affairs Office organizes multiple sessions of the Practical Legal Issues – Case Studies and Solutions Seminar at different units along with other training events each year. The office also provides 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, there were three labor penalty cases within the scope of this report (connected to Taipower, not to its related legal entities) for violations of the Labor Standards Act. The penalties were imposed for failure to comply with the regulations on the payment of wages for extended working hours and holidays, and failure to comply with the regulations on the payment of labor pension derived from extended working hours. In these cases, the Company was fined NT$20,000, NT$40,000, and NT$300,000, respectively. The former fines mainly resulted from the 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.

Administrative Sanctions for Industrial Safety

Taipower received 13 penalties for industrial safety in 2020 and the types of cases are categorized as follows:



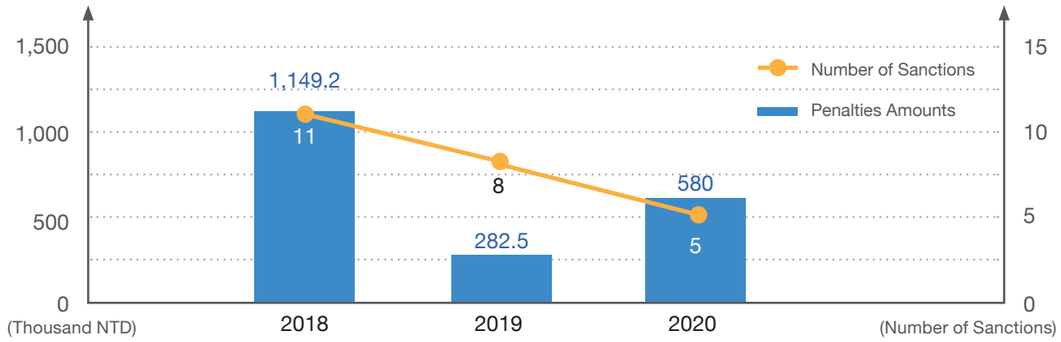
In response to the aforementioned violations, Taipower has planned training (re-education) sessions and strengthened pre-job training for employees in accordance with the Guidelines for Enforcement of Violation of Safety and Health Regulations by Contractors of Taiwan Power Company Limited. When the 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.

Administrative Sanctions on Environmental Protection Issues

Although the total penalties for Taipower's environmental protection violations increased in 2020, the number of penalties decreased from the previous year (excluding policy-related fines). Moreover, there were no violations of water consumption or water quality regulations. In spite of the revision of environmental protection laws and regulations, the continuous implementation of major development projects for electricity facilities, and an increase in the intensity and severity of law enforcement, Taipower has been able to maintain a high level of compliance. 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
- Continuous guidance to the Company's thermal power plants and engineering units on improving operational processes that failed to fulfill environmental regulations; Requests that unit supervisors and deputy supervisors strengthen on-site environmental protection management by wandering around and verifying compliance with environmental protection regulations

Number of Sanctions and Penalty Amounts for Environmental Protection Violations



Note: The number of penalties in the table has excluded policy-related penalties. The statistics for the past three years are as follows:
In 2018, there were seven policy-related fines and the amount of fines was NT$3,589 thousand.
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.

Product Responsibility and Personal Information Protection

Taipower's main product is electricity. Electricity prices and payments must be handled in accordance with government laws, regulations, and policies. As such, Taipower deals with all customer information, electricity payments in arrears, and suspension of electricity services in accordance with the Personal Information Protection Act and the Electricity Act. Taipower conducts an annual inventory of personal data files and systems, reviews necessary fields, and revises relevant business regulations. For the confidentiality of customer-related data, Taipower has formulated a confidentiality mechanism and operations method according to different targets. It abides by the regulations on the handling of personnel data by various units to ensure the protection of customer data related to business execution. For example, to prevent inadvertent leakage of a customer's personal information and violation of law by the service personnel that fail to follow the operations method, Taipower has stipulated handling procedures to check the identification of applicants or to verify their IDs when the personal data of customers or their entrusted persons are involved during the power consumption inquiry process. These inquiries may be made through face-to-face encounters, via telephone, fax, online query, or by printing out the results of such queries. For important databases, Taipower has established a database activity monitoring system to audit and protect data. Through real-time monitoring and event

analysis, the system reports abnormal records to the maintenance department for review and inspection every month. The results of the quarterly review in 2020 were all normal. There were no violations of laws or regulations due to the provisions and use of these products and services.

Information Security Protection Plan

Taipower has identified six major focus areas in developing smart grids. One of these – Information and Communication Infrastructure – is aimed at improving data quality, analyzing applications, and ensuring the safety of information systems and program control systems. To manage these endeavors, Taipower has formulated an Information and Communication Security Policy and established an Information and Communication Security Promotion Group. The policy objectives and guidelines of the Information and Communication Security Policy are as follows:

- IT assets and critical IT infrastructure must be regularly inventoried, classified, and graded. Risk assessments will be conducted for important IT assets and critical IT infrastructure. The Company must implement appropriate protective measures based on the results of these risk assessments.
- The collection, processing, and utilization of personal data must meet the requirements of the Personal Data Protection Act.
- Unit supervisors must pay close attention to the identification and management of confidential and sensitive information. They are responsible for the supervision, implementation, and auditing of unit compliance with information security policies, related laws, and operational regulations. They must also ensure implementation in the units' routine operations and employees' daily tasks.
- The Company will establish comprehensive reporting and emergency response measures for information security incidents and hold regular information security drills to ensure continuous business operations.
- All employees will be fully aware of the purpose of the information security policy and their duties.
- The Company will regularly review the effectiveness of the information security management system.
- The Information and Communication Security Policy and related operational regulations will be revised in accordance with changes in business operations, developments in information technology, and risk assessment results.

2.4 Operational Performance

Strategy for Sustainable Financial Operations

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 in response to changes in power generation and sales structures, fuel price volatility, and uncertainty in electricity rate adjustments.

2018-2020 Taipower Financial Performance Targets and Results Unit: NT$ million

Year	Total Assets	Operating Revenue	Equity	Income Before Tax
2018	2,028,132	587,327	288,619	30,037
2019	2,072,525	594,185	304,614	17,326
2020	2,145,085	604,648	325,886	23,445

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 2020 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 2019 are reviewed and audited final accounts which are not the same as the basis of disclosure for the 2020 Sustainability Report.

Electricity Tariff Review Mechanisms

According to the International Energy Agency (IEA), the latest statistics (2020) from Enerdata and the Electricity Tariffs of Neighboring Countries, Taiwan's residential and industrial electricity tariffs were both ranked fourth lowest in the world in 2019. Taipower is committed to remaining the driving force behind industries and people's livelihoods by providing a stable supply of electricity for Taiwan's social development and economic growth. Refer to Taipower's official website for information on the residential and industrial electricity tariffs of neighboring countries.

Under the mandate 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 a review plan 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.

Electricity Retailing Utility Enterprises' formula for determining the electricity tariff

$$\text{Average pricing of electricity per kWh} = \frac{\text{Expenditure on the purchase of electricity (including profit)} + \text{Expenditure on power transmission and distribution (including profit)} + \text{Service fee for power sales} + \text{Reasonable profit of the Electricity Retailing Utility}}{\text{Electricity sold (kWh)}}$$

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 electricity tariff review meetings in March and September 2020. Taipower submitted an electricity tariff review proposal with +1.83% and +0.18% adjustments. After evaluating international oil prices, reassessing the total cost of nuclear energy back-end operations, and evaluating the price stabilization policy and Taipower's currently stable operations, the Company concluded that the electricity tariff should remain unchanged and therefore not be adjusted.

The average prices of residential, industrial, and commercial electricity in 2019 and 2020

Unit:NT$/kWh

Year	Residential	Industrial	Commercial	Other	Grand total
2019	2.5256	2.4738	3.2381	2.6637	2.6190
2020	2.5596	2.4461	3.1787	2.6586	2.5986

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

In the face of multiple challenges that include the opening of the electricity market and its organizational transformation, Taipower is pursuing an expansion strategy aimed at extending its original business in the electricity industry, strengthening asset revitalization, and entering spin-off businesses. Taipower will continue to provide a stable power supply and actively explore new business opportunities in the future. The Company exists not only for the purpose of profit, but also for the implementation of corporate social responsibility, assisting the government in promoting industrial development and environmental sustainability. Taipower homes to create a new entity that will benefit both society and the business by integrating external resources. Currently, Taipower is actively creating a variety of new businesses. These include real estate revitalization, a fiber optic circuit bandwidth rental business, electric equipment repair contracting, and cultural and creative businesses. In 2020, these new ventures brought in more than NT$1.6 billion in revenue for Taipower. For more information on Taipower's diversified management and results, please scan the QR Code.

Improvement in Operational Performance

Taipower has actively strengthened its operations in recent years by setting targets and performance appraisals. It reviews performance indicators each year to ensure that general operational objectives have been met. In 2020, the Company achieved all 25 of its targets set for 2020. For 2021, 18 overall targets and KPIs were set to continue improvements. (Refer to Appendix P.137 for key performance indicators)

2.5 Strengthening Supplier Management

All Taipower's supplier management processes adhere to the pertinent 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. Additionally, suppliers are required to sign a statement of compliance with environmental and social performance management criteria.

2.5.1 Supplier Composition

Taipower's suppliers include the 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 the suppliers is described as follows:

Fuel Supplier Management

The main fuels used in Taipower's thermal power plants are coal, natural gas, 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

LNG	Coal	Fuel Oil	Nuclear
• Exclusive supply 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 country of origin and supplier for regular contracts • Investment in offshore mining operations	• Fuel oil is supplied by CPC Corporation • Diesel fuel is supplied by CPC Corporation and Formosa Petrochemical Corp.	• Spreading out nuclear fuel processing across 2-3 suppliers

Fixed-Term Supply Contracts

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

LNG	Coal	Fuel Oil	Nuclear
• Signing fixed-term contracts with CPC • Planning 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	• Fixed-term contracts for 70-80% of the coal supply with the remainder replenished by spot contracts	• Procured from local suppliers through fixed-term contracts to guarantee security of supply	• Given that current long-term contracts and inventories are sufficient to accommodate demand, uranium procurement has been suspended • Signing long-term contracts for all nuclear fuel enrichment services

Safe Inventories

LNG	Coal	Fuel Oil	Nuclear
• In accordance with the stipulations of the Taipower and CPC Contact and Early Warning Mechanism for LNG Supply and Demand, Taipower urges CPC to maintain ready LNG inventories of more than 80,000 and 50,000 tons for dispatch to the Yong'an and Taichung Plants respectively. • Planned corresponding responses in the event of accidents with CPC and established terms agreed by both parties	• 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 38 days of inventory as its planning basis for 2021, in which one day of inventory is defined as the average daily usage of coal in the previous year	• The operating reserve for fuel oil is 120,000 ± 40,000 kiloliters • The diesel inventory is established in accordance with the specific supply and transmission conditions at each power plant	• 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 6.18 million tons of coal with a 24.05% shipping ratio in 2020. The self-management of coal transportation ensures stable fuel supply and dispatching.

Fuel Procurement

Natural Gas Procurement

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 Xiehe 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, Xiehe and Tongxiao Phase 2 power plants. This not only enables Taipower to have greater autonomy in its sourcing of LNG for reducing 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.

Currently, CPC is the most important supplier of gas for Taipower. As such, its influence on the stability of the power supply should not be underestimated. Consequentially, Taipower has been actively engaged in establishing a functionally linked mechanism with CPC.

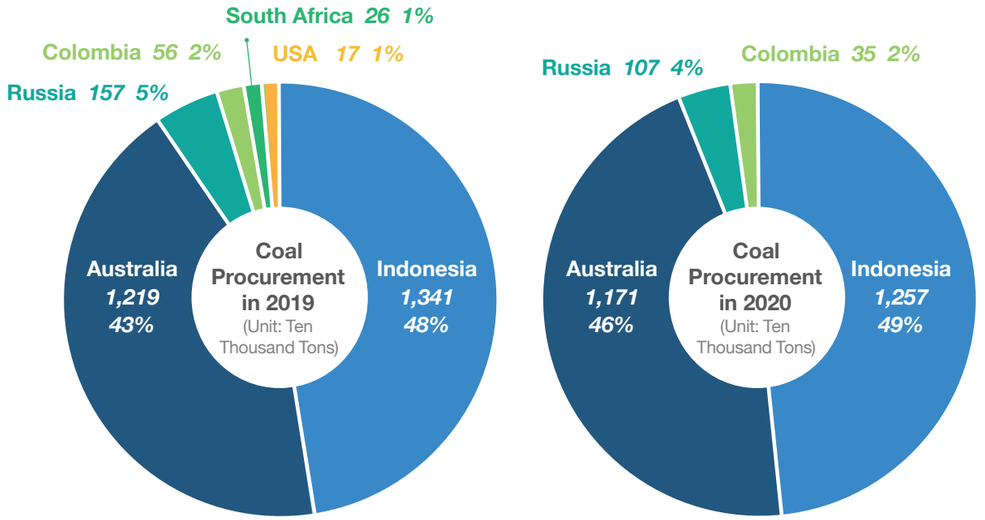
The Mechanism for Gas Supplied From CPC

Frequency	Means of Communication
Annually	· Each year before the end of May, Taipower sends revised data to CPC if monthly estimates for gas consumption in the second half of the year require revision. · Each year before August 20, Taipower sends CPC the monthly estimates of total gas consumption and the 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	· Both parties take part in a quarterly supply coordination meeting to discuss relevant issues on LNG usage.
Monthly	· Each month prior to the 10th, Taipower faxes a Daily LNG Requirement Table for the subsequent month to the CPC. 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 will ensure that appropriate dispatching is performed following Taipower's requests.
Daily	· CPC updates its LNG usage and inventory notice by no later than 10:30 a.m. every day (including holidays) through fax or email. · 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	· 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 Legal Affairs Office. Through various meetings with external energy and economic experts, the task force formulates flexible coal procurement strategies and ensures an adequate supply of quality coal to all coal-fired power plants within the limitations of environmental protection regulations.

Coal Procurement from Different Regions and Total Procurement Quantities for 2019 and 2020



By revising procurement regulations for sources of coal, Taipower has improved the competitiveness of tenders, flexibly utilized buyers' options in terms of the agreed amount in each fixed-term contract, and promptly executed spot procurement strategies to reduce fuel procurement costs and improve fuel procurement performance. Compared with the price of coal in the Asia-Pacific region at the time of purchase, Taipower's coal procurement reduced expenditure by NT$5.956 billion.

Fuel Supply

In terms of fuel (including fuel oil and diesel), 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 fuel oil and diesel inventory levels are set in accordance with the specific supply and transmission conditions at each power plant.

Nuclear Fuel

The procurement of nuclear fuel involves the purchase of uranium and subsequent processing services for conversion, enrichment, and fabrication. Taipower is decommissioning its nuclear power plants to support the government's nuclear-free homeland policy (Item 18 of the National Sustainability Goals). Taipower has stopped all uranium procurement as the current uranium inventory is sufficient for the operations 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.

Suppliers of Materials and Equipment

Suppliers of Materials

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 digital transformation 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 construct a comprehensive system.

The Equipment Supply Chain

Taipower integrated the evaluation/re-evaluation/inspection/feedback steps on defects with ISO 9001 to execute supplier management and auditing to ensure 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. It 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. Prior to 2016, Taipower was permitted to purchase thermal electricity generated by independent power producers (IPPs) in accordance with the 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, and 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 be announced by the electricity industry's regulatory authority in assessing the power supply. When there is electricity demand, the 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 2020, Taipower has signed contracts with nine independent power producers (IPPs), 49 co-generation power providers, and has 34,997 contracts for renewable energy including solar power, wind power, hydropower, and others. A full 55.1kWh of electricity was purchased from external sources in 2020.

2.5.2 Creating a Sustainable Supply Chain

Review and Procurement Standards for Taipower Suppliers

Supplier Review Standards Pursuant to the Government Procurement Act

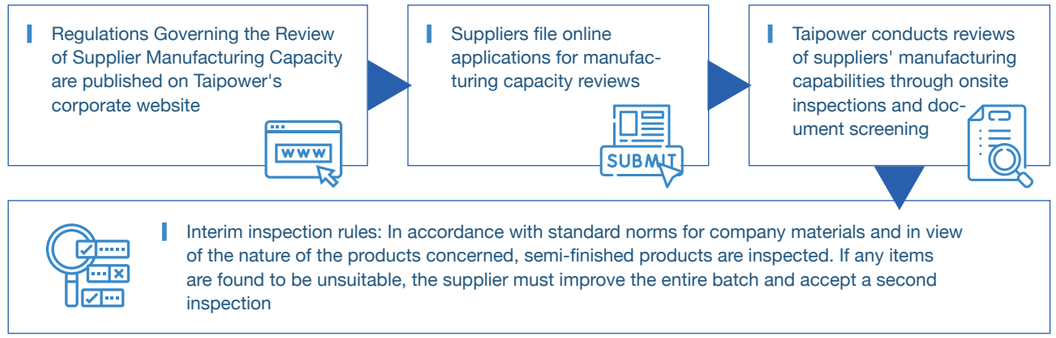
To ensure material quality, maintain power supply safety, and improve procurement efficiency, Taipower reviews the bidding documents of suppliers in keeping with the Government Procurement Act. If the Company has doubts about the contents of the documents provided by suppliers that participate in the 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 2020, Taipower received a total of 3,257 material procurement tenders from 1,184 domestic suppliers and 40 foreign suppliers, or a total of 1,224 suppliers. A total of approximately NT$120.7 billion in tenders was awarded. Domestic tender awards totaled approximately NT$111.2 billion and accounted for approximately 92% of the Company's procurement of property. Among them, the tender awards for selective tendering came to roughly NT$33.8 billion and accounted for approximately 28% of Taipower's total procurement of property. There were 65 contracted suppliers (the tender awards for items that fell under the purview of the localization policy came to approximately NT$19.8 billion and accounted for approximately 16% of Taipower's total procurement of property.) The tender awards for other types of tenders amounted to approximately NT$77.4 billion which accounted for approximately 64% of Taipower's total procurement of property.

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

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. There were approximately 21,106 company-level material procurement contracts, centralized purchase contracts, and cross-department centralized purchase contracts in 2020 with a total contract value of approximately NT$79.6 billion.

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 who are included on the list of qualified manufacturers and allowed to participate in the bidding process must obtain a Certificate of Manufacturing Capacity, and must provide a list of relevant equipment belonging to the company, an independent inspection report, an incoming material inspection, an independent inspection form, and maintenance plans, etc. In addition, the manufacturer's quality management system must be certified by the relevant local professional institutions to ensure the supplier meets execution capability and quality safety standards.

Supplier Evaluations and Audits

Taipower conducts supplier evaluations based on its Application Guidelines for the Re-assessment of Electrical Equipment. 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.

Through 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 shall be issued Certificates of Manufacturing Capacity. When suppliers fail to meet the 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 2020, Taipower strengthened its audits of material suppliers. Among the 156 qualified selective tendering suppliers, 31 were chosen for re-assessment which accounted for 20% of the suppliers. The results of all supplier re-assessments met Taipower's requirements. In addition, the Company conducted inspections during the manufacturing process and on-site audits of suppliers a total of 456 times.

Note: The ratio of suppliers being re-reviewed for supplier risks accounted for 20% of the 156 selective tendering suppliers, which accounts for 2.5% of the 1,224 domestic and foreign suppliers (1,184 domestic suppliers and 40 foreign suppliers).

Performance Highlights

- In terms of the proportion of overall power generation, gas-fired power generation surpassed coal-fired power generation for the first time in 2019, illustrating the effectiveness of Taipower's energy transition.
- In 2020, the System Average Interruption Frequency Index was **0.23** times/household, and the System Average Interruption Duration Index was **15.931 minutes/household.**
- In 2020, Taipower's renewable capacities in operation were **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 by year, from **45.64%** in 2019 to **46%** in 2020.
- In 2021, **the first phase** of the Green Energy Project is completed and a renewable electricity generation system with a total capacity of **160 MW** is scheduled for development between 2022 and 2024.
- The progress of renewal, expansion and new thermal generating unit projects in 2020 is as follows: Linkou Plant (98.57%), Dalin Plant (100%), Tongxiao Plant Phase 1 (99.74%), Datan Plant (38.19%), Taichung Plant (5.99%), Xingda Plant (18.56%), Xiehe Plant (3.64%), and Tongxiao Plant Phase 2 (0.62%).

3 Provider of Sustainable Power

The Implication of Provider of Sustainable Power

A stable power supply is closely related to people's livelihood issues. Taipower supplies electricity steadily day and night in support of Taiwanese people, enterprises, and economic development. As Taipower undergoes transition, it has prioritized three major focal points: the development of renewable energy, the promotion of low-carbon gas, and the renewal of coal-fired power units with ultra-supercritical (USC) generation units. These measures will stabilize the hardware capital of the electric system. Along with the renewal of generating units, the development of low-carbon power, and improved reliability of power generation, transmission, substations and distribution, Taipower will continuously implement the energy transition goals through multi-track parallelism.

Major Investments

- Invest $418 billion in renewables between 2015 and 2030.
- Strengthen the construction of the power transmission and substation system. The total investment in the 7th Transmission and Substation Revision Project will be about NT$236.9 billion (until 2021). By the end of 2020, substation capacity of 15,725.20 KVA (84.75%) and 1,770.44 circuit kilometers (90.04%) of lines had been completed.
- The total length of the underground transmission cable will reach 4,406.74 circuit kilometers.
- In the case of power failures, employ drone aerial photography to transmit back video of outage points along the power supply line, conduct data processing, and establish an AI abnormal image recognition model to assist in anomaly detection for the relevant transmission equipment.

Future Plans

As the trend of energy transition continues, the proportion of renewables used will gradually, but inevitably, rise. However, the unstable nature of this generation will make meeting future electricity demands challenging. Taipower is eagerly developing diversified energy sources on the supply side to cope with policy requirements. Meanwhile, it continues to make good use of opportunities in power dispatch, constantly renews thermal power generating units, increases the proportion of gas-fired energy, and enhances the Company's operational capabilities and market competitiveness.

3.1 Providing Quality Electricity Service

3.1.1 A Stable Power Supply and Generation System

A Stable Power Supply and Installed Capacity

In recent years, Taiwan's electricity consumption has repeatedly hit record highs. To ensure the stability of the power supply, Taipower continuously strengthens its management, promotes power development plans, and brings new generating units online. In terms of managing the operation of thermal power generating units and apart from refining various operational maintenance strategies, Taipower has also established a licensing system and a retraining mechanism for staff to ensure the stability of daily operations. Additionally, the main management measures for nuclear power units 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.

Installed Capacity and Structure Over the Years

Total Amount and Composition of Power Generation from 2018 to 2020

	2018		2019		2020	
	Billion kWh	Percentage	Billion kWh	Percentage	Billion kWh	Percentage
Net amount of power generation and purchase	**233.3**	**100.0%**	**232.5**	**100.0%**	**238.9**	**100.0%**
Amount of power generated	**182.7**	**78.3%**	**180.4**	**77.6%**	**183.9**	**77.0%**
Pumped storage hydro	3.4	1.4%	3.2	1.4%	3.1	1.3%
Thermal	148.3	63.6%	140.6	60.5%	147.0	61.5%
Nuclear	26.7	11.4%	31.1	13.4%	30.3	12.7%
Renewable energy	4.3	1.9%	5.5	2.4%	3.4	1.4%
Amount of purchased power	**50.6**	**21.7%**	**52.0**	**22.4%**	**55.1**	**23.0%**
Privately-owned thermal	38.9	16.7%	39.4	16.9%	40.6	17.0%
Renewable energy	7.1	3.0%	8.5	3.7%	10.4	4.3%
Cogeneration	4.6	2.0%	4.1	1.8%	4.1	1.7%

Average Availability Rates for Power Plants from 2018 to 2020 Unit: %

Unit		Energy type	2018	2019	2020
Thermal	Steam	Coal	86.55	82.65	86.82
		Oil	89.01	93.83	87.01
		Natural gas	90.21	73.70	95.51
	Combined cycle	Natural gas	87.62	88.00	87.98
Hydro		Hydro	95.58	94.30	96.81

Average Availability Rates for Nuclear Power Plants from 2018 to 2020 Unit: %

	NPP1		NPP2		NPP3	
	Reactor 1	Reactor 2	Reactor 1	Reactor 2	Reactor 1	Reactor 2
2018	- (Note 2)	41.76 (Note 3)	85.46	56.62 (Note 4)	87.70	92.07
2019	-	-	100.00	88.03	87.38	97.11
2020	-	-	87.29	88.81	99.36	86.71

Note. 1. Annual availability of nuclear power units = Annual interconnection generation hours/Total annual hours

2. Reactor 1 of Nuclear Power Plant 1 (NPP1) entered the decommissioning stage on December 5, 2018, when its operating license expired.
3. The operating license of reactor 2 of Nuclear Power Plant 1 (NPP1) expired on July 15, 2019, and remained at shut-down condition during the period.
4. Reactor 2 of Nuclear Power Plant 2 (NPP2) tripped on May 16, 2016 due to a failure of the lightning arrester on the generator. The power plant completed all maintenance and testing work on June 27, 2016. On June 13, 2016, the Education and Culture Committee of Legislative Yuan made an interim proposal, demanding the Atomic Energy Council provide a report to the Legislative Yuan before restarting reactor 2 of NPP2. The units were approved by the Atomic Energy Council to apply for grid connection after a major overhaul on March 27, 2018 and full load operation was reached on June 17. The units are currently in stable operation.

▼ Longjing Solar Photovoltaic Field

Increasing the Reliability of the Power Supply

Taipower has a complete power dispatch and reliability management mechanism. The specific action plan is as follows.

Power Dispatch and Reliability Management Mechanism

Regular Review and Analysis

Execution method

- Conduct regular electromechanical system incident review meetings
- Conduct regular power dispatch system incident review meetings

Execution status

- An electromechanical system incident review meeting is held every month to review and analyze the causes of electromechanical outages for systems above 161kV and make follow-up improvements.
- A power dispatch system incident review meeting is held every two months to ensure normal operation of the energy management system (EMS) related software/hardware and peripheral equipment and the safe and stable operation of power dispatching.

Risk Management Implementation

Execution method

- Given the impact of different power incidents on power dispatching reliability and stability, power shortages affecting system stability and safety are listed as a risk control event. The risk level is determined according to the degree of impact and measurement standards in different scenarios. Also, relevant measures are formulated for tracking and control.
- Quarterly follow ups on reviews and execution.
- Conduct a general review at the end of the quarter and set future control objectives.

Execution status

- On January 11, 2021, a review of the execution and effectiveness of the power shortages affecting system stability and safety for the fourth quarter of 2020 was conducted.
- On February 5, 2021, a meeting was held to review the execution of power shortages affecting system stability and safety in 2020. These meetings also conduct continuous adjustments and set the control objectives for 2021.

Personnel Training

Execution method

- In response to the future electricity market transaction mechanism of the Electricity Act, regular on-the-job training is carried out to establish the concept 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

- The training center conducted the first Electric System Reactive Power and Voltage Adjustment Seminar. The training targeted on-duty or business-related personnel of the dispatch centers (central, regional, distribution), power plants, IPPs, ultra-high voltage substations, etc., with a total of 29 participants.
- Dispatchers who had passed the examination after completing the training internship can participate in the dispatcher license examination. In 2020, one dispatcher license was issued. In addition, seven senior dispatchers and five dispatchers were approved for license renewals.

Taipower actively implements the power supply management mechanisms from the three dimensions above to ensure a stable power supply throughout Taiwan. Nonetheless, 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 and provides offshore users with 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 in the Tashan Plant. This helps to avoid a complete blackout in the area in the event of an electric system outage.

At the same time, Taipower is currently planning to integrate the Penghu area grid into the main island's interconnected operations. At present, a new substation construction project in Penghu has been completed. The double circuit line of the Taiwan-Penghu submarine cable is being added to the system. The Penghu system will be integrated into the main island's system, and some of the Jianshan Plant's units will be decommissioned and converted into a standby plant. Moreover, as the proportion of renewable grid-connections in the Penghu area will be greatly increased in the future, the surplus renewables may also be sent back to the main island.

Responding to the Taiwan-Wide Blackout of May 13 and the Power Rationing on May 17 in 2021

At 2:37 pm on May 13, a bus bar outage in Kaohsiung's ultra-high voltage substation led to a sharp drop in voltage. This resulted in the tripping of four units at the Xingda Plant and the loss of 2.2 Gwh of power supply. To maintain grid stability, the electric system automatically started immediate, low-frequency load shedding. The emergency divisional power outage was carried out from 3 pm onwards, affecting approximately four million households in total, and the normal power supply was restored at 8 pm.

Then, on the afternoon of May 17, the Xingda Plant's Reactor 1 failed and tripped. This was caused by excessively high temperature and increased demand that resulted from pandemic related working and studying from home. The power consumption hit a record high (the peak loads usually occur around July, but in 2021, historically high consumption rates were reached on seven days in May with the record electricity consumption peak being broken on May 28). At the time, a unit with a total capacity of 4.57 GWh was unavailable for use due to an overhaul, resulting in a tight power supply. The system automatically protected its equipment at 8 pm, resulting in power failures for some users. Subsequently, the emergency divisional power outage mechanism was carried out at 8:50 pm. The power supply was restored at 9:40 pm.

Taipower actively reviewed and responded to the two power failure incidents. In response to the power failure on May 13, which was due to human error, the Company will implement an on-site SOP, review individual fool proofing mechanisms, and optimize the accountability mechanism for its construction interface. The incident that occurred on May 17 was due to the record-high power consumption in May, in addition to the water drought in 2021, and the record-low precipitation in the same month. Both were not foreseen by Taipower during the annual maintenance planning conducted in the previous year. Therefore, in response to abnormal weather and pandemic-related electricity behavior changes, Taipower will review and strengthen the impact of related social factors on the future growth of electricity consumption. In addition, Taipower will reassess its annual maintenance schedule, strengthen its ability to respond to power dispatch, promote demand-side management strategies, and accelerate diversified power construction to enhance the reliability and resilience of the power system.

▼ Techi Dam dried up reservoir from water shortage

Facing the Challenges 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, all kinds of disaster flash report education and training, as well as 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 will issue at least one local press release every day before, during, and after each typhoon to reinforce public awareness of disaster prevention and preparation. It also sets up the Taipower 1911 customer service hotline, a power outage inquiry and notification system on the official website, and the "apply/repair" function on the Taiwan Power application for the public to report blackouts. In addition, the branch offices have established real-time communication channels such as social media community groups, telephone, fax or e-mail, and other channels based on regional characteristics. This is to ensure a comprehensive control and that the power recovery status of users can be confirmed, so that incidents are handled as soon as possible. Please scan the QR code and refer to the website for Taipower's specific management policy and implementation schedule for natural disasters.

Specific Management Policies and Implementation Schedules for Natural Disasters

Ensuring Nuclear Power Safety

The Company always 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 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 an in operation. These systems must be tested regularly according to regulations to maintain a high degree of readiness to respond to any contingency.

Regarding "defense-in-depth," the Company uses the following four lines of defense in practice.

Defense-in-Depth

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

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. Taipower submits reports on radioactive waste treatment, storage, and final disposal to the competent authority, as well as on the annual operation, radiation protection, environmental radiation monitoring, etc. 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

Usual preparedness	**Organize emergency response plan training**	• The emergency staff of nuclear power plants and the Nuclear Emergency Preparedness Executive Committee shall be 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	• Each nuclear power plant will conduct an in-plant drill once a year. Taipower will invite experts and scholars, in addition to representatives from competent authority, to evaluate the response measures of the drill so that the emergency response plans and actions can be gradually improved. • In 2020, Taipower conducted 2020 Nuclear Safety Drill No. 26 (NPP2). Other nuclear power plant emergency response plan drills were conducted at NPP3 and NPP1 in July and November respectively.
	Construct and implement emergency preparedness performance indicators	• Each nuclear power plant will implement the following three emergency preparedness performance indicators and report on them to the Atomic Energy Council every quarter as part of the control measures taken by the nuclear energy regulatory entity to ensure the preparedness of nuclear power units. – Drill/drill performance. – Participation in the drills of the emergency response organization. – Reliability of the warning and notification system.
Response operation in case of outages	**Take emergency measures**	• When a nuclear outage occurs, the nuclear power plant will perform unit rescue operations in accordance with the provisions of the emergency response operating procedures of the plant. • 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 people.
Post outage recovery operations	**Damage assessment and recovery measures**	• After the cause of the 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 tasks 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 a disaster recovery plan and its 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

Taipower's power transmission and distribution system has always faced stringent challenges. In response to the planned energy transition, Taipower has vigorously promoted renewables in recent years. 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 of concentration in power supply and load centers. Faced with such arduous challenges, Taipower's transmission and distribution system will 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 the offshore wind power phase I grid reinforcement, the UHV substation expansion at the Southern Taiwan Science Park, and the Baoshan UHV substation construction project that strengthen grid power integration capabilities and to introduce 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 268 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 to 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 ecological 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 2020, Taipower has built 618 distribution-level substations and 10,097 feeders.

Furthermore, to help accelerate the acquisition of electricity for factories set up by returning Taiwanese businesses, Taipower has proposed an accelerated power supply review mechanism. The mechanism shortens the review period to one month for newly added UHV power consumption cases connected to the three major investment plans in Taiwan (The Action Plan to Welcome Taiwanese Businessmen to Return to Taiwan to Invest, the Action Plan for SMEs to Accelerate Investment, and the Action Plan for Accelerating Investment by Taiwanese Enterprises to Root in Taiwan).

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 and replace old facilities and lines. The Company will also promote grid projects in a timely manner to maintain a high-quality supply of electricity.

Taipower's current performance indicators of power supply reliability are the System Average Interruption Duration Index (SAIDI) and the System Average Interruption Frequency Index (SAIFI). In 2020, the SAIDI was 15.931 minutes/household, and the SAIFI was 0.230 times/household. Over the past decade, Taipower has continued to show stable performance in terms of outage duration and number of outages. This has greatly contributed to the quality of power supply, customer service, and corporate image. Nevertheless, considering the extreme 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 blackout 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 system and strategy research. It has also built the generation information consolidation platform and other related systems to actively respond to future challenges.

Power Supply Reliability Results from 2018 to 2020

		2018		2019		2020	
		Target	Performance	Target	Performance	Target	Performance
System Average Interruption Duration Index (minutes/household • year)	Work blackout	12.518	12.052	12.481	12.125	12.253	11.696
	Outage blackout	4.7120	4.1351	4.619	4.363	4.547	4.235
	Total	**17.23**	**16.187**	**17.1**	**16.488**	**16.8**	**15.931**
System Average Interruption Frequency Index (times/household • year)	Work blackout	0.063	0.057	0.064	0.059	0.064	0.059
	Outage blackout	0.207	0.170	0.206	0.150	0.196	0.171
	Total	**0.270**	**0.227**	**0.270**	**0.209**	**0.260**	**0.230**

Line Loss Rate from 2018 to 2020

2018	2019	2020
3.94%	3.86%	3.97%

Strengthening Power Transmission and the Substation System

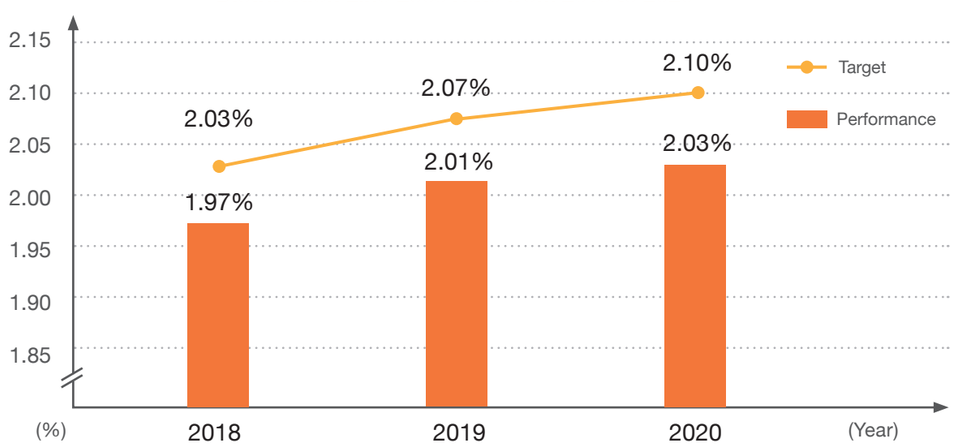
In response to economic growth, Taipower continues to strengthen the overall power grid through power transmission and substation projects, reinforcement of transmission capacity for the main line system, and optimization of the power supply capacity for ultra-high voltage, large-scale customers. The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

Important Project Plans

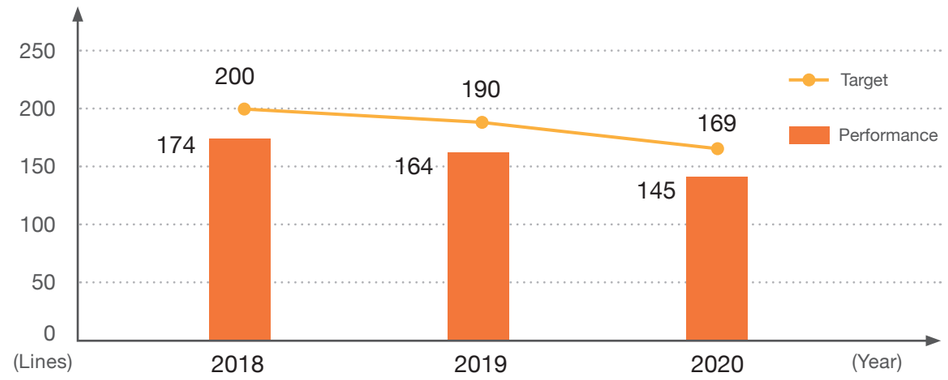
Increasing the Reliability of Power Distribution

To reduce the cost of generation and increase the power supply capacity, the distribution and sales system is based on the target value of the distribution line loss rate allocated by the Department of System Operations. Branch offices are instructed to work out improvements in 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 a management target of reducing the feeders with currents exceeding 300A as a basis for the performance of distribution lines.

Distribution Line Loss Rate from 2018 to 2020



Reduction of Feeder Lines with Currents Exceeding 300A from 2018 to 2020



Distribution Feeder Automation Installations from 2018 to 2020

Performance	2018	2019	2020
Feeder Automation (No.)	7,354 lines	7,590 lines	7,815 lines
Switch Automation (No.)	963 new units	970 new units	1,304 new units

Taipower's Measures for Improving Distribution Reliability

Management approach	Implementation method
Regular review and analysis	- All branch offices regularly conduct high voltage outage review meetings for assessment. - The Department of Distribution holds a monthly improvement meeting on power supply reliability to regularly review the average outage performance of the distribution system, the causes of major outages, and to formulate improved countermeasures and provide the best improvement strategy for each outage.
Risk management implementation	- Yearly review of possible risk factors that affect the stability and reliability of the power supply. The review also includes risk management control for the following year. The implementation performance is then tracked and reviewed a regularly.
Personnel training	- Regularly organize on-the-job education and training for maintenance personnel and dispatchers to advance professional skills and strengthen maintenance capabilities.
Audit operations strengthening	- During spot checks of electrical work or power supply quality, irregular assessments and inspections of equipment operation are reinforced and the outage prevention improvement plans of all branch offices can be supervised.

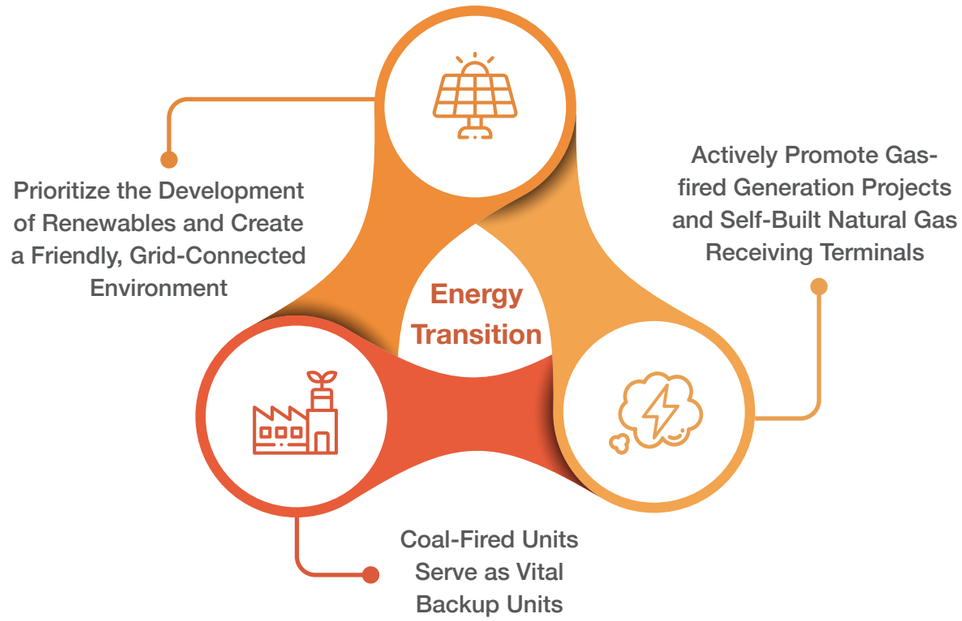
In response to the energy transition and the move towards a new generation of power supply systems, Taipower has accelerated the automation of its distribution feeders. This not only helps to improve the quality of the power supply but also enables fault detection. Through remote control of on-site automatic line switches, outage areas can be isolated promptly to reduce the scale of power failures. Feeder automation has been applied to industrial areas, vital metropolitan areas, and remote areas that are not accessible for repair. In the future, Taipower will continue to promote distributed feeder automation and raise the target value of feeder construction.

3.2 Planning for New Sources of Energy

3.2.1 The Transition to a New Generation of Energy

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 successively decommissioned. In consequence, Taipower has adopted a strategy of reducing coal, increasing gas, and developing green and nuclear-free energy as its future power development strategy. At the same time, in line with the government's energy transition policy, the Company is promoting the development of renewables and actively planning low-carbon, gas-fired units and improving the environmental protection equipment of 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 vigorously gives impetus to the establishment of renewables, such as offshore and onshore wind power, solar power, 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 collaborates with the private sector to fully stimulate the development of renewables.

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

Gas-fired units are cleaner and emit less carbon than coal-fired units. Therefore, Taipower is enthusiastically renewing and expanding plants with gas-fired projects. These projects include the Tongxiao renewal, the Datan expansion, the Xingda renewal, the Taichung new construction, the Xiehe renewal, and more. To ensure the stability of the natural gas supply for power plants and national energy security, Taipower has taken regional balance and the integration of ports and plants as in determining its planning direction. The Company pushed forward the construction of its own natural gas receiving terminals in Taichung Port and Keelung Port (Xiehe), 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 taking into account 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, 97.8% 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 is currently moving towards low-carbon power and renewable development while maintaining an actual reserve capacity of 16.4% in the Taipower system. The overall generation structure consists of is 40.8% gas-fired, 36.4% coal-fired, 12.7% nuclear energy, 1.3% fuel oil, 5.8% renewable, and 3% from other power generation sources (including pumped storage and cogeneration). In addition to meeting the government's 2020 target of a 15% reserve capacity rate to ensure a stable power supply, the proportion of Taipower's gas-fired generation 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

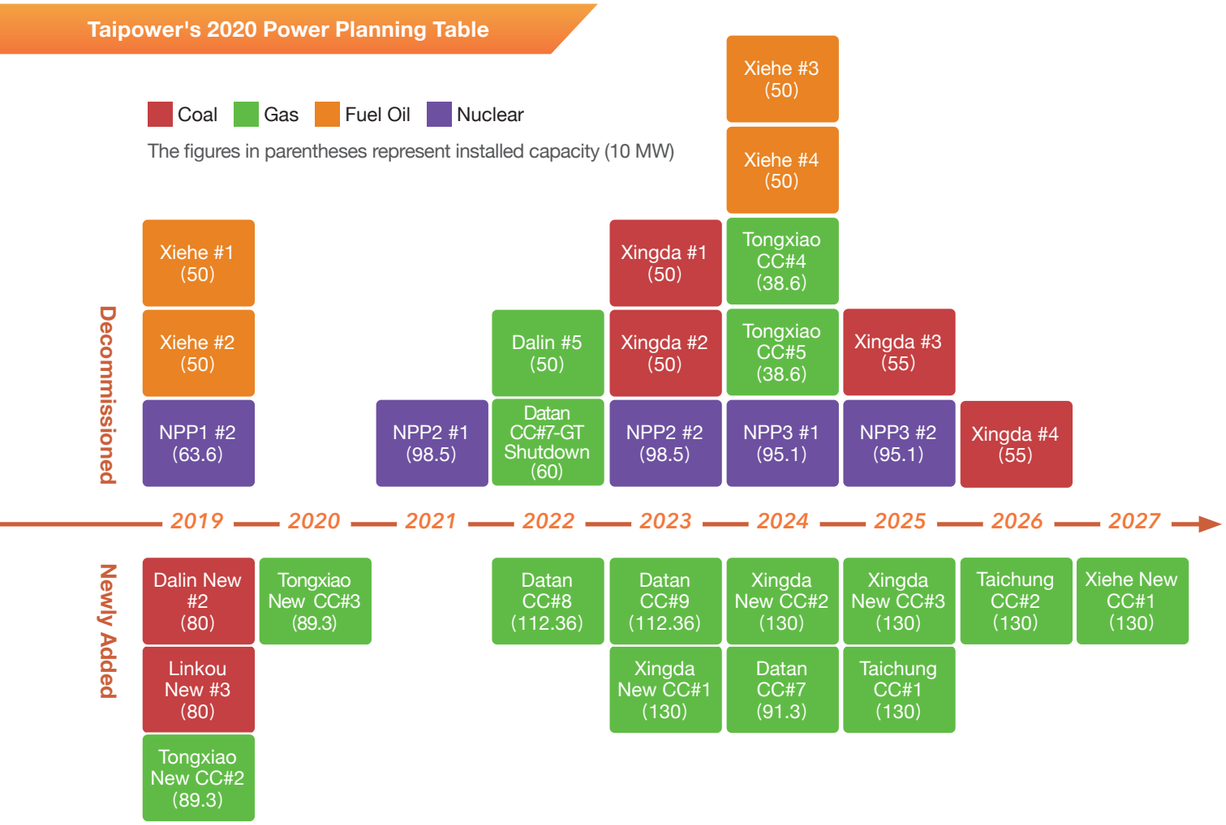
Taipower continues to push forward with the replacement of old plants with new thermal power plants. To facilitate the balance of power supply in Taiwan, improve generation efficiency, and coordinate with the government's low-carbon sustainable policy, Taipower has implemented renewal and expansion projects in the northern, central, and southern regions. At present, the renewal and expansion projects include wind power, solar power, thermal power, and hydropower generation plans. Please scan the QR Code for more details.

Medium-Term Measures

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 so that it can meet electricity needs and remain aligned with the government's energy transition policy and various environmental situations. The plan is shown in the figure below:

Taipower's 2020 Power Planning Table



Note: Based on the 2019/2020 National Power Supply and Demand Report by the Ministry of Economic Affairs.

3.2.2 Renewables Development

Promoting Renewable Energy

In response to the potential demand for grid connections due to the mass production of green power in the future, Taipower is laying the foundation for its energy transition policy. In 2021, it finalized the Green Energy Phase 1 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 focus of work. In 2020, wind power generation reached 775 GWh and solar photovoltaic reached 254 GWh.

Renewables Generation Status

	Deployments	Installed Capacity (MW)	Generation in 2020 (GWh)	Number of Households Accommodated
Wind Power	23 sites 168 units	297.040	775	215,278
Solar Photovoltaics	53 sites	283.845	254	70,556

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 constantly work on raising the proportion of renewable generation and continue to research and develop potential renewables. Taipower is hoping to achieve lower carbon emission and more sustainable electricity for users in Taiwan.

Government and Taipower Renewables Development Targets

	Government's Target		Taipower's Target	
Development Timeline	2025		2025	
Item of Promotion	Capacity (MW)	Power generation (billion kWh)	Capacity (MW)	Power generation (billion kWh)
Hydropower	2,150	6.6	1,828	4.48
Onshore Wind Power	1,200	2.8	370	0.91
Offshore Wind Power	5,667	20.5	403	1.33
Solar Photovoltaics	20,000	25.6	500	0.66
Geothermal Power Generation	200	1.3	2	0.01
Fuel Cells	60	0.5	-	-
Biomass Energy	813	4.3	-	-
Total	**30,090**	**61.5**	**2,928**	**7.2**

Note: The government targets are based on the Taiwan Green Energy Development Trend briefing by the Bureau of Energy at the 2020 Energy Vision Summit Forum on November 11, 2020.

The Current Status of Renewable Energy

Taipower will continue to be play a leading role in the 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 invests 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

Hydropower has a long history at Taipower. By the end of 2020, 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, small hydropower plants such as those at Jingshan Hydropower and in Phase 1 of the Island-wide Small Hydropower Project are still under construction. Small hydropower installed capacity is expected to reach 20,566 kw in 2023.

Wind power

Since 2000, Taipower has been dedicated to wind power development. By the end of 2020, the Company had completed the Zhongtun Wind Power Demonstration Project, phases 1 to 4 of the Wind Power Generation Project, the Penghu Huxi Wind Power Project, and the Kinmen 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. The Offshore Wind Power Phase 1 Project deploys 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. By the end of 2020, two wind turbines had been installed and work had proceeded to the interconnection test phase, with a completion target of August 31, 2021. It is expected that the security dispatch of all units will be completed by October 31, 2021.

Solar power

Phase 1 of the Solar Power Project was implemented in 2008. Since that time, a large number of solar photovoltaic systems have been built. By the end of 2020, a total of 53 solar photovoltaic fields had been completed, including the Tainan Salt Field Photovoltaic Project which generates 150MW. This is the largest photovoltaic field in Taiwan with a total system installed capacity of approximately 283MW. 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.

Geothermal power generation

The pilot project for the Green Island geothermal generating unit and Phase 1 of geothermal power generation at Renze and Tuchang in Yilan.

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 (dated on February 18, 2021)

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)	4,580	13,274.97
	Approved but haven't signed a contract (B)	5,885	17,697.37
	Have signed a contract but haven't connected to the grid (C)	38,957	7,819.23
	Subtotal (=A+B+C)	49,422	38,791.57
Grid-connected cases		38,475	5,842.55
Official power purchase cases		35,058	4,769.11

Committed to Renewable Energy Efficiency

To improve the efficiency of renewable energy power generation, Taipower conducts regular preventative maintenance inspections to reduce the unit failure rate. 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 93% and a capacity factor of 30%. In the future, Taipower will enhance its technical management capabilities and refine the 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 2018 to 2020

	2018	2019	2020
Availability rate of wind power (%)	93.83	92.19	93.03
Capacity factor of solar power (%)	15.05	13.85	16.02

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 the grid in a centralized deployment method to avoid waste of Taipower's investment. Meanwhile, Taipower continues to implement its distribution-grade power grid reinforcement project that enables increased renewable grid-connection and promotes the 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 guise 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

The Implication of Leader of Smart Grid Development

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

Major Investments

- Developed Automated Metering Infrastructure (AMI), smart meter big data analysis and value-added applications, refined power consumption visualization and user interaction functions, and guided users to save energy voluntarily. The Company is expected to invest $46.4 billion in smart meters and communication modules between 2019 and 2030.
- Planned to complete a deployment of 6 million smart meters by 2030, along with 3GWs of demand response measures and participation.

Performance Highlights

- Installed a total of **29,621** high-voltage AMIs and **1,096,869** low-voltage AMIs by the end of 2020.
- Installed **65** kilometers of optical cables and deployed **94** optical fiber communication systems in 2020. Provided **773** communication circuits in line with the development of the smart grid.
- Constructed the **Kinmen energy storage system**, consolidated and applied various energy sources, regulated and reduced system fluctuations, and maintained grid stability.

Future Plans

Taipower is in alignment with the government's policies and plans. In the short term (2020), the Company will focus 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.

4.1 The Smart Grid General Planning Framework and Action Plan

4.1.1 The Smart Grid General Planning Framework

Smart grids are vital to driving energy transition, leading industrial transformation and new economic development. Taipower is proactively reducing the impact of intermittent renewable energy generation, 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 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 the 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 Master 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

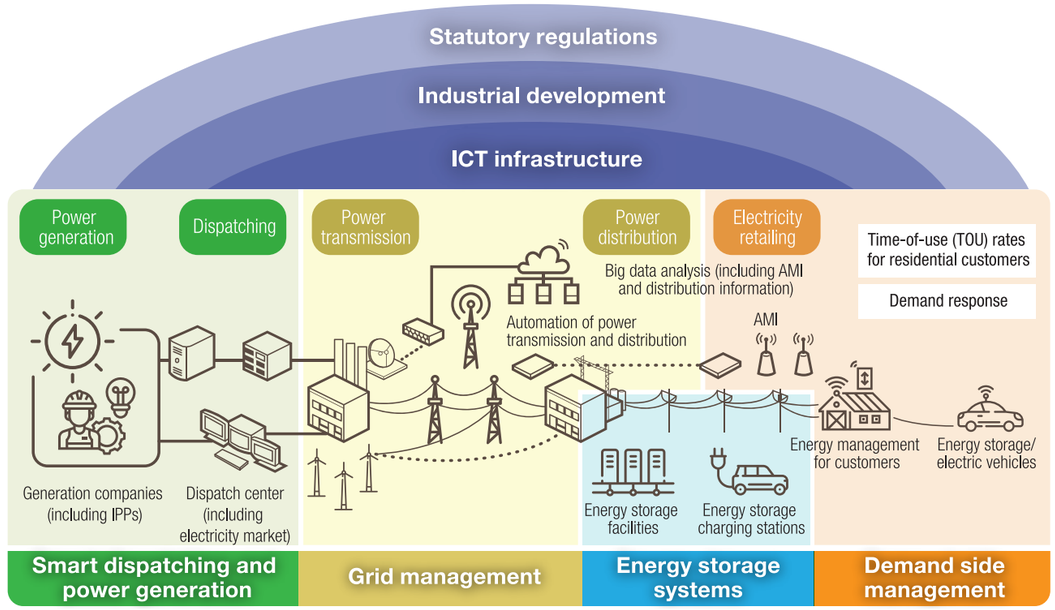
Chairman of the Board to attend and offer insights	**Supervision Group**: Convener: President; Deputy Convener: Vice President			
	Executive Secretary: Department of Power Supply			
	Chief Host of System Integration	**Smart Grid Project Management Office (PMO)**		
	Vice President and CEO	Vice President and Chief Digital Officer	Vice President and CEO	
	Grid Management	**Energy Storage Systems**	**Demand Side Management**	**Statutory Regulations**
Organized by	Department of Power Supply	Department of System Planning	Department of Business	Department of Distribution
Coordinated by	Department of Distribution	Department of Transmission Line and Substation Projects Department of Renewable Energy Department of System Operations	Department of Distribution	Department of System Operations Department of Power Supply Department of Renewable Energy Taiwan Power Research Institute
	Smart Generation and Dispatch		**ICT Infrastructure**	
Organized by	Department of System Operations		Department of Telecommunications	
Coordinated by	Department of Generation Taiwan Power Research Institute Department of Distribution		Department of Information Management Taiwan Power Research Institute	

4.1.2 Smart Grid Action Plan

Taipower's smart grid action plan is aligned with the Smart Grid Master Plan as approved by the Executive Yuan on Mar. 27, 2020. The future smart grid strategic plan will be oriented towards problem-solving and focus on the system integration of smart grid functions. The Company has examined existing issues with the power system, revised the plan's structure and organized issues into seven major fields. The seven major fields are: smart dispatching and power generation, grid management, energy storage systems, demand side management, ICT infrastructure, industry, and statutory regulation. Among them, Taipower is responsible for the first five fields, while the Industrial Development Bureau is in charge of developing the industry, and the Bureau of Energy is in charge of statutory regulations.

The Current Development of Seven Major Fields of Smart Grid

Smart Grid General Planning Framework



In 2020, Taipower experienced several major achievements within the five fields under its purview. They are as follows:

Smart dispatching and power generation	Consolidating existing renewable energy generation and establishing an information management platform, creating a power market trading platform and coal-fired unit big data monitoring, and introducing a Distribution-level Renewable Energy Advanced Management System (DREAMS).
Grid management	Transmission system data planning, operation, and maintenance, information Consolidation to strengthen transmission and distribution asset management.
Energy storage system	Self-built 11.5MW of system capacity in 2020 (including a demonstration field) and procured additional ancillary services of 15MW, totaling 26.5MW.
Demand side management	Taipower is targeting potential power-saving users in its deployment of smart meters. The Company plans to complete a cumulative deployment to six million users by 2030. By the end of 2020, a total of 29,621 high-voltage AMIs and 1,096,869 low-voltage AMIs had been installed.
ICT infrastructure	Completed the installation of 65 kilometers of optical cables and 94 optical fiber communication systems, providing 773 communication circuits.

Taipower Smart Grid Planning Objectives

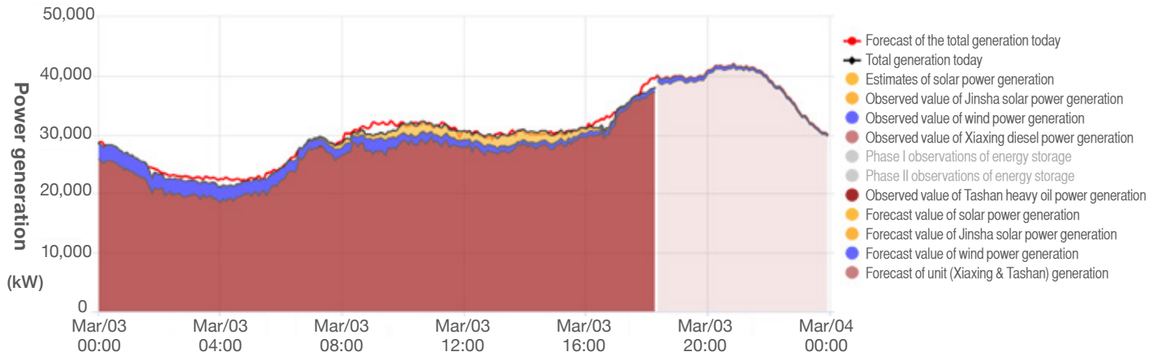
Smart dispatching and power generation	• Real-time monitoring capacity of renewable energy (GW) • Renewable energy forecast accuracy (day-ahead/hour-ahead error rate %) • Electromechanical outage rate (times/year) • Coal-fired plant unavailability index (EUF) (total hours of equivalent pipe downtime) • Ancillary service reserve (MW)
Grid management	• Average failure time of transmission system equipment (hours/year) • The proportion of power recovery outages in the downstream of automated feeder within 5 minutes (%)
Energy storage system	• The capacity of the energy storage system (MW)
Demand side management	• Automated Metering Infrastructure (AMI) (cumulative number of households) • AMI user power consumption data published online for query (hours) • Participation in demand response planning (GW)
ICT infrastructure	• Introduction of intrusion detection system security protection • Bandwidth increase for backbone/regional fiber optics system (bits/sec)
Industry development	Responsibility of the Industrial Development Bureau
Statutory regulations	Responsibility of the Bureau of Energy

4.2 Tracking Smart Grid Achievement - Kinmen Smart Grid Energy Consolidation and Applications

Renewable energy generation is booming in Kinmen. But as renewable energy is integrated into the system, its volatile generation will affect power plant operations and system stability. To mitigate these effects, Taipower has introduced two energy storage systems in Kinmen. A 2MW lithium battery energy storage system swiftly provides short-term power compensation by detecting and responding to system status. This makes the power supply and demand system more stable. Additionally, a 1.8MW sodium-sulfur battery system was designed to have a large storage capacity, and can be used continuously for up to six hours. It is charged during daytime when solar power is abundant and is discharged at night. This system is used in combination with diesel generators.

With the increasing proportion of renewable energy in the Kinmen power system, accurate generation prediction can reduce fuel costs that result from operating thermal units as a reserve. Currently, Taipower has consolidated forecast information for wind and solar power in the Kinmen area to develop a generation information platform that provides a reference for Kinmen's Tashan Power Plant's unit scheduling and maintenance management.

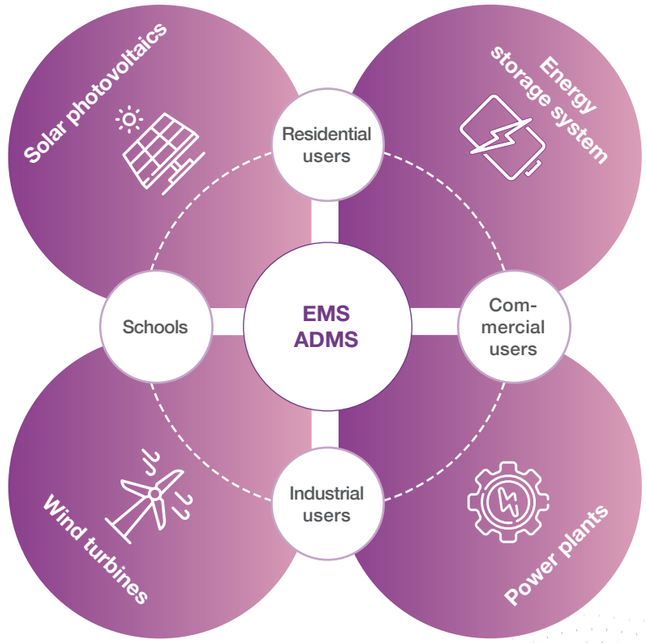
Kinmen Power Plant Generation



Taipower also established an Energy Management System (EMS) at the Tashan Plant in Kinmen. The system integrates information on diesel units, solar photovoltaics, and wind turbines and incorporates information on energy storage system status, grid structure, and user load forecasts to provide dispatchers with operational status for the next 24 hours. An AI algorithm is also used to provide power dispatching countermeasures.

Furthermore, an Advanced Distribution Management System (ADMS) is set up on the power distribution end in the Kinmen area. The system incorporates the management of distribution line structure and equipment status, and provides real-time power generation status control for over than 95% of the island's solar photovoltaics. This information allows Taipower to achieve user load demand assessments, automatic fault recoveries, and renewable dispatch, so as to improve power quality and reliability for users. Through the EMS and ADMS in the Kinmen area, Taipower is able to immediately assess Kinmen's power system situation and respond with the dispatch and coordination of different energy sources to maintain the stable operation of the system while moving towards the goals of becoming a low-carbon society and achieving sustainable development.

Schematic Diagram of Smart Grid



5 Provider of Services for Smart Living

The Implication of Provider of Services for Smart Living

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 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.

Major Investments

- Promoted demand bidding to strengthen customer participation and reduce peak loads.
- Implemented time-of-use rates to manage public power consumption, checked power saving potential, and popularized demand response measures while carrying out power-saving incentives to maintain the stability of the power supply.
- Established diversified information transmission channels and set up customer communication channels such as a customer suggestion mailbox, the Taipower 1911 customer service hotline, and dedicated services.

Performance Highlights

- Provided communities and organizations with power-saving advocacy services. A total of **1,559 sessions** were held in 2020, attracting **250 thousand participants**.
- In 2020, Taipower completed **45** energy-saving diagnoses, held **one** energy-saving skill competition (**30 participants** on 10 teams), organized **four** seminars and technical exchanges (**150 participants** in total), and conducted **five** energy-saving practical training courses (**170 participants** in total).
- Taipower's Power-Saving Service Team visited **5,410 customers** in 2020, with an estimated power saving potential of **96.41 million kWh**.
- In 2020, Taipower's 1911 customer service hotline received more than **2.15 million calls**. The proportion of calls that were answered with 20 seconds reached **95.89%**.

Future Plans

Taipower continues to promote and refine its various demand response measures every year. 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 adjustment in the power system dispatching. The demand response participation target in 2021 is 2.55GW and is expected to reach 3.0GW by 2030.

5.1 Smart Electricity Service

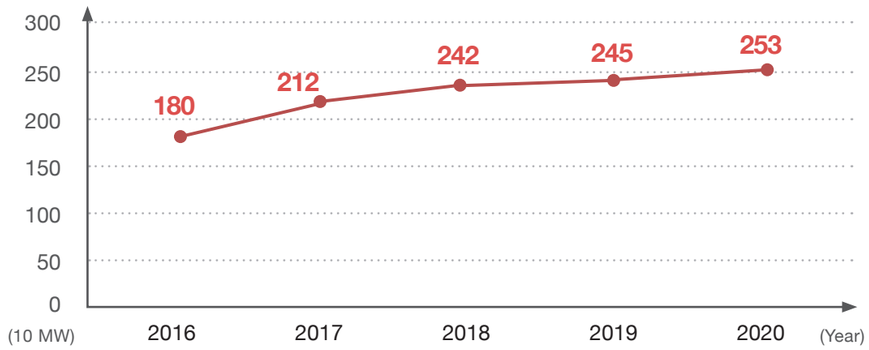
5.1.1 Demand Side Management Measures

Taipower has been actively deploying Automated Metering Infrastructure (AMI) or smart meters. In order to properly utilize the huge amounts of resulting electricity data, Taipower provides value added services such as high and low voltage visualized electricity consumption information and consumption trial calculations. Taipower also provides visualized consumption analysis charts and comparative information for customers in the same area. These features allow customers to manage their electricity consumption and promotes user participation in demand response measures.

Demand-Based Bidding

Since 2015, Taipower has been promoting the ideas of feedback pricing, which is determined as customers voluntarily reduce their electricity consumption, and demand bidding, which takes place during the peak period of power consumption in summer. 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 achieve a stable power supply.

Demand Response Load Management Measures: Applying for a Reduction of Capacity



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 the 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 rates 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. Beginning in 1979, Taipower has used TOU rates for more than 40 years. 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	13,027,865	38,247	0.29
Meter-rated lighting for business	1,031,734	111,824	10.84
Low-voltage electricity	298,972	35,030	11.72
High-voltage electricity	24,449	24,449	100.00
Ultra-high-voltage electricity	651	651	100.00
Total	14,383,671	210,201	1.46

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 three-stage TOU rates on May 1, 2021. In the future, Taipower will introduce more diversified electricity rate schemes, allowing users to be more selective and increasing load management efficiency at the same time.

Automated Metering Infrastructure (AMI)

Electro-mechanical meter

Electricity meter

Demand Side Management Measures

Measure		Description	Applicable customers	Results
Use of TOU rates since 1979		Reflect the cost of electricity during different periods. Encourage 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 **4.05 GW** in 2020
Launched Simplified Residential/Commercial TOU rates in 2016		To provide 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 other customers	
Demand Response Load Management Measures	**Implemented Air Conditioner Duty Cycling Load Control Measures in 1991**	The central air-conditioning system is paused for 15 minutes every 60 minutes of operation. Packaged air conditioning systems are paused for eight minutes with 22 minutes of operation to suppress peak load.	Non-productive customers (e.g. office buildings, schools)	
	Implemented Power Consumption Reduction Measures in 1987	Provide reduced rates as incentives to encourage customers to reduce electricity consumption during peak hours or shift to off-peak hours, to reduce system peak load.	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	Daily peak load reduced by **1.08 GW** on the peak load day of 2020 (July 23, 2020)
	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	Allow customers to apply for Demand-Based Bidding in groups	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 has visited **5,410 users** in 2020, with an estimated power saving potential of **96.41 GWh**
Community Energy Saving Campaigns		Provide free power-saving advocacy services for communities and associations. Taipower uses the occasion of assemblies to promote power-saving, share energy-saving related knowledge and experiences. Taipower 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 community, association	A total of **1,559 seminars** were organized in 2020, with approximately **250 thousand participants**
Visits to customers consuming more than 100 kW		Improve the overall efficiency of energy-saving services through regular visits, continuously pay attention to the use of large power users, and learn how to help them save electricity	Customers above 100 kW	A mechanism for initial visits and revisits has been established

5.1.2 Power Saving Performance

In order to encourage customers to implement energy conservation in practice, Taipower has employed power-saving incentives since July 2008 that prompt users to maintain power-saving motivation over the long term. In addition, 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). In the same year, the Power-Saving Reward Points app was launched. This allows users to collect points by participating in various energy-saving puzzle activities on the app. The points may be redeemed for prizes or to participate in sweepstakes. The goal is to promote the concept of power-saving among the public and form a power-saving culture and habits.

Power Savings Reward Performance in 2020

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
2018	1.32	9.9	67	1,722
2019	1.43	11.7	73	1,877
2020	1.19	10.3	61	1,568

Notes: 1. Based on the nation's electricity emissions coefficient of 509 grams CO_2e/kWh of 2019 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 CO_2 per year.

2. The performance of power-saving rewards is the statistical data of customers who have completed the login of power-saving reward activities (3.34 million customers in 2018, 3.95 million customers in 2019, and 4.22 million customers in 2020).

5.2 User Communication and Management

Diverse Channels for Engagement and Communication

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, and English to cater to customers' power service needs in the language of their preference.

Diversified Information Communication Channel

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 customers' 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 Feedback Channels

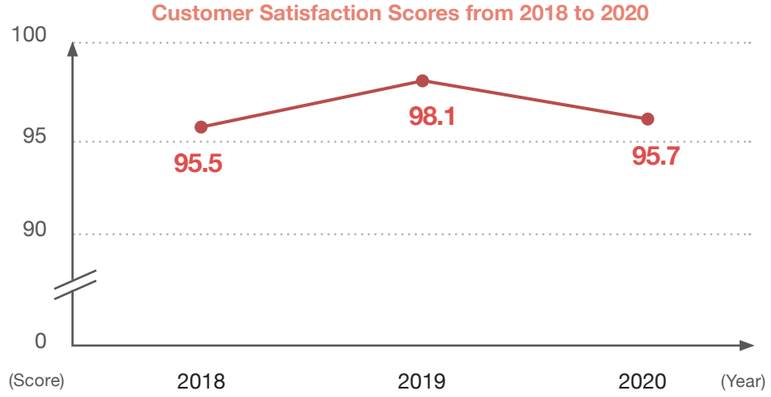
Customer feedback mailbox	A customer feedback mailbox was established on the corporate website to provide a smooth and effective feedback channel for the immediate processing of customer opinions, thereby improving service quality and satisfying customer demands.	The customer suggestion mailbox received **4,702** letters in 2020
Customer Service Hotline	Provide 24/7 services all year round, including electricity bill and business inquiries, acceptance of electricity applications, and repair of power supply line equipment, etc., to improve service satisfaction.	In 2020, more than **2.15 million** calls were answered, and **95.89%** of calls were answered within 20 seconds.
Dedicated Service	In order to strengthen customer-oriented services, Taipower provides dedicated services to customers using high-voltages, national trade associations, and village/neighborhood offices so as to maintain good communications with customers.	In 2020, there were a total of **39,515** dedicated services performed for customers

Customer Satisfaction

In 2020, Taipower conducted an opinion survey for general, medium and large customers. The scope of the survey included quality of service, Taipower's corporate image, customer feedback, and overall customer satisfaction. The 2020 survey was conducted between November 6 and December 18 of that year. In recent years, customer satisfaction has consistently been maintained at over 90%. The result indicates that the quality of Taipower's services has been recognized by customers.

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 strengthen its communication with customers to make service delivery even better.

Customer Satisfaction Scores from 2018 to 2020



6 Agent of Environmental Friendliness

The Implication of Agent of Environmental Friendliness

The operation of a business is bound to have an impact on the environment. As an energy enterprise, Taipower must face the challenge of maximizing positive impacts while minimizing negative impacts. As the economy develops, Taipower must continue to pursue cleaner energy and low-carbon transformation. Taipower will work with society and enterprises to seek more energy-efficient operating methods as it pursues carbon value and environmental sustainability.

Major Investments

- In 2020, the establishment of an index system for promoting the ranking of ecological fields was completed; Linkou and Dalin Power Plants established a new version of the energy management system.
- The environmental protection capital expenditure in 2020 was approximately NT$4.75 billion, of which nearly 90% came from equipment capital investment in renewable energy. The environmental protection recurring expenses were about NT$3.63 billion, of which NT$950 million were related to air pollution prevention and control.
- In 2020, Taipower commissioned the Fisheries Agency to handle fish fry releases with an expenditure of NT$3.5 million.

Performance Highlights

- The wastewater-reclamation ratio at thermal power plants exceeded the original target of 73% and reached **79%** in 2020. The net carbon emissions of thermal units decreased by **6.52%** compared to the target base year (2016) of the Environmental White Paper.
- In 2020, coal ash production was 2.209 million tons with a reuse rate of **89.7%**. The desulfurized gypsum ($CaSO_4 \cdot 2H2O$) production was 29.6 tons with a reuse rate of **98.6%**.
- SF_6 gas was reclaimed in 2020, reducing the total amount of CO_2e by approximately **1.09 million tons**.
- The climate risk assessment of each generation, transmission and distribution unit was completed. **Three major system demonstration sites** (Taichung Power Plant, the Operation Office of Taipei Power Supply Area, and Kaohsiung District Sales Office) were constructed.
- The project planning for the **Linkou Marine Ranch** was completed along with conservation work for life below water and one marine ranch research plan.
- **The inspection plan for ecological integration at power facilities** was completed. The plan put forward specific visions for ecological restoration and environmental maintenance in the areas around power facilities.

Future Plans

To meet the 2025 commitment outlined in the Environmental White Paper, Taipower will continuously strive to reduce the environmental impact of various power facilities while enhancing the efficiency of utilizing various energy resources. In response to air quality and climate issues, Taipower has adjusted its energy structure, increased the use of gas and renewable energy, and improved pollution prevention equipment and other measures, which enabled the Company to reach the target of halving air pollution by 2030 ahead of schedule in 2019. At the 2020 Environment Month conference, Taipower revised the emission reduction target and raised the commitment target by more than 60% for 2025 and 70% for 2030 compared to 2016. In addition to achieving these targets ahead of schedule, Taipower also voluntarily set more stringent objectives and is actively fulfilling its environmentally friendly promises.

6.1 Strengthening Environmental Management

6.1.1 Environmental Policy and Goals

The operation of the electric power industry must take into account energy quality, energy safety, and environmental sustainability. Taipower adheres to the corporate mission of supplying stable electricity for the diversified development of society in an environmentally friendly and reasonable-cost manner and the corporate vision of transforming into a prestigious, trustworthy world-class power utility group. The Company is actively responding to the major environmental issues and development trends faced by the energy industry. For example, in response to the United Nations Sustainable Development Goals (SDGs) and the international vision for achieving a carbon-neutral transformation by 2050, Taipower has planned an environmentally long-range development path. Taipower's Chairman of the Board personally signed Taipower's environmental policy in April 2019 and publicly disclosed it, demonstrating Taipower's green commitment for future generations.

Through the six major strategic aspects and the corresponding development of 12 strategic dimensions, Taipower's Environmental White Paper serves as the 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 reduction and emission reduction), and "three transformations" (intellectualization, ecological, and circularization). Through a multi-pronged approach, Taipower will create environmentally friendly power facilities, a comprehensive model of green environmental protection, a sustainable and inclusive power generation, transmission, distribution, and sales enterprise system.

Taipower's Environmental Policy

Taipower's Environmental White Paper

Six Strategic Objectives and Achievements of the Environmental White Paper

Strategy	Key strategic dimension	Achievements in 2020	Target values for 2025
Respond to climate change	**Promote mitigation procedures**	Net emission intensity of thermal power units (greenhouse gas) has been reduced by 6.52% as compared to 2016	Net emission intensity of thermal power units will be reduced by 15% as compared to 2016
Protect environmental quality	**Manage air pollution emissions**	Achieved the 2025 target value ahead of schedule: Air pollution emission intensity was reduced by 60% compared to the Environmental White Paper base year (2016)	Air pollution emission intensity will be reduced by 60% compared to 2016
Focus on circular innovation	**Establish a circular business model**	Completed the compilation of a coal ash marine engineering manual	Implement a circular resource supply model
Refine management systems	**Develop intelligent management**	Intelligent management and service coverage reached 46% (including the deployment of smart meters in one million households representing 69% of the total national total power consumption)	Intelligent management and service coverage will reach 65% (including the cumulative deployment of smart meters in three million households, representing 81% of the total national total power consumption)
Create ecological inclusiveness	**Plan the fusion of ecology and facilities**	Completed the establishment of an index system for promoting the ranking of ecological fields	Establish at least three ecologically inclusive plans for power facilities
Expand internal and external engagement	**Deliver information on electricity and the environment**	Achieved the 2025 target ahead of schedule: Annual communication of environmental protection information reached 990 thousand people	Annual communication of environmental protection information will reach 700 thousand people

Implementing Environmental Impact Assessments

Improperly managed power facilities can have several potential impacts on local communities. These impacts may include water, air, and soil pollution, noises and vibrations, odors, waste, toxic substance pollution, site subsidence, radiation pollution, and damage to natural resources, landscapes, sociocultural, and economic environments. Taipower is committed to the principle of minimizing these environmental effects and is actively engaged in 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 community is minimized. In 2020, Taipower had no violations of environmental laws or regulations. Please refer to QR Code for information on Taipower's achievements with development project and environmental impact assessment implementation.

Environmental Impact Assessments Achievements

6.1.2 Environmental Accounting

In 2008, Taipower implemented an environmental accounting system (EAS) which 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. 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. Information is also compiled in the environmental accounting management system to make reimbursement more convenient and to accurately evaluate Taipower's investment in environmental protection expenditures. This approach indicates that, in 2020, Taipower's environmental protection capital expenditure was approximately $4.75 billion and its recurring environmental protection expenses were about $3.63 billion.

In 2020, Taipower also made some major improvements to its environmental accounting process. These improvements are as follows:

Alignment with Environmental Protection Management Goals

In accordance with international environmental accounting standards, Taipower connected brought its environmental accounting into alignment with its actual environmental management goals and changed its accounting method so that only environmental expenditures are calculated. The new version of the accounting principles preferentially removes industrial health and safety expenditures and adds renewable energy expenditures. This directly aligns Taipower's EAS with the environment category, thus allowing Taipower to focus on environmental protection issues.

Optimized Accounting Codes

The new accounting method merges and adds codes based on environmental protection categories. The optimized environmental accounting coding method helps employees identify the correct code more intuitively when filling in reports, reducing the chance of false information or omission.

Improved the Calculation Method with a Refined Definition of Cost Units

In the past, environmental protection-related expenses for Taipower's turnkey projects were not included in environmental accounting. As a result, Taipower's efforts in environmental protection could not be fully reflected in its environmental accounting. The new model includes the environmental accounting calculation. Moreover, the cost centers of each unit are divided into environmental and non-environmental cost centers according to the attributes of each unit and department. The new version includes a standard process for staff to attribute the reported expenses to environmental protection-related expenditures when requesting, purchasing, or reimbursing operations, and strengthens the environmental accounting calculation methods.

Reduced Human Input Errors and Regular Debugging

In the past, environmental accounting of labor costs, water and electricity bills was reliant on reporting from each unit on its proportion of environmental-related expenses. There was no standard calculation method, and follow-up tracking was impossible. This became a potential risk. In 2019, the HR expenses, water and electricity bills were linked to environmental protection cost centers. Considering the degree to which the unit's business is related to environmental protection, the accounting information was directly brought into the system for calculation. After the adjustment of statistical principles in environmental accounting, the system's functions were refined. For example, capital expenditures are now applicable to environmental asset code recognition methods, and environmental cost center judgments are automatically assessed by the back-end system to avoid errors caused by human judgment.

In addition, the optimization of statistical principles was also designed and planned for in the periodic output of abnormality reports. The system is set to automatically send a list of abnormalities every half a month to remind employees to make corrections to mistakenly filed, obsolete codes by a set deadline. Through the mechanisms of debugging and auditing, the rates of omission and error are reduced.

6.2 Toward the Goal of Low-Carbon Electricity

In response to the low-carbon transition trend of the global energy industry, Taipower is committed to developing high-efficiency generation technologies, adjusting its generation structure, and continuously increasing the proportion of renewable energy to reduce the electricity carbon emissions factor. Taipower has adopted the following methods to achieve energy transition and move towards low-carbon electricity:

- **Transformation from coal to gas-fired:** Elevate the proportion of gas and continue the trend of primarily gas with coal as support, making the gas ratio higher than that of coal
- **Coal-fired unit upgrades:** Gradually replace coal-fired units with ultra-supercritical units with 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 with better generation efficiency

In recent years, Taipower has actively engaged in energy transition. Apart from reducing the carbon emission factor of electricity each year, Taipower has continued to achieve its goal of decreasing air pollution and providing cleaner electricity for industries and individuals in Taiwan through the use of cleaner energy.

Taipower's Environmental Policy - Short, Medium, and Long-Term Goals

Strategy／**Respond to climate change**

Key strategic dimension／**Promote mitigation procedures**

Short-term goal (by 2021)	Medium-term goal (by 2025)	Long-term goal (by 2030)
Net emission intensity of thermal power units (greenhouse gases) will be reduced by **7%** compared to 2016	Net emission intensity of thermal power units (greenhouse gases) will be reduced by **15%** compared to 2016	Net emission intensity of thermal power units (greenhouse gases) will be reduced by **20%** compared to 2016

Thermal Power Generation

Taipower actively manages the power consumption in its plants. The Company sets targets for annual power consumption in plants that do not exceed the average performance 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 operations and maintenance measures. The current gross efficiency of lower heating values (LHV, gross) at thermal plants rose from 45.64% in 2019 to 46% in 2020. Generation efficiency has continued to improve in recent years. Taipower will continue to strengthen its international exchanges and cooperation efforts and introduce related knowledge and technologies in electricity and environmental protection.

The Efficiency (Gross LHV) of Taipower's Thermal Plants from 2018 to 2020

Item	2018	2019	2020
Efficiency (Gross LHV) (%)	44.81	45.64	46.00

Power Consumption in Thermal Power Plants from 2018 to 2020

Item	2018	2019	2020
Plant power consumption (billion kWh)	5.562	5.494	5.569
Plant power consumption rate (%)	3.62%	3.76%	3.65%

Sulfur Hexafluoride (SF_6) Reduction

Sulfur hexafluoride (SF_6) is a greenhouse gas with 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 for more than ten years. Efforts to develop an on-site SF_6 reclaimed emission reduction method, were reviewed and approved by the Environmental Protection Administration in 2020, and are publicly applicable to other electricity enterprises. Taipower units that manage substation equipment have SF_6 maintenance management procedures. Relevant units carry out SF_6 reclamation and purification work as part of procedures for overhauling substation equipment. After the equipment is overhauled, the purified SF_6 will be backfilled to the equipment to reduce greenhouse gas emissions. The industry is also encouraged to recycle SF_6 to mitigate climate change problems and achieve the goals of circular economy and resource regeneration.

Climate Adaptation Strategies and Actions

Taipower's power plants and transmission systems are located in mountains, along coasts, and in river basins. Power infrastructure is spread over complex terrain, making climate change issues more important. Therefore, to cope with these issues, Taipower is actively preparing climate adaptation actions to adjust the constitution of power plants and improve grid resilience. In cooperation with the Ministry of Economic Affairs Bureau of Energy's Climate Change Adaptation Guidance Program of Energy Industry Taipower has conducted risk assessments for strong wind and flooding at 44 units (excluding offshore islands) at power generation (hydro and thermal power) facilities and transmission and distribution systems. The Company has also established a demonstration case for an adaption strategy for power generation and the distribution system. Moreover, Taipower autonomously launched a Kaohsiung District Branch Office Climate Change Adaptation Research Project in 2019, selected power equipment with higher climate risk-tolerance in 2020, and reinforced the protective abilities of hydro and thermal power plants as well as transmission and distribution systems to reduce environmental impacts and strive for sustainable operations.

Furthermore, Taipower subsequently began a parallel expansion of the above mentioned demonstration to each unit in sequence. This has resulted in the establishment of demonstration cases for solar power and land-based wind power risk assessment and initiated a climate change adaptation plan for the generation system. In addition to continuing to cooperate with the Bureau of Energy, Taipower will launch relevant projects simultaneously and independently to enhance Taipower's ability to adapt to climate change.

6.3 Reducing Use of Energy and Resources

6.3.1 Fuel Usage Management

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 to gas. This will help to ensure that coal-fired power plants are able to maintain their operating permits while new and renewed gas-fired units and facilities are constructed, ensuring the power supply is stabilized, energy requirements are met and pollutant levels in fumes generated by thermal power remain lower than legally required levels.

Taipower's Use of Fuels from 2018 to 2020

Item	2018	2019	2020
Gas (million cubic meters)	14,085	13,371	15,075
Coal (million tons)	29.009	27.443	26.937
Fuel oil (thousand kiloliters)	1,601	1,103	758
Nuclear fuel (ten thousand pounds)	164.86	116.41	155.5

Note: The above amounts are actual consumption

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%. Further restrictions on mercury content have been imposed. While Taipower exercises strict control of emissions from downstream power plants in its supply chain, the Company works even harder to deliver on its commitments to upstream areas of its supply chain. Please refer to Chapter 2.5 for information on Taipower's management and performance in fuel procurement.

Xinda Power Plant combined-cycle gas-fired units thermo-element upgrades

6.3.2 Enhancing the Energy Efficiency of Taipower's Operations

Management of Productive Resources

Taipower's total thermal greenhouse gas emissions in 2020 were about 92.66 million tons of CO_2e . Its 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, refrigeration and air-conditioning equipment, etc. Although there are no emission restriction 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 gas and to publicly disclose that the Scope 1 greenhouse gas emissions of Taipower and its thermal power units (coal, fuel, and gas-fired) are 93.35 million tons.

In 2015, Taipower implemented an energy management system for power plants. Taipower has assisted six units, including the Taichung, Datan, Xingda, Nanbu, Dajia River, and Daguan plants in successfully obtaining new verification certificates. Taipower also completed the establishment of the energy management systems of the Nanbu, Dajia River, and Daguan plants. The system was also established in the Linkou and Dalin plants in 2020. This process is expected to reach completion by 2021 with plants receiving external verification certificates.

Greenhouse Gas Emissions from 2018 to 2020

Unit: 10,000 tons of CO_2e

Year	CO_2	CH_4	N_2O	SF_6	HFC
2018	9,753	25	33	13	2
2019	9,082	25	31	10	2
2020	9,266	23	30	13	3

Emissions of Thermal Power Units from 2018 to 2020

Unit: 10,000 tons of CO_2e

Item	2018	2019	2020
Emissions of coal-fired units	6,340	6,009	5,934
Emissions of oil-fired units	512	352	244
Emissions of gas-fired units	2,889	2,720	3,088

Non-Productive Resource Management

In 2020, Taipower gave impetus to power-saving in conjunction with the Executive Yuan's Electricity Efficiency Management Plan for Government Agencies and Schools by setting a goal of zero growth in annual power consumption compared to the previous year. Moreover, in accordance with the Ministry of Economic Affair's Water Saving Normalization Action Plan, Taipower promotes 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 constituted a comprehensive energy-saving and carbon-reduction scheme. Taipower will also track its energy consumption (paper, water, power, fuel) on a monthly basis and conduct annual assessments to select units with excellent performance.

Taipower's Non-Productive Power Consumption from 2018 to 2020

Item	2018	2019	2020
Consumption (GWh)	120.7	119.6	118.1

Taipower's Non-Productive Water Consumption from 2018 to 2020

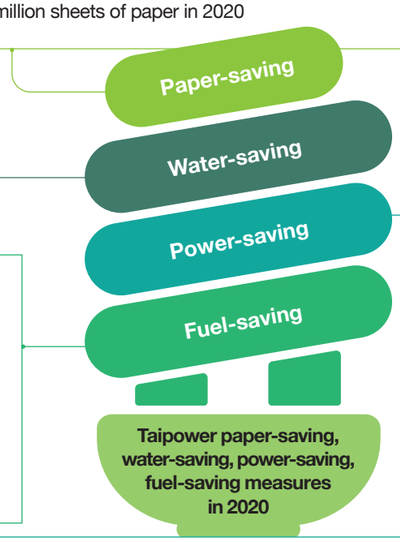
Item	2018	2019	2020
Consumption (Tons)	1,251,845	1,302,211	1,328,077

Results of Non-Productive Resource Management

- In line with the Water Saving Normalization Action Plan, Taipower actively promoted the installation of water-saving equipment in offices, at construction sites, and in employee dormitories. Old water-consuming equipment was replaced and water-saving measures such as water-saving advocacy, water management, pipeline facilities leak inspection, and rainwater reclaim and reuse were strengthened.

- Continued to implement paper-reduction measures such as electronic exchanges of official documents and online approvals, with the performance reaching 70% and 85%, respectively
- Advocated for employee use of double-sided printing to save 2.37 million sheets of paper in 2020

- 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 4,240 liters of fuel in 2020 compared to 2019



- 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
- An energy-saving operation control mode for elevators in each building was adopted and elevator operation was suspended during off-peak hours, off-hours, and holidays
- Operated energy-consuming equipment and business machines in all offices in an energy-saving manner; for example, the power supply for water dispensers was turned off automatically during off-hours and regular holidays to save standby power
- High energy-consuming offices, such as the headquarters building, adopted energy management systems to analyze the building's electricity, equipment operation energy consumption to strengthen energy-saving management results

6.4 Minimizing Environmental Impacts

6.4.1 Response Measures to Air Pollution

The Company has formulated air pollution management strategies for thermal power plants. These include load reductions during periods of poor air quality and sufficient power supply. Taipower also conducted a comprehensive inventory of existing control equipment, planned to set up high-efficiency air pollution control equipment, and continuously improved on air pollution improvement measures for thermal power plants in three stages: short, medium, and long-term. These measures ensure a balance is achieved between power supply and environmental protection. The short, medium, and long-term goals are detailed below. It is particularly worth mentioning that Taipower has achieved its target ahead of schedule in 2020. At the 2020 Environment Month conference, it demonstrated the Company's efforts to improve air pollution by further increasing its commitment and revised the emission reduction target by more than 60% for 2025 and 70% for 2030 compared to 2016.

Taipower's Environmental Policy - Short, Medium, and Long-Term Goals

Strategy / Key strategic dimension		Short-term goal (by 2021)	Medium-term goal (by 2025)	Long-term goal (by 2030)
Protect environmental quality / **Manage air pollution emissions**	Original target	Air pollution emission intensity will be reduced by **30%** compared to 2016	Air pollution emission intensity will be reduced by **40%** compared to 2016	Air pollution emission intensity will be reduced by **50%** compared to 2016
	Revised target in 2020 Environment Month	Air pollution emission intensity will be reduced by **30%** compared to 2016	Air pollution emission intensity will be reduced by **60%** compared to 2016	Air pollution emission intensity will be reduced by **70%** compared to 2016

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 load. 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 (natural gas) in its fuel selection (source control). In addition, continuous flue gas emission monitoring instruments are installed in the smoke fontanels of various thermal power plants to accurately assess the concentration of pollutants in the flue gas, enabling equipment efficiency to be maintained in the best state, and minimizing the emission of pollutants in flue gas. Consequently, Taipower's flue gas pollutants are far lower than regulatory standard values.

The Actual and Regulatory Values of Major Air Pollutants from 2016 to 2020 Unit: kg/GWh

	PM		SO_x		NO_x	
	Actual value	Regulatory value	Actual value	Regulatory value	Actual value	Regulatory value
2016	22	77	306	589	308	379
2017	21	70	296	479	270	360
2018	20	67	183	403	213	317
2019	14	61	125	346	158	283
2020	7	60	102	303	137	264

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

Since 2015, the Company has demonstrated its environmental concern by voluntarily implementing load reductions and emission controls at coal-fired power plants, while also ensuring the ongoing stability of the power supply system. Since November 2017, Taipower has also adhered to the amended Emergency Prevention Measures for Sever Air Quality Deterioration issued by the Environmental Protection Administration (EPA). When the EPA issues next day air quality forecasts that reach early warning stages, Taipower voluntarily undertakes load reduction early in the morning so that reductions don't impact the delivery of a safe and sound power supply. In addition, on day's that have poor air quality, if more than one-third of air quality zones have deteriorated to the early warning stage, autonomous load reduction and emission reduction measures are evaluated and initiated. Between the implementation of these measures and the end of December 2020, a total of 3,182 load reduction and emission reduction operations had been performed.

Principles of Load Reduction in Response to Air Pollution Grading

Load reduction action	Criteria	Action plan
Voluntary load reduction	The Air Quality Index (AQI) forecast for the following day is published each day at 4:30 PM on the Taiwan EPA's Air Quality Monitoring Network website. Voluntary load reductions are initiated if the AQI forecast reaches the red level early warning or higher (i.e., AQI >150)	Provided there will be no impact on power supply safety, Taipower arranges for coal-fired power plants in the designated zones and upwind areas to implement load reductions during off-peak hours at night (i.e., between midnight and 7:00 AM)
Enhanced voluntary load reduction	When one-third or more of air monitoring stations in various areas have reached red alert early warnings, on the EPA's Air Quality Monitoring Network website, enhanced voluntary load reductions are initiated	If the estimated result will not impact power supply safety, Taipower arranges for coal and oil-fired power plants in the designated areas to implement load reductions
Mandatory load reduction	When the air quality index reaches its worst level (i.e., AQI > 200, 300, or 400), mandatory load reduction occurs	Each power plant reduces emissions as stipulated in the Emergency Response Procedures for Air Quality Deterioration to reduce actual daily emission by 10, 20 or 40%

Load Reductions due to Air Pollution in 2020

All power plants in Taiwan	Frequency of load reduction (times)	Amount of load reduction (MWh)		
		Annual overhaul (maintenance)	Non-annual overhaul (maintenance)	Total
Voluntary load reduction	783	3,308,414	5,302,602	**8,611,016**
Enhanced voluntary load reduction	89	190,885	279,498	**470,383**
Total	**872**	**3,499,299**	**5,582,100**	**9,081,399**

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

The Company has carried 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. Meanwhile, Taipower will introduce more advanced and efficient air pollution prevention and control equipment, install equipment in new power plants or renew equipment in existing plants to effectively reduce the emission of air pollutants, and set up continuous automatic monitoring equipment for flue gas emissions. In addition, Taipower's air pollution control improvement plan 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 $70.229 billion between 2015 and 2024 in these initiatives. The measures are expected to reduce particulate matter by 398 tons/year, sulfur oxides by 7,118 tons/year, and nitrogen oxides by 10,319 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)	– 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 – Use chemicals to stabilize the surface of long-term storage coal piles and plant windbreaks around them so that coal dust will not escape
Nitrogen oxides (NO_X)	– Install low NO_X burners (LNB) and selective catalytic reduction (SCR) equipment
Sulfur oxides (SO_X)	– Install flue-gas desulfurization (FGD) equipment to remove more than 95% of sulfur oxide

Long-Term Actions: A Power Source Shift from "Mainly Coal with Supportive Gas" to "Mainly Gas with Supportive Coal"

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 "mainly coal with supportive gas" to "mainly gas with supportive coal." In other words, 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 Dalin, will operate gas-fired units. Still more gas-fired units are being newly added at the Xiehe, Datan, Taichung, and Xingda plants. This measure will ensure both air quality and a stable power supply. After the new gas-fired units at the Taichung and Xingda 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 maintaining ambient air quality.

Monthly and Annual Reports

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 led Taipower to make an inventory of its large diesel vehicles that meet the 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. Meanwhile, 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

The Company'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 of Taiwan Power Company in 2018. The Company's projects will 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 set up environmental protection management personnel, who should be full-time and have the qualifications of Class B air pollution control or above (one qualified personnel is required for project contracts of NT$50 million, two qualified personnel for project contracts above NT$200 million), to reduce air pollution from construction projects.

To reduce emissions from coal yards, Taipower set up dust-proof needing 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, Xingda, and Dalin 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.

▼ Taichung Power Plant closed-trough conveyor belt system can reduce the escape of coal dust

6.4.2 Effluent Management

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 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. In 2020, Taipower did not violate water consumption or water quality regulations. As Taiwan's water supply was at less than 10%, Taipower did not take water or use water from places with serious or extremely serious benchmark shortages. To ease its water usage, Taipower installed MED-type desalination equipment at the Dalin Power Plant and handed the right of use to the plant in February 2018. It is currently in operating normally with a designed water production capacity of 2,000 tons per day. The Taichung Power Plant is also currently constructing desalination equipment.

2020 Water Consumption for Generation at Taipower's Thermal Power Plants Unit: m³

Power Plant		Volume of Tap Water	Volume of Desalinated Water	Total
Thermal Power Plant	Xiehe	254,067.0	0.0	254,067.0
	Linkou	527,112.0	0.0	527,112.0
	Datan	435,908.2	0.0	435,908.2
	Tongxiao	507,130.0	0.0	507,130.0
	Taichung	4,573,878.0	0.0	4,573,878.0
	Xingda	2,149,171.0	0.0	2,149,171.0
	Dalin	330,814.0	241,636.0	572,450.0
	Nanbu	115,245.0	0.0	115,245.0
	Jianshan	0.0	50,926.0	50,926.0
	Tashan	0.0	15,000.1	15,000.1
	Total	**8,893,325.2**	**307,562.1**	**9,200,887.3**

Wastewater Reuse

Taipower actively pursues a goal of zero wastewater discharge. Rainwater collection (at power plants and dormitories) and wastewater reuse projects have been pursued 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 2020 are as follows (Note that 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).

Reclaimed and Reused Wastewater in Thermal Power Plants Unit: Tons

Item	2018	2019	2020
Reuse of Rainwater	230,087.3	96,557.9	108,959.0
Reuse of Effluent and Wastewater from Processes and Boiler Blowdowns	2,172,782.9	2,605,645.9	2,682,750.82

Rainwater storage and utilization essentially provide an alternative water source. It is an economical and practical water source development model because it does not consume energy or cause pollution. Thermal power plants have implemented measures for rainwater reclamation and wastewater reuse for years. The main uses of the reclaimed water are for green irrigation, electrostatic precipitators, ash discharge, vacuum pump 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. Taipower records the daily usage of demineralized water in unit operation. If there is any abnormality, Taipower tracks it immediately, and advocates and implements water conservation so that employees can sincerely cherish water resources and develop habits for water conservation.

Reclaimed Water Volumes of Taipower's Thermal Power Plants in 2020 Unit: m³

Power Plant		Reclaimed Volume of Rainwater	Reclaimed Volume of Wastewater	Total
Thermal Power Plant	Xiehe	214	48,571	48,785
	Linkou	1,998	312,886	314,884
	Datan	0	167,020	167,020
	Tongxiao	0	158,528	158,528
	Taichung	8,459	829,532	837,991
	Xingda	98,024	789,610	887,634
	Dalin	0	328,248	328,248
	Nanbu	264	42,806	43,070
	Jianshan	0	5,519	5,519
	Tashan	0	31	31
	Total	**108,959**	**2,682,751**	**2,791,710**

6.4.3 Waste Management

Potential Environmental Impact of Waste

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

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 ash and bottom ash) and desulfurized gypsum	The emission of particulate pollutants produced by fuel combustion easily affects air quality and human health and may also have an impact on the nearby ecology	Thermal power generation (including gas and coal) accounts for approximately 78.5% of Taipower's total generated and purchased power	· Taipower has formulated an air pollution management strategy for thermal power plants (Please refer to 6.4.1) and response measures to air pollution. For example, coal-fired thermal power plants are equipped with dust collection equipment to remove particulate pollutants in the smoker, and flue gas desulfurization equipment is installed to remove sulfur oxides from flue gas and improve air quality · Sulfur oxides combined with a limestone slurry produce desulfurized gypsum ($CaSO_4 \cdot 2H_2O$) through chemical reactions such as absorption, neutralization, oxidation, and crystallization. This can be reused in the cement and fireproof board industries
Nuclear Power			
The main wastes can be divided into high and low-level radioactive wastes. The low-level radioactive wastes include the radioactive wastes (comprising radioactive waste resins, waste liquids, residues, radiation protection clothing, parts, etc.) generated during regular operations, equipment maintenance, or improvement projects on 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 the surrounding ecology, human health, and pollute the surrounding 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, Wind Power, Solar Power			
Decommissioned units and equipment	There is no waste produced during the power generation process, and the product life cycle of units and equipment is enduring, resulting in low environmental impact	The power generation processes of hydropower, wind power, and solar power units rely on natural resources, and the unit life cycles are enduring, so there is no materiality at present	Regarding renewable energy equipment that may be decommissioned, Taipower will entrust a compliant disposal company to carry out waste cleaning and transportation and will evaluate the reuse of resources to minimize environmental impact

The accumulation of coal ash also has potential hazards. Taipower takes steps to control ash levels effectively. Fly ash load 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 forces. The Company also considers the extreme conditions of an empty silo and a full silo adjacent to it, analyzes and confirms that the bearing force, deflection, displacement, subsidence, angular variables, and other items are safe to minimize potential hazards. Coal ash accumulation is classified according to the degree of potential hazards as follows:

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

Power Plant	Linkou	Taichung	Dalin	Xingda
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 by-product resource utilization through cross-unit cooperation. Its responsibilities include the development and implementation of coal ash and gypsum removal strategies, review of the current coal ash bidding specifications in power plants, the application for a green mark 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.

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

Utilization of Industrial Waste

Reuse of Coal Ash and Desulfurized Gypsum

Waste	Reuse practice	2020 production	2020 reuse volume	2020 reuse ratio
Coal ash	Taipower has encouraged its engineering units to use fly ash in civil construction projects and to fill trenches. This raises the volume and utilization rate of fly ash and reduces the environmental burden.	2,209 thousand tons	1,982 thousand tons	89.7%
Desulfurized gypsum	To improve air quality, coal-fired thermal power plants have flue gas desulfurization equipment installed to remove sulfur oxides from flue gas. Limestone slurry is then used to create gypsum through the chemical processes of absorption, neutralization, oxidation, and crystallization. The resultant desulfurized gypsum ($CaSO_4 \cdot 2H_2O$) can be used by local cement and fire-retardant board makers.	296 thousand tons	292 thousand tons	98.6%

Bidding for Industrial Waste

Other industrial wastes, such as waste wire and cables, as well as 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.

6.4.4 Promoting Circular Economy

In response to the international trend of energy transition and the government's 5+2 Innovative Industries Plan, Taipower has listed the circular economy as one of its key projects for promoting sustainable operations. The Company has pledged to create efficient and sustainable energy resource utilization with circular mindset and to implement the concept of circular economy, and carry out two dimensions of establishing a circular economic business model and improving resource efficiency to promote various circular economic measures. The Company hopes to transform from the linear economic mindset of the past into a circular economic model that gives increased consideration to sustainable development.

Taipower's Short, Medium and Long-Term Environmental Policy Goals

Strategy ／
Focus on circular innovation

Key strategic dimension ／
Establish a circular business model

Short-term goal (by 2021)	Medium-term goal (by 2025)	Long-term goal (by 2030)
Inventory of potential circular materials and development of a feasible business model pilot	Implement the circular resource supply model	Establish a circular economy system

In order to better implement its environmental policy commitments, Taipower held an Expert Advisory Commission in October 2020. The commission conducted in-depth discussions on the Taipower circular economy strategic framework and promotion plan for product service applications. Considering the unique circular economy mindset of the power industry, Taipower needs to explore the possibility of constructing a recycling loop from planning and design, resource procurement and power manufacturing infrastructure to power supply, sales, services, and to the final stages of disposal and reclamation. The strategic blueprint framework of the circular economy starts with energy and resources. In terms of energy, Taipower specializes in and continuously strives to optimize the efficiency of power generation, transmission, and distribution, and gives consideration to the development of power reclamation.

In terms of resources, power infrastructure is Taipower's largest asset. The concept of circular construction is being incorporated into the design, procurement, construction, maintenance, operation, and decommissioning of relevant infrastructure and generation equipment.

Taipower used the events of its "Environment Month" in May 2021 to disclose the strategic blueprint framework to the public (see p.10 of the special issue of this report). To implement a circular economy within Taipower, the Company has produced more than 20 action plans through hosting a World Café event in May 2021. In the future, it will combine these plans with the circular economy strategy framework to create a circular economy action plan.

Circular Economy World Café

In 2021, Taipower hosted World Café events for the first time. The event mainly targeted internal employees as the key communication group. The purpose of the events was to break the vertical management structure and use a horizontal communication mode to assemble supervisors of all units and systems above the team leader rank. In a relaxed, but focused atmosphere, the ideas and intelligence of employees from all units were brought together to produce a Taipower circular economy action plan. In the future, Taipower expects the World Café model to become a fixed feature of communication and discussion on sustainability issues.

To encourage a full discussion of circular economic issues, the Chairman gave Taipower employees expectations and encouragement at the beginning of the meeting and organized several World Café education and training events to prepare staff beforehand. On the day of the World Café, Chairman Charles Huang of the Taiwan Circular Economy Network and Managing Director Niven Huang of KPMG Climate Change and Sustainable Services Asia-Pacific Region were invited, to emphasize the spirit of a circular economy and its connection with sustainability. Through the three rounds of discussions in the second half of the meeting, a condensed a circular economy action plan was produced with Taipower's characteristics and will be implemented in Taipower's future operations.

6.4.5 Environmental Sustainability Strategy Refinement

Taipower is committed to minimizing the negative impact on the surrounding environment during operations and 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 releasesing, green space adoption, and building artificial reefs, Taipower continues to conduct environmental education and carefully evaluates environmental factors before power plant expansions and unit additions. 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 Taipower.

Taipower's Short, Medium, and Long-Term Environmental Policy Goals

	Short-term goal (by 2021)	Medium-term goal (by 2025)	Long-term goal (by 2030)
Strategy／**Refine management systems** Key strategic dimension／**Develop intelligent management**	Coverage of intelligent management and services will reach **52%** (Including the cumulative deployment of smart meters in **1.5 million households**, representing **69%** of the total national power consumption)	Coverage of intelligent management and services will reach **65%** (including the cumulative deployment of smart meters in **three million households**, representing **81%** of the total national power consumption)	Coverage of intelligent management and services will reach **82%** (including the completion of smart meters installations in **six million households** after a feasibility assessment of smart meters, representing **85%** of the total national power consumption)
Strategy／**Create ecological inclusiveness** Key strategic dimension／**Plan the fusion of facilities and ecologies**	Produce at least **one** ecologically inclusive plans for power facilities	Produce at least **three** ecologically inclusive plans for power facilities	Produce at least **five** ecologically inclusive plans for power facilities
Strategy／**Expand internal and external engagement** Key strategic dimension／**Deliver information on electricity and the environment**	Annual communication of environmental protection information will reach **480 thousand people**	Annual communication of environmental protection information will reach **700 thousand people**	Annual communication of environmental protection information will reach **750 thousand people**

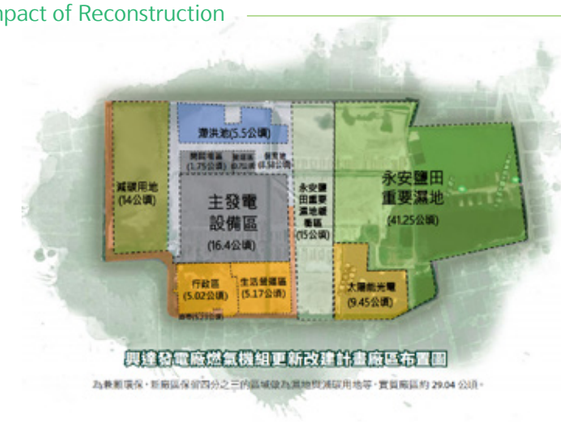
Power Facilities Coexisting with Ecology

Zhangbin Solar Power Plant - Little Tern Conservation

During the construction of the Zhangbin Solar Power Plant, about 7.4 hectares of land in the southwest corner of the property was reserved to set up a landscape balancing reservoir and collect rainwater through channels to serve as drinking water for little terns and other creatures. Meanwhile, about one hectare of gravel ground was laid in the center of the landscape balancing reservoir to create a mini "ecological island," that allows the little terns to nest, spawn, and brood. In addition, a bird-watching pavilion was set aside for academic monitoring and research. At the periphery of the plant area, the green belt of a windbreak was cultivated to reduce wind speeds, filter salt, and provide a place for birds to shelter from the disturbances of the outside world.

Xingda Power Plant - Reducing the Environmental Impact of Reconstruction

In order to reduce the environmental impact of the renovation project at Xingda Power Plant, a non-development area was set aside. The area includes 41.25 hectares of wetland, 15 hectares of buffer zones, 5.5 hectares of retarding basin, 14 hectares of carbon reduction land, as well as 13.81 hectares of green belt and conservation land. In other words, three-quarters of the area will be used for environmental protection. In response to the construction, an additional silt retarding basin will be installed to prevent drainage or flooding during the construction period from affecting the fish farm. In addition, during cold weather in winter, contractors' heavy vehicles are required to enter the work area after 9 a.m. to avoid disturbing the bio-routine of the fish farm.



Jingshan Branch Plant of the Zhuolan Power Plant - A Hydroelectric Plant That Does Not Interrupt Water Supply

Zhuolan's Jingshan Power Plant is one of Taipower's small hydropower plants. Due to its small scale, the amount of soil and rock excavation and disposal during the construction period was small. Therefore, there was no need to set up a separate soil and rock stacking yard. After the completion of the power plant, remote monitoring equipment, and communication lines were installed. The monitoring mode is controlled remotely by the adjacent power plants and has a very slight impact on the surrounding environment. In addition to increasing the output of renewable energy, it also reduces carbon emissions. Furthermore, Water Resources Agency required Jingshan Power Plant to carry out ecological discharges and to design dedicated control pipelines to regulate them according to rainfall, weather, and downstream water demands. When the downstream water demand surpasses the plant's generation consumption, or when the water supply is insufficient for power generation while downstream ecological water demands still need to be maintained, the water supply is met through the dedicated pipelines, and the ecological needs are taken into account. This is pioneering work in the design of power plants.

Changhua Offshore Phase One Wind Power - Win-Win Situation of Energy, Fishermen, and Ecology

To avoid affecting the harvest of oysters, the submarine cable for the Changhua offshore wind power plant adopted a horizontal deflection drilling method in the near-shore area to submerge the cable 21 meters under the seabed. The original length was about 380 meters, but to protect the environment and the farming of oysters the cable length was extended to 950 meters, completely avoiding the oyster breeding area. To solve the problem of piling noise, two measures were taken. The first was to reduce noise by using a bubble curtain. Bubble curtains are a common method that involves a bubble boat continuously producing bubbles on the seabed around the piling. In the process of escaping to the surface, the bubbles absorb part of the noise. The second measure involved hiring cetacean observers to guard the area. If a whale or dolphin was found, the piling was suspended until the whale or dolphin had moved on.

7 Practitioner of Corporate Social Responsibilities

The Implication of the Practitioner of Corporate Social Responsibilities

Taipower's operations are located in every corner of Taiwan. The Company interacts with internal and external stakeholders through multiple channels and continues to strengthen its partnerships with society so we can grow and prosper together. From the core of its power industry operations, Taipower also 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 responsibilities. Talent development is the cornerstone of the sustainable development of companies. In addition to continuously improving its talent management policies for recruitment, training and development, utilization and retention, Taipower has also introduced new technologies and action plans to enhance training and occupational health and safety measures. Taipower also continuously strengthens its protection of employee and contractor rights to create healthy and happy workplaces.

Major Investments

- Enhanced the transparency and readability of information on online mediums such as Taipower's official website, Taipower's Facebook page, the sustainability webpage, and at Taipower's YouTube channel. The Taipower 1911 customer service hotline, online counter, and a Taipower App were also set up to provide better services to customers.
- Taipower's charitable activities saw the participation of 5,588 employees in 2020. Employees recorded a total of 20,714 hours of service.
- Approximately NT$112.53 million was donated to neighborhood work in 2020.
- More than NT$470,000 was invested in artwork leases, exhibitions and performances in 2020.

Performance Highlights

- In 2020, the total number of participants in health and safety training reached **54,049**.
- In 2020, **831** health and safety-related seminars were held for contractors, with a total of **31,721 attendees**.
- In 2020, **99.3%** of all employees were covered by the collective bargaining agreement.
- In 2020, more than **21 thousand people** visited the special "Charged with Electricity" exhibition on cultural heritage.
- In 2020, **more than 1,000** cultural artifact inspections were conducted.

Future Plans

Taipower is committed to communicating with its stakeholders by disclosing necessary information openly and transparently to meet their expectations. In terms of social welfare investment, Taipower promotes vital elements of Taiwanese society such as culture, arts, and sports under the premise of fostering long-term development. Meanwhile, in response to its ongoing organizational transformation, Taipower will continue to invest in talent development and training while providing career development resources for employees. The Company will also provide employees with comprehensive salary protection and retirement care. In terms of industrial safety, the Company will continue to improve its industrial safety management and pursue its goal of zero industrial safety incidents as it seeks to create a friendly, safe, and happy workplace for employees.

7.1 Human Resource Management Strategies

7.1.1 Human Resource Strategies

Taipower is facing a number of business challenges such as energy transition, low-carbon sustainability, and the development of a smart grid. As it does so, the Company must consider the talent pool required for future development while maintaining a stable power supply. Taipower reviews employees' core technical skills to resolve talent gaps and recruits necessary electricity specialists through diversified talent recruitment strategies. The Company employs various training systems and measures to pass on electrical technology knowledge and experience, and to enhance the professional and cross-disciplinary skills of its employees. In response to the rise of the green economy and the digital era, Taipower has utilized internal and external training resources to strengthen training for renewable energy talent. The Company develops the talent necessary for business development and promotion to ensure that it can effectively achieve its goals for recruitment, training and development, utilization and retention of human resources. This allows the Company to resolve a wide range of human resources challenges. For more information on related strategies, please scan the QR code.

Human Resources Recruitment, Training and Development, Utilization and Retention Strategies

7.1.2 Structure of Human Resources

Employment Categories

All Taipower employees are full-time. The Company has not hired any part-time or foreign employees.

Total Number of Employees and the Ratio of Male/Female Employees from 2018 to 2020

		2018		2019		2020	
Total employees		**26,962**		**27,606**		**27,836**	
Local employees	**Male**	23,160	85.9%	23,586	85.4%	23,550	84.6%
	Female	3,802	14.1%	4,020	14.6%	4,286	15.4%
Direct personnel	**Male**	21,647	80.3%	21,621	78.3%	21,415	76.9%
	Female	2,068	7.7 %	2,214	8.0%	2,379	8.5%
Indirect personnel	**Male**	1,513	5.6%	1,965	7.1%	2,135	7.7%
	Female	1,734	6.4%	1,806	6.6%	1,907	6.9%

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

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

		2018		2019		2020	
		Male	**Female**	**Male**	**Female**	**Male**	**Female**
Statistics of New Employees							
Number of new employees		**1,812**		**2,504**		**2,321**	
Age	**Under 30**	895	284	1,349	271	1,236	318
	31-50	448	172	666	204	524	222
	Over 51	12	1	14	0	16	5
	Total	**1,355**	**457**	**2,029**	**475**	**1,776**	**545**
Statistics of Resigned Employees							
Number of resigning employees		**1,600**		**1,864**		**2,075**	
Age	**Under 30**	127	37	178	42	172	47
	31-50	109	112	124	115	126	112
	Over 51	1,143	72	1,301	104	1,503	115
	Total	**1,379**	**221**	**1,603**	**261**	**1,801**	**274**

Note: The number of departing employees includes both those on extended leave without pay and retirees.

Outsourced Workforce

As of the end of December 2020, Taipower's outsourced workforce included contracted service and labor contractors. The number of outsourced workers was 1,100 in 2020, which includes those engaged in cleaning, document processing, telephone operations, and driving services.

Note: 1. The above statistics do not include outsourced workloads (Work associated with manual and service contract labor tasks, outsourcing procurement, manual labor, technical services, facilities operations and maintenance that are outsourced in other ways).
2. The data on outsourced human resources in 2020 was derived from the 2020 Q4 labor contracting conditions statement.

7.1.3 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 as well as the software and hardware of its employee care. Taipower's human resources training includes technical training systems and science-based talent cultivation. Taipower continues to strengthen the talent pool and the results of training in 2020 are shown in the table below. For more information on the implementation methods and content, please scan the QR code.

Implementation Methods and Content

Statistics on Taipower Training

Training type	Training subject		Number of participants (in 2020)
Development training	New dispatch personnel orientation training		0 (Note)
	Fundamental development training		835
	Total		**835**
On-the-job training	Professional training	Organized by the Training Institute	4,545
		Organized by other units	68,171
		External training	3,735
	Total		**76,451**
Manager training	On-the-job training for managers		569
	Cultivation training for managers		524
	Total		**1,093**
Cooperative education	Recommendations for graduate school	Master's degree programs	6
	Total		**6**
Total			**78,385**

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 Taipower E-Learning platform.

7.1.4 Employee Performance and Evaluation Policy

Taipower follows the relevant regulations in implementing employee performance evaluations. Supervisors at each level evaluate the performance of their subordinates in seven major categories and determine the evaluation results and award performance bonuses within a prescribed period. Taipower will continue to establish performance-based reward mechanisms that reward units or employees with excellent performance or dedication to their work. Taipower is hoping 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 evaluate the seven major categories of the evaluated employee's professional ability, work performance, teamwork, work attitude, moral integrity, management skills, and leadership skills at any time

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

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- (2021), medium- (2025), and long-term (2030) goals to demonstrate Taipower's resolve in implementing a safe and healthy workplace.

Occupational Health and Safety Management System

Taipower has established an occupational health and safety management system in accordance with the Occupational Safety and Health Act that adheres to requirements equivalent to the CNS 45001 national standard. The management system covers workers at all worksites, including employees at hydropower and thermal power plants, nuclear power plants, district offices, power supply branches, construction and other units, contract workers, volunteers and other workers (including self-employed workers). A total of 46 of Taipower's units were required to complete CNS 45001 certification this year and 100% of them have completed unit certification. There were no excluded workers at the certified sites.

Graded Risk Assessment, Management and Control

Taipower minimizes risks by implementing occupational safety risk classification and control. To ensure reasonable and fair work safety risk classifications for each unit, the Company formulated Regulations of Occupational Safety Risk Classification for Subsidiary Units based on the number of employees in each unit, the number of projects, the types of equipment, and the characteristics of the project, to calculate the classification based on the risk ratio. The risk classifications are divided into three levels, including level A for high risk, level B for medium risk, and level C for low risk.

Taipower also established Risk Assessment Guidelines for Occupational Safety for the Delivery of Contracted Construction Projects to strengthen the occupational safety management of contracted projects and to help contractors implement independent management. Before the start of construction, each unit must file an occupational safety management and risk assessment report for the construction process. If there are changes in construction personnel, site environment, construction methods, or use of machinery, risk assessments and hazard identifications must be re-executed to manage changes. Experts and scholars may also be invited to review submitted risk assessment reports. The Company has not distinguished between routine and non-routine measures for the identification of occupational hazards and risk assessments.

Taipower has stipulated Occupational Safety Accident Handling Procedures, which contain regulations and procedures for workers to report occupational hazards and dangerous conditions. In the event of an accident, workers must notify the relevant management units within one hour, and report to the local labor inspection institution depending on the situation. When the workers believe that they are in a working condition that may cause harm or illness, they are free to leave without fear of punishment. The Company also revised its management guidelines to aggravate its punishment mechanism by referring to the Summary Table of Occupational Safety and Security Clauses and List of Awards and Punishments Concerning the Hierarchical Responsibility and Delegation of Industrial Safety and Operational Accidents. These guidelines are applicable to the Ministry's subordinate enterprises, and promote a punishment mechanism for supervisors to mitigate impacts which may derive from the related hazards and risks.

Health and Safety Management Policies

The protection of human lives through occupational safety are Taipower's highest priority. To ensure the safety of employees and operations, Taipower pursues a goal of zero occupational incidents to create a safe, healthy, and friendly workplace. Additionally, to minimize the occupational injuries of contractors, Taipower optimizes items related to health and safety management in its construction contracts and actively assists and supervises contractors in establishing and implementing their own occupational safety management mechanisms. Taipower requires each contract organizer to provide notice of all hazards in the workplace before construction begins. The Company also require contractors to convene a Tool Box Meeting (TBM) to verify the normal state of the team's equipment, its mental status, assign work and to prepare a work equipment inventory before operations begin. Taipower also conducts on-site hazard awareness activities (Kiken Yochi, KY) to identify potential hazards in the work environment, to take preventative measures and to take photos for records and future reference. In 2020, 831 seminars were held on occupational health and safety for contractors, with a total of 31,721 participants.

For construction contractors, Taipower has incorporated guidelines on contractor health and safety into its contracts. Public construction projects over NT$200 million are required to set up an on-site and real-time surveillance systems to effectively control and record worksite conditions. In terms of management, during construction planning, relevant departments and occupational safety departments are called in to perform risk assessments and hazard identification to ensure personnel and operational safety.

Dimensions of Occupational Safety Management Bases and Practices

Dimension	Management Method	Management Bases/Practices
Regulatory	Training	· Procedures for Training and Utilization of Occupational Health and Safety Personnel from Affiliated Units
	Auditing and supervising	· Management Enforcement of Procedures through Inspections by Supervisors at All Levels
	Operational safety	· Enforcement Procedures for Operational Safety Standards · Enforcement Procedures for Consultative Organizations in Joint Operations
	Personal protective equipment management	· Management Procedures for Personal Protective Health and Safety Equipment
	Incident handling	· Occupational Safety Accident Handling Procedures · Guidelines for Assisting Employees in Handling Industrial Incidents
	Rewards and punishments	· Procedures for Punishment of Practitioners Violating Health and Safety Regulations · Procedures for Rewarding Practitioners Engaged in Excellent Health and Safety Performance
	Contractor management	· Procedures for Health and Safety Counseling · Procedures for Penalties for Contractor Violations of Contractual Health and Safety Requirements · Procedures for Additional Training for Contractor Violations of Contractual Health and Safety Requirements
Onsite Execution	Before job task starts	· Industrial safety communications and hazard notifications · Pre-work training workshops · Review lists of operation personnel
	Job task in progress	· Health and Safety check-ins for operating personnel · Executing TBM-KY and making records · Implementing automatic inspections · Auditing health and safety measures
	Operational equipment and machinery inspection	· Regular inspections and confirmations of machinery · Dedicated notebooks or files for inspection records · Building coordination and control mechanisms

Taipower's occupational injuries in the past ten years may be categorized into three major types: 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:

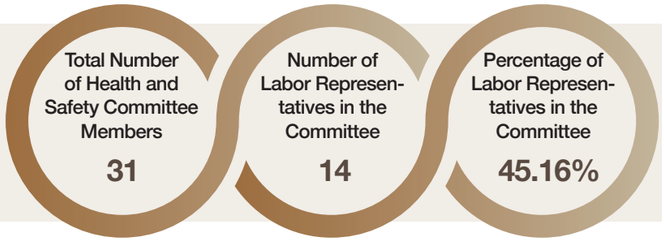
Future Improvement Strategies and Methods for Occupational Safety

Strengthen the system	· Amending relevant 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 passed the selection standard for procurement, and improving the weight of the industrial safety assessment · Risk assessment reports will be submitted during the bidding processes
Implement training and education	· Pre-service training and drills · Implementing qualification training · Organizing awareness campaigns · Changing the method to interactive teaching for the education and training on hazard identification · Organizing virtual reality (VR) simulation training for preventing falls
Increase the level of punishment	· Violator re-education · Increasing the penalty limits for first-time offenders · 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 on holidays · Change management · Entry and exit control 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	· Identifying risk items and blind spots through self-checking mechanism for occupational health and safety organized by external experts
Occupational Safety Care Platform	· Provide a platform for employees to report errors they have found in the construction projects of each unit
Disaster prevention technology	· Smart occupational safety management app · Mobile work site real-time surveillance system (CCTV) and introduction of advanced AI recognition applications

The Organization of Occupational Health and Safety

Taipower's Occupational Health and Safety Committee is comprised of 31 members, with one member acting as the committee chairman and one as the deputy chairman. The chairman is the President of Taipower, and the deputy chairman is the Deputy Vice President who supervises the department in charge of occupational health and safety. At least seven of the committee members are supervisors from the departments of the Secretariat, Power Generation, Power Supply, Business, Power Distribution, Construction, Nuclear Generation, Industrial Health and Safety, Human Resources, Accounting, and Power Equipment Repair. Other members include the heads of designated construction units, occupational health and safety personnel, medical practitioners engaging in labor health services, and representatives of the Taiwan Power Labor Union (labor union representatives are required to occupy 1/3 or more of the total seats on the committee).

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



The duties of the committee include making recommendations on the health and safety policies formulated by employers. The committee then review, coordinate, and make recommendations on matters related to health and safety. The Occupational Health and Safety Committee of the Taipower Headquarters convenes a meeting every two months (More than the one meeting every three months required in Article 12 of the Occupational Safety and Health Act). The Occupational Health and Safety Committees of all units convene one meeting every three months in accordance with the Occupational Safety and Health Act.

Taipower provides workers with occupational health and safety-related information on various occasions and through various methods (such as e-mail, employee forums, posters, or slogans, etc.). Workers can make proposals related to the system of occupational health and safety to the Occupational Health and Safety Committee for discussion and deliberation. Workers can also fill out proposed improvement measures for units they have seen via the Occupational Safety Care Platform.

Employee Education and Training

Each Taipower unit's on-site manager or foreman organizes demonstrations and drills for operating procedures and notices on a regular or irregular basis each year in accordance with the Enforcement Procedures for Operational Safety Standards. Drills may include emergency response training for fires at power plants and emergency response training for hydrogen leaks. Each Taipower unit also organizes regular or irregular emergency response training for occupational safety incidents in accordance with the Occupational Safety Accident Handling Procedures to increase emergency response capacity in the event of an accident. For instance, nuclear power plants must conduct drills that simulate disaster conditions and response measures.

Occupational health and safety training is implemented in three ways, including the appointment of external training institutions, training in dedicated training institutions, and training provided independently by the unit. In addition to general education on health and safety, training includes introductions of CNS45001/TOSHMS management system, fire drills, and first aid training. Taipower provides special training for relevant operators, foremen, supervisors, and safety assessment personnel, such as training for high-pressure gas and other dangerous equipment operations to avoid occupational hazards. The participants in various health and safety training in 2020 totaled 54,049. Units organized a total of 231 sessions of interactive hazard identification training for 12,670 participants including employees and contractor personnel.

Occupational Safety Performance

Taipower organizes regular training to ensure rapid responses in the event of an accident. According to Taipower's Occupational Safety Accident Handling Procedures, employee and contractor accidents are reported to Taipower within one hour and the responsible person must file an accident report. Accident reports serve as the basis for the compilation of relevant statistics and analytical reports for the occupational safety management of all units. The information is then used to minimize the likelihood of future occupational accidents. The accidents are reported to the occupational safety department, occupational safety offices, and local labor inspection agencies based on the severity of the accident. Where an employee or contractor is involved in a major occupational accident, it is reported to the local labor inspection agency within eight hours in accordance with regulations.

After an accident has occurred, the Company assigns employees to investigate the cause, conduct case reviews, and review administrative liabilities of the accident. For different incidents such as a false alarms or minor injuries to employees or contractors, disability of other individuals, or disability or injury people in the area of responsibility of the unit, an investigation team is formed based on the severity of the incident. The team reviews the cause of the incident and formulates specific preventive measures. It also continuously tracks improvements and the preventive measures of each unit to prevent similar incidents from recurring.

The main causes of injury for Taipower's workers include traffic accidents, arc discharges, collapsed objects, electric shocks, and falls. The statistics for the work-related injuries of employees and contractors in 2020 are as follows:

Statistics of Serious Work-Related Injuries in 2020

Worker category	Employees			Construction contractors
Gender	Male	Female	Total	Total
Total number of work hours	48,587,161	8,844,471	**57,431,632**	**39,715,206**
Number of deaths caused by occupational injuries	0	0	**0**	**2**
Rate of death caused by occupational injuries	0	0	**0**	**0.05**
Number of severe occupational injuries (excluding deaths)	0	0	**0**	**15**
Rate of severe occupational injuries (excluding deaths)	0	0	**0**	**0.378**
Number of recordable occupational injuries (number of people)	22	0	**22**	**17**
Rate of recordable occupational injuries	0.383	0	**0.383**	**0.428**
Number of false alarms (number of people)	10	0	**10**	**5**
Rate of false alarms	0.174	0	**0.174**	**0.126**

Note: 1. Total work hours: The total work hours of male and female employees of Taipower are calculated based on the total work hours and the gender ratio of Taipower employees

2. 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)
3. Rate of severe occupational injury (excluding deaths) = (Severe occupational injuries/Total hours worked) × 200,000
4. Rate of recordable occupational injuries = (Number of recordable occupational injuries/Total hours worked) × 200,000
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
6. Construction contractors didn't compile their total person-work hours according to gender this year, the data is therefore unavailable. The statistical method for this item will be improved in the future

In the event of a false alarm incident involving a Taipower employee or contractor, the head of the department where the incident occurs or the head of the department responsible for the operation shall serve as the convener and form a Unit Investigation Team with the occupational safety department and the Taiwan Power Labor Union Branch to investigate the incident. Where necessary, the internal affairs department of the unit may be requested to conduct joint investigations. The unit where the incident occurred shall submit an Occupational Safety Incident Report within three workdays after the occurrence of the incident. In the case of special circumstances, an initial report may be submitted and relevant, additional information may be provided later.

Analysis and Statistics of Occupational Injuries in 2020

	Contact of objects with great temperature difference	Hit by falling objects	Falls	Rolled into machinery	Electric shocks	Collapse	Others
Employees: 9 cases (Resulting in 10 individuals disabled)							
Number of accidents	4 cases (5 individuals disabled)	1 cases (1 individuals disabled)	0 cases	1 cases (1 individuals disabled)	2 cases (2 individuals disabled)	1 cases (1 individuals disabled)	0 cases
Injury rate by accident category	50%	10%	0%	10%	20%	10%	0%
Contractors: 15 cases (Resulting in 2 deaths and 15 individuals disabled)							
Number of accidents	6 cases (7 individuals disabled)	1 cases (1 individuals disabled)	1 cases (1 death)	0 cases	3 cases (4 individuals disabled)	3 cases (1 death and 2 individuals disabled)	1 cases (0 death and 1 individuals disabled)
Injury rate by accident category	41%	6%	6%	0%	23.5%	17.5%	6%

Note: 1. Injury rate by accident category = number of casualties of the disaster type/number of casualties of the entire year x 100%

2. The data on Taipower employees' occupational injuries did not include the non-commuting traffic accidents affecting 12 other individuals.

Taipower's occupational health and safety management system includes accident investigation operation procedures and operating procedures for non-compliance and corrective actions. The system also makes use of the Plan-Do-Check-Act (PDCA) cycle management model. The above mentioned procedures are reviewed or randomly checked through sampling inspections from time to time. Where an accident or non-compliance cannot be effectively prevented, the Company shall implement adjustments or enhancements until the occupational safety performance is significantly improved.

For level two and level three suppliers, all units must designate occupational health and safety personnel and other designated personnel to attend negotiations before the contracted construction project is delivered. The contractor will be required to compile lists of personnel for their contracted work with and the contracted work of their subcontractors. The contractors and their subcontractors shall be required to take the following necessary measures in accordance with Article 27 of the Occupational Safety and Health Act and elect representatives to ensure onsite occupational safety management.

- Establish a consultative organization, and appoint a person responsible for supervision and coordination of the workplace
- Regulate and integrate work
- Conduct inspections at workplaces
- Direct and assist in health and safety education related to the contracted work
- Other measures necessary to prevent occupational accidents

7.2.2 Labor-Management Communication and Collective Bargaining

Taipower attaches great importance to the voices and needs of all 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

2020 Communication Channels and Performance

Labor-management conferences

Taipower holds regular labor-management conferences to foster effective communication. There were 9 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 4 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

Taipower and the Taipower Labor Union (TLU) signed a Collective Bargaining Agreement (CBA) in 2013. The agreement calls for annual meetings to implement or clarify articles of the signed CBA. To safeguard employees' rights, in accordance with Article 41 of the CBA, Taipower is required to communicate with the TLU regarding the creation, reorganization, and merger of units in advance. In 2020, thirteen consultative meetings were held.

Number and Ratio of Employees Covered by the Collective Agreement Unit: person

Item	2017	2018	2019	2020
Total employees	26,734	26,962	27,606	27,836
Number of employees in the union (%)	26,408 (98.8%)	26,599 (98.7%)	26,866 (97.3%)	27,654 (99.3%)

Performance and Implementation of the Grievance System

Taipower's Guidelines for Processing Matters of Grievance Concerning Working Personnel helps 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.

Occupational Health Services

In order to prevent occupational injuries and illnesses and protect workers' physical and mental health, Taipower has formulated a Labor Health Service Plan in accordance with the Rules for Labor Health Protection. The plan covers labor health risk assessments, physical and health examination data processing, and assessments and management for laborers with high health risks. The plan is a reference for all units when formulating their labor health service plans.

Taipower provides regular health examinations for current employees. Those under the age of 40 are eligible for examination once every five years, while those aged 40 to 65 are eligible once every three years. The Company also encourages employees over the age of 50 to schedule examinations each year and provides discounts and subsidies. The examination results are submitted to the occupational safety department for tracking, and they are processed in accordance with Article 21 and 22 of the Labor Health Protection Regulations (e.g., assigning workers to suitable work environments, changing work environments, changing work, or reducing work hours). Employees who engage in hazardous operations are regularly scheduled for special health checkups to establish health management data and are then classified into Levels 1 to 4 for health management based on their health report.

Taipower follows the regulations in Article 3 and 4 of the Labor Health Protection Regulations when appointing health service personnel. A total of 43 units employ full-time nursing staff for health management, and a total of 62 units hire contracted doctors to provide on-site health services. A further 24 units hire contracted nursing staff to assist with on-site health services, implementing health management, and enhancing employees' physical and mental health. Medical staff of on-site health services can assist the Company in various ways, including:

- Analysis and evaluation of health checkup results
- Assist employers in the determining proper divisions of labor
- Assessments and case management for high-risk laborers
- Maternal health care
- Prevention of work-related diseases

In addition to the traditional occupational hazards of the workplace, workers also face other health hazards such as performance pressure, excessively long working hours, shift work, and psychological pressure. In response to the increase in of emerging occupational diseases such as those related to overwork, Taipower has established prevention plans for ergonomic hazards, ailments induced by exceptional workloads, and wrongful physical or mental harm to control non-traditional occupational hazards.

7.3 Corporate Cultural Inputs and Public Welfare

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 the team leaders and deputy team leaders of their respective volunteer service teams and they elect their own executive directors. The volunteers' 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 the needs of their locations. The volunteer teams of 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 combing the history of Taiwan's electrical industry development with education, Taipower injects diversity into society and promotes the use of value-added knowledge. The Company established a working group on a Cultural Heritage Preservation, Operation and Maintenance Project 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 Project 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. For more information on Taipower's cultural contributions, please scan the QR Code.

Taipower's Cultural Contributions

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. For more information on the results in 2020, please scan the QR Code.

Promotion Results

Professional Curation and Activities

Through professional curation and interdisciplinary cooperation, exhibitions can be enriched and deepened in their interpretation of power utility cultural assets. This is achieved through the combination of humanistic heritage, aesthetic creativity, and educational significance in order to translate information on professional power generation technology to the daily lives of the general public.

Promoting Cultural Heritage with Diverse Exhibitions and Forums

The Light Up-2020 Taipower Cultural Heritage Exhibition

The Light Up-2020 Taipower Cultural Heritage Exhibition has attracted over 20,000 visitors this year. The exhibition focused on the progression of the electricity grid during the past decade. Taipower used attractive designs, creative art, and multimedia to display the processes of power generation, transmission, distribution, and sales. Through interactive exhibitions, the general public can easily gain knowledge of electricity. Taipower also added overall descriptions that are different from those provided in museums and used design and conceptualization to view the development history of the electric power industry from a more humanist and caring perspective.

Cultural Heritage Governance Speeches on "Truth, Virtue and Beauty"

Taipower invited the former Minister of Culture, Ms. Li-Chun Cheng to deliver a speech on "Diversity, Heritage and Creativity: Cultural Heritage Governance." In the speech Ms. Cheng explored the administration's perspective on ways Taipower can link its cultural heritage in the electric power industry with the values of the era under the influence of the energy transition to implement cultural governance. She also recognized Taipower's efforts and dedication to promoting the preservation of cultural heritage in the electric power industry. For example, Taipower was the first state-owned business to set up a project budget, recruit cultural heritage talent, and receive Germany's Red Dot Design Award. The speech inspired attending senior officials and employees.

"Taipower: A Glittering Story of Diligent Operation" in Xinyi Eslite Bookstore

Taipower organized the new book releases event for the "Taipower Solar Power Electricity Services" and "Taipower Glittering Story of Diligent Operation" at the Xinyi Eslite Bookstore in 2020. The Company invited employees of related Taipower units to share their thoughts and experiences. Students of the Department of Electrical Engineering at National Taiwan University and Taipei Normal University and the general public also used the open registration system to take part in the event.

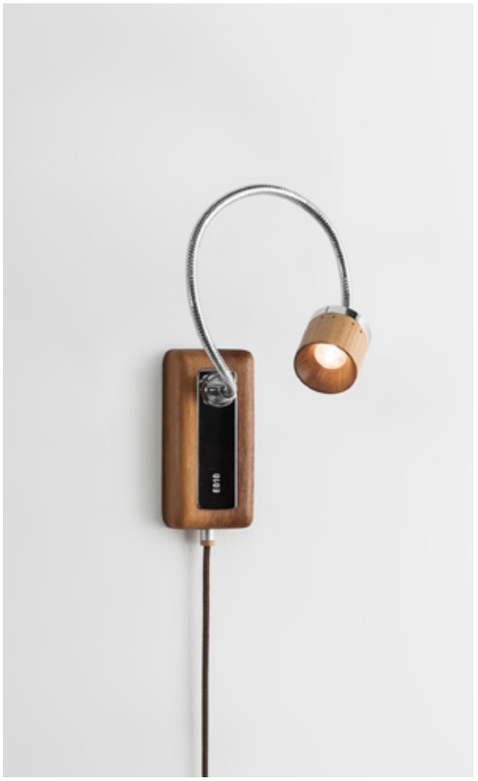
"Dialogue between Footprints and Buildings" – A Cultural Heritage Forum

In 2020, Taipower organized its fourth "Dialogue between Footprints and Buildings" cultural heritage forum with the theme "cultural paths." The Company invited Director General Kuo-Lung Shih of the Bureau of Cultural Heritage, Ministry of Culture along with experts, scholars of cultural heritage conservation and related personnel of other state-owned businesses. The Company organized keynote speeches and discussions to help Taipower employees learn more about cultural heritage and create a consensus on cultural conservation.

TPCreative: A Circular Economy Brand

The TPCreative brand was formally launched in 2019. With the circular economy as the core concept of the brand, TPCreative cooperates with professional designers that use discarded and waste materials generated during the power generation process and combined them with elements of Taipower's identity to explore the feasibility of developing cultural and creative products. Through the display and sale of these creative products, the public is able to see a different side of Taipower. This helps to narrow the distance between the Company and the public and thereby enhances the Company's corporate image. The promotion results for 2020 were as follows:

- TPCreative launched a new product on Earth Day 2020. The WhimsE010 reading light is made with wooden beams from decommissioned electricity transmission equipment. The product name "#E010" refers to the code number for the wooden beams in Taipower's warehouse system. It was designed to provide three levels of lighting and touch control to minimize the impact of lights on the overall brightness of a space and instill new value into retired materials.
- The Company is working with innovative designers in Taiwan to create the latest Chinese zodiac souvenirs for 2021. The souvenirs are made with coal ash from the Linkou Power Plant. The stationery was designed in the shape of buffaloes to create innovative products made with 20% coal ash and 100% Taiwanese design.



Investment in Cultural and Art Activities

From 2018 to 2020, Taipower has 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 has 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

		2018	2019	2020
Painting Rentals	Number of items	70	54	74
	Amount ($NTD)	356,066	329,000	351,471
Art Gallery	Number of exhibitions	5	5	6
	Amount ($NTD)	323,350	310,000	48,033
Exhibitions and Activities in the Grand Hall	Number of exhibitions	26	18	14
	Amount ($NTD)	877,439	518,747	60,000

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. In 2020, Taipower held numerous public welfare activities of various sizes, with a total of 5,588 participants volunteering 20,714 hours.

Promotion of Popular Science Education on Energy

Taipower actively promotes education and communication about energy science, renewable energy, and environmental knowledge. The Company's Environmental White Paper lays out a strategy of 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.

A Fun and Interactive Special Exhibition Experience to Promote Knowledge of Green Energy

"Power Zone Hsinchu" – A Special Exhibition on the Popular Science of Transformer Boxes

The "Power Zone Hsinchu" special exhibition on the popular science of transformer boxes was held in Taipei's Xinyi District for the first time last year. The Hsinchu City Government subsequently invited Taipower to attend its 2020 Taiwan Design Expo, and "Power Zone" was exhibited again at the Confucius Temple in Hsinchu. The semi-transparent wave roofing sheets and steel structure were spread out in a single row based on the exhibition venue's conditions. More than 85% of the materials were recycled from the exhibition in Taipei to meet circular economy values. It became the most fascinating part of the Design Expo and attracted 47,000 visitors in just three weeks.

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"Energy Diversification and Small Innovations" – Forum

"Energy Diversification and Small Innovations" was the energy innovation forum organized for the 2020 Environmental Protection Month. Taipower invited the founder of Sunny Founder and the CEO of Mr. Watt to share their experiences and business models with Taipower to foster the creation of new ideas. The resulting dialogue demonstrated how Taipower and energy innovators can communicate and cooperate by exchanging views and communicating needs in the crucial phase of energy transition as more young people enter the energy industry. Taipower is committed to working together with innovators to achieve co-prosperity with the energy industry.

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

Taipower has built the nation's first renewable energy exhibition hall called Taipower D/S ONE (D/S ONE). The hall is connected to the Banqiao train station with 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 the communication between Taipower and external entities and demonstrated the Company's core values of green, smart, and future-oriented. The defines these three values 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 expands environmental and renewable energy education for parents, teachers, and students. It has become the first green energy venue brand in Taiwan. Taipower positioned the operation as a platform for public participation instead of as a mere exhibition hall. The Company integrated the concepts of a gymnasium with renewable energy generation to make renewable energy easily understandable for the general public. In doing so, Taipower has completely changed the unappealing image of renewable energy and allowed the public to have a hands-on experience at the exhibition. Through educational and fun facilities and interactive displays, people of all ages can learn about the development of renewable energy in Taiwan. In promoting the exhibition hall, Taipower partnered with local middle and elementary schools to promote awareness of renewable energy from a young age.

D/S ONE was opened on December 24, 2019. As of the end of 2020, it has attracted more than 70,000 visitors and numerous groups and engaged with nearly 10,000 fans on Facebook. It has also gradually created a close partnership with the neighboring Banqiao Senior High School as well as other schools near Banqiao station. The "D.T. Alliance" was established to maximize the use of D.SCHOOL and TechShop classrooms in New Taipei City to promote general science and technology courses. The results have received wide acclaim.

Major Public Welfare Activities and Sponsorships

Taipower is crucial in empowering Taiwan's economic development. Taipower continues to enhance its partnerships for coexistence and co-prosperity within society. The Company continually increases its investments in culture, art, and philanthropic activities to strengthen Taipower's image as a Practitioner of Corporate Social Responsibilities. The Company's electricity construction projects have caused changes and impacts on local environments. Neighborhood work and interaction are therefore important to ensure co-prosperity with local communities. The Company's neighborhood work is focused on supporting local philanthropic activities. Taipower's approach includes emergency relief, life support for low-income households, benefits for the elderly and people with disabilities, education, culture, and other charitable causes. In 2020, there were 4,080 neighborhood work projects and approximately NT$112.53 million in donation.

Purchasing Agricultural and Fisheries Products for Donation to Disadvantaged Groups

In response to the impact of the COVID-19 pandemic in 2020, Taipower supported the government's relief policies by purchasing six types of vegetables and fish, including bok choy and grouper, on seven different occasions. Taipower 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 in times of need to create benefits for all parties.

Seeds of Hope: Hope Cultivation Project

Since 2005, Taipower has provided summer job opportunities for indigenous college students from Taitung, Hualien, and Pingtung in their hometowns to help them reduce their tuition burdens. Taipower provides approximately 75 summer job opportunities each year. By 2020, the 16th year of the program, a total of 1,000 students had participated in the project. The purpose of the program is to encourage young indigenous people to return to their hometowns with opportunities for achievement and growth.

End-of-Year Care Program for Solitary Seniors

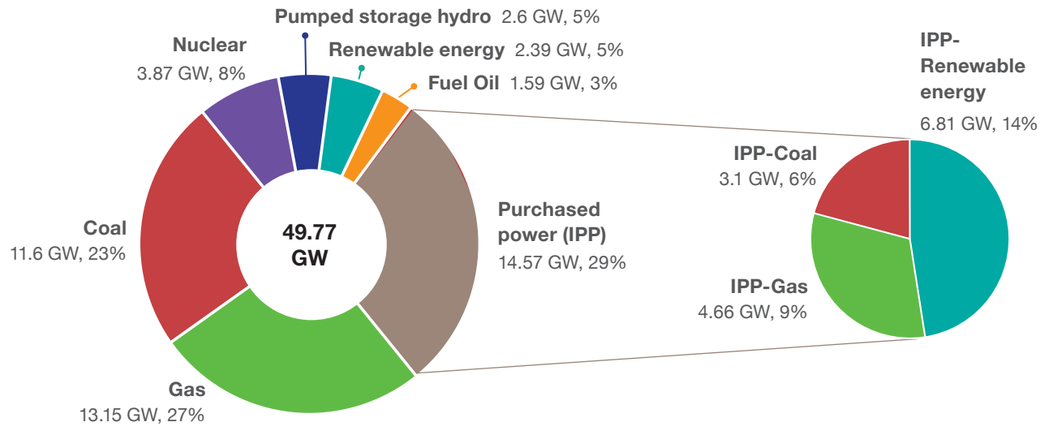
Since 2005, Taipower's power plants and district offices have invited isolated seniors to attend year-end dinner parties during the Lunar New Year. Taipower purchased new-year supplies and distributed gifts to the residences of attendees. The events have helped senior citizens who live alone enjoy Lunar New Year and allowed Taipower to spread warmth and fulfill its social responsibilities. Approximately 730 participants attended the "Lighting up Love" year-end dinner party in 2020.

Reading Promotion: Fireflies Children's Reading Project

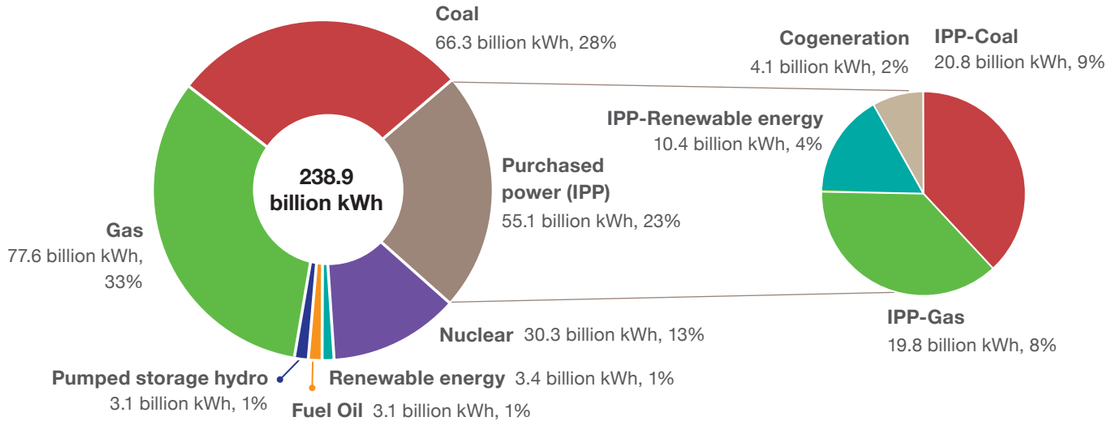
In 2007, Taipower established multiple after-school programs for children in remote areas of Hualien and Taitung to promote ethical and art education. Taipower uses mobile library vans, summer reading camps, and year-end angel club activities to provide underprivileged children in remote areas with assistance and resources. The Company seeks to reduce the gap between urban and rural resources and help children improve their knowledge and skills. The Company also helps students to explore their interests and potential through reading and talent activities. In 2020, more than 6,000 children were reached.

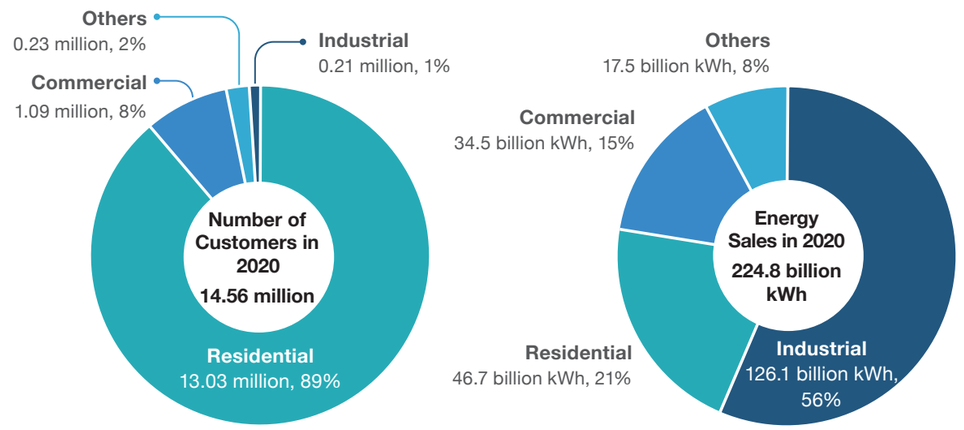
Appendix | Corporate Highlights

Installed Capacity in 2020

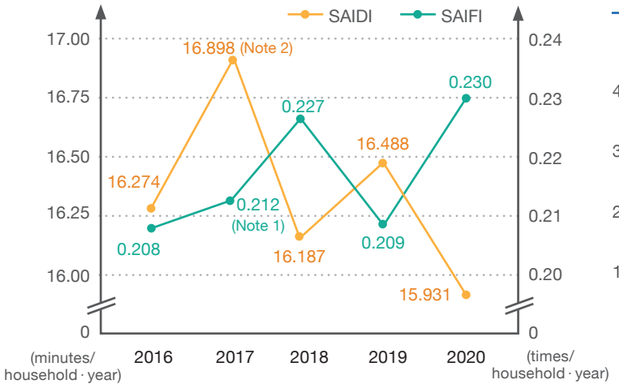


Net Generation and Purchase Power in 2020

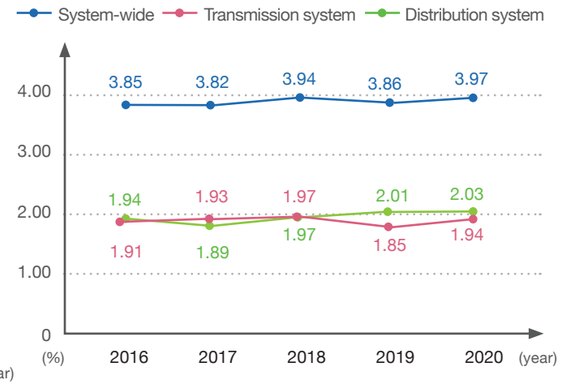




System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) from 2016 to 2020



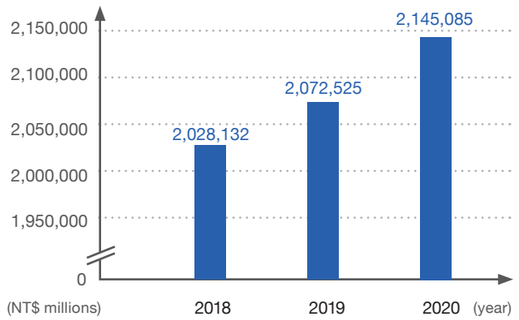
Line Loss Rate from 2016 to 2020



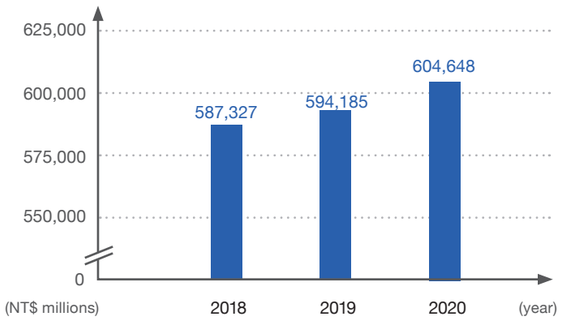
Notes: 1.Data excludes the impact of the blackout on August 15 2017. The blackout was mainly due to the gas supply interruption of CPC Corporation, and Taipower was not held responsible. The average interruption frequency related to the blackout on August 15 was 0.553 (times/household · year).

2. Data excludes the impact of the blackout on August 15 2017. The blackout was mainly due to the gas supply interruption of CPC Corporation, and Taipower was not held responsible. The average interruption duration related to the blackout on August 15 was 32.572 (minutes/household · year).

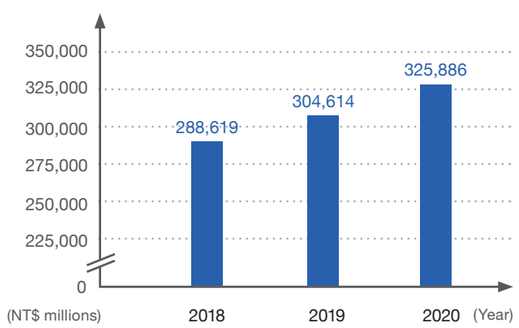
Total Assets



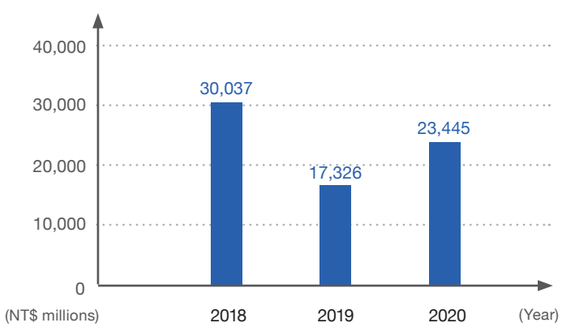
Operating Revenue



Stockholders' Equity



Net Profit/Loss Before Tax



Note: Figures above have been audited by CPAs and compiled in accordance with the International Financial Reporting Standards (IFRS) since 2013. As a state-owned enterprise, figures in Taipower's financial report are based on the final audit accounts of the National Audit Office. Therefore, the aforementioned figures in 2019 are audited final accounts and are slightly different from those in the 2020 Sustainability Report.

Appendix | Key Performance Indicator Evaluation Results

Objectives and Key performance indicator	2020 Target	2020 Performance	2020 Target achieved	2021 Target
1. Complying with the rate control mechanism and reach the annual earnings target				
Pre-tax income (NT$100 millions)	≧ 143	234	✓	≧ 37.5
Control of operations and maintenance expenses (cents/kwh)	≦ 32.93	30.37	✓	≦ 32.05
2. Controlling capital expenditure in the electricity industry				
Fixed asset construction and improvement to expand execution (capital expenditure execution rate) - annual budget execution rate of special projects and general construction and equipment plans (%)	≧ 95	98.39	✓	≧ 90
3. Improving the supply of fuels, materials, and operational performance				
Coal procurement performance (%)	≦ -4.91	-11.97	✓	≦ -6
Maintain sufficient coal inventory (number of days)	30-35	33	✓	30-38
Ratio of collective asset procurement (%)	≧ 24	46.53	✓	≧ 36.30
Ratio of asset procurement cost reduction (%)	≧ 15	16.58	✓	≧ 15
4. Promoting new businesses and managing investments				
Diversification benefits (NT$100 millions)	≧ 19	16.15	(Note)	≧ 14.5
5. Enhancing Taipowers' corporate image				
Customer satisfaction (score)	≧ 90.2	95.7	✓	≧ 85
Engineering construction quality (score)	Construction Inspection Avg. score ≧ 80	87.1	✓	Construction Inspection Avg. score ≧ 80
6. Providing customers with value-added services				
Mobile payment services (10,000 customers)	≧ 34	70.2	✓	≧ 63
7. Promoting demand response and energy conservation				
Reducing electricity demand during peak hours - demand bidding (including participation in ancillary services by demand response) applying for reduction of capacity (10 MW)	≧ 80	169	✓	≧ 80
Smart energy-saving and technical services (10MWh)	≧ 8,600	9,641	✓	≧ 9,000
Electricity saving plan achievement rate (%)	≧ 95	100	✓	≧ 95
8. Improving hazard identification knowledge and ability				
Increasing employees' abilities to predict dangers (class)	Held ≧ 2 class	2	✓	Held ≧ 4 class
Implementing and deeply rooting the activation of the zero disaster campaign (score)	The avg. score of completion is ≧ 85	88.9	✓	The avg. score of completion is ≧ 85
Strengthening the safety awareness of employees at the power plant (class)	Held ≧ 4 class	4	✓	Held ≧ 4 class
9. Promoting virtual reality training for industrial safety	This item is a qualitative indicator. For details, please refer to 7.2 A Sound Working Environment			

Note: Failing to reach the target of diversification benefits was mainly due to the impact of the global pandemic on the development plan of the Bengalla Coal Mine, which had caused the decline in coal prices and affected earnings.

Objectives and Key performance indicator	2020 Target	2020 Performance	2020 Target achieved	2021 Target
10. Strengthening the contractor's operation safety				
Remote instant care application: completing the priority application for power transmission and delivery contract projects (line)	Complete ≧ 186 lines	296	✓	Complete ≧ 500 lines
Forum for senior executives and contractors on occupational disaster prevention advocacy (sessions)	Held ≧ 1 session	2	✓	Held ≧ 1 session
11. Striving for occupational safety and health awards				
Participating in the selection of occupational safety and health by the Ministry of Labor and the Ministry of Economic Affairs (unit)	≧ 12 units	19	✓	≧ 6 units
Participating in the selection of excellent healthy workplaces by the Ministry of Health and Welfare (unit)	≧ 4 units	6	✓	None (Note)
Obtaining CNS45001 verification of occupational safety and health management system (unit)	≧ 24 units	47	✓	None (Note)
12. Occupational safety performance				
Occupational accident rate	≦ 0.22	0.17	✓	≦ 0.15
Occupational safety accident (frequency)	0	24		0
13. Promoting power development plans				
Achievement rate of the Company's renewables plan (%)	≧ 90	99.03	✓	≧ 95
14. Ensuring the stable operation of generation units				
Hydro unit availability (%)	≧ 95.08	96.81	✓	≧ 95.08
Coal-fired unit availability (%)	≧ 97.50	98.58	✓	≧ 97.50
Thermal unit heat consumption rate (kcal/ kWh)	≦ 2,138	2,095	✓	≦ 2,132
Number of overdue unit maintenance schedules (excluding nuclear power) (time)	≦ 3	0	✓	≦ 2
Wind turbine annual availability (%)	≧ 92.5	93.03	✓	≧ 92.5
Solar power annual generation (GWh)	≧ 268	254.2		≧ 358
15. Abiding by the mission of being environmentally friendliness and achieving the vision of becoming a green enterprise				
Electricity carbon emission factor (deducting nuclear power generation) (kg/kwh)	≦ 0.637	0.590	✓	≦ 0.634
Lower the net emission intensity of thermal units compared to 2016 (%)	Lower than 5.3% compared to 2016	Lower than 6.52% compared to 2016	✓	Lower than 7% compared to 2016
Reducing air pollution emission intensity compared to 2016 (%)	Reduce 15% compared to 2016	Reduce 62.72% compared to 2016	✓	Reduce 50% compared to 2016
Smart management and service (%)	Cumulative rate reach 17.125%	Cumulative rate reach 46.95%	✓	Cumulative rate reach 52%
Communication of environmental protection information in the power industry (people)	≧ 555,000	996,814	✓	≧ 480,000
16. Ensuring the safety and stable operation of nuclear power				
Nuclear reactor trips (frequency)	≦ 1	1	✓	0
Abnormal incidents caused by operational negligence (times/plant·year)	≦ 2	0	✓	≦ 2
Improving nuclear safety performance: nuclear safety performance indicator signals (times)	White lights ≦ 2 Yellow lights = 0 Red lights = 0	White lights = 0 Yellow lights = 0 Red lights = 0	✓	White lights ≦ 2 Yellow lights = 0 Red lights = 0
Safety index rating (stars)	≧ 2.8 stars	2.95 stars	✓	≧ 2.8 stars

Note: The goal marked “None” are deleted in 2021.

Objectives and Key performance indicator	2020 Target	2020 Performance	2020 Target achieved	2021 Target
17. Promoting the decommissioning of nuclear power generators as well as handling of nuclear waste	This item is a qualitative indicator. For details, please refer to 6.1 Strengthening Environmental Management and 3.2 Planning for New Sources of Energy			
18. Research and application of key technologies				
Complete the installation of smart meters	1. Smart meter installation: 1.1 million units completed installations (Cumulative) 2. Smart meter installation: The success rate of data transmission to the MDMS system reached 90%	1. Smart meter installation: 1.1 million units completed installations (Cumulative) 2. Smart meter installation: The success rate of data transmission to the MDMS system reached 91.26% (Cumulative complete 1 million of communication module installation, with 912,628 modules can transmit data to the MDMS	✓	1. Smart meter installation: 1.5 million units completed installations (Cumulative) 2. Complete 1.5 million installation of communication module. The success rate of data transmission to the MDMS system reached 90%
Establishing a disaster prevention micro-grid demonstration field (site)	≧ 2	3	✓	None (Note)
The establishment of existing substations and the application of feeder GOOSE protection strategy and breaker operating time (number of substations)	≧ 14 substations (31.8%)	14	✓	None (Note)
Amount contributed to research and development (minimized cost + increased revenue) (NT$ millions)	≧ 5,701	7,331	✓	≧ 7,267
Investment in energy saving, carbon reduction, and green power industry research (NT$ millions)	≧ 3,230	2,370		≧ 3,650
19. Planning and establishing ancillary services and a capacity reserve trading pilot platform				
Non-traditional units participating in ancillary service power interchange	Complete ≧ 2 ancillary service business model	3	✓	None (Note)
Research and analysis of foreign power interchange information and cultivation of core power interchange capabilities (sessions)	Held ≧ 10 sessions	14	✓	None (Note)
20. Improving the resilience and power supply capabilities of the power grid				
Power supply reliability - reduction of the average interruption duration (min/household. year)	≦ 16.80	15.9307	✓	≦ 16.70
Dispatching performance (%)	100 ≦ CPS ≦ 120	113.60	✓	100 ≦ CPS ≦ 120
Line loss rate (%)	≦ 4.30	3.97	✓	≦ 4.25
21. Promotion and application of smart grid				
Promoting feeder automation (units)	≧ 900	1,304	✓	≧ 900
Accepting achievement rate of green energy grid-connections (%)	≧ 90	97.92	✓	≧ 90
Assisting the operators of type III renewable energy generation equipment to handle the interconnection review - cases exempting from system shock analysis (working days)	≦ 15	8.08	✓	≦ 15
Assisting the operators of type III renewable energy generation equipment to handle the interconnection review - cases requiring system shock analysis (working days)	≦ 20	8.35	✓	≦ 20
22. Planning the transformation into a holding company with subsidiaries	This item is a qualitative indicator. For details, please refer to 1.3 Promoting Corporate Transformation			
23. Human resource development and technology inheritance	This item is a qualitative indicator. For details, please refer to 7.1 Human Resource Management Strategies			
24. Strengthening talent cultivation and learning effectiveness				
Average hours of internal and external learning (hours/person)	≧ 30	58.8	✓	≧ 30
25. Promoting employee care and growth				
Organizing communication activities with grassroots colleagues in all units (sessions)	≧ 176	186	✓	≧ 176
Promoting employee assistance programs of all units (cases)	≧ 30	35	✓	≧ 30
Organizing various sharing meetings (sessions)	≧ 10	12	✓	None (Note)

Note: The goal marked “None” are deleted in 2021.

Appendix | GRI Standards Index

GRI Standards	Reference	Page
GRI 102: General Disclosures 2016		
Organizational Profile		
102-1 Name of the organization	1.1.1 Taipower Profile	17~18
102-2 Activities, brands, products, and services		
102-3 Location of headquarters		
102-4 Location of operations		
102-5 Ownership and legal form		
102-6 Markets served	1.1.1 Taipower Profile Appendix-Corporate Highlights	17~18 135~136
102-7 Scale of the organization	1.1.1 Taipower Profile	17~18
102-8 Information on employees and other workers	7.1.2 Structure of Human Resource	118~119
102-9 Supply chain	2.5.1 Supplier Composition	56~60
102-10 Significant changes to the organization and its supply chain	1.3.1 Core Transformation Concept 1.4.1 Identification of Stakeholders	28 30
102-11 Precautionary principle or approach	2.2.1 Risk Management 2.2.2 Risk Assessment and Identification	45~46 46
102-12 External initiatives	1.4.4 Stakeholder Communication Performance	34~37
102-13 Membership of associations		
Strategy		
102-14 Statement from senior decision-maker	Statement from the Chairman	4~5
102-15 Key impacts, risks, and opportunities	2.2.2 Risk Assessment and Identification	46
Ethics and Integrity		
102-16 Values, principles, standards, and norms of behavior	1.1.2 Mission, Vision and Core Values 2.3.1 Ethical Management	19 49~51
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102-18 Governance structure	1.2 Implementing Sustainable Development	20~27
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102-40 List of stakeholder groups	1.4.1 Identification of Stakeholders	30
102-41 Collective bargaining agreements	7.2.2 Labor-Management Communication and Collective Bargaining	127~128
102-42 Identifying and selecting stakeholders	1.4.1 Identification of Stakeholders	30
102-43 Approach to stakeholder engagement		
102-44 Key topics and concerns raised	1.4.3 Identification of Material Topics	32~33
Reporting Practice		
102-45 Entities included in the consolidated financial statements	1.1.1 Taipower Profile	17~18
102-46 Defining report content and topic boundaries	Reporting Principles	1
102-47 List of material topics	1.4.3 Identified Results of Material Topics	32~33
102-48 Restatements of information		
102-49 Changes in reporting		
102-50 Reporting period	Reporting Principles	1
102-51 Date of the most recent report		
102-52 Reporting cycle		
102-53 Contact point for questions regarding the report	Reporting Principles	1
102-54 Claims of reporting in accordance with the GRI Standards		

GRI Standards	Reference	Page
102-55 GRI content index	Appendix-GRI Standards Index	140~142
102-56 External assurance	Appendix-Assurance Statement	144~146
GRI 103: Management Approach 2016		
103-1 Explanation of major topic and its boundary	1.4.2 Identification of Material Topics	31
Disclosure of Material Topics and Specific Topics		
Integrity and Taipower and Sustainability		
103-2 The management approach and its components	2.2.1 Risk Management 2.2.2 Risk Assessment and Identification 2.3.1 Ethical Management	45~46 46 49~51
103-3 Evaluation of the management approach		
205-1 Operations assessed for risks related to corruption	2.3.1 Ethical Management	49~51
205-3 Confirmed incidents of corruption and actions taken	2.3.2 Compliance	52~54
419 Non-compliance with laws and regulations in the social and economic area		
Electricity Tariff Rationalization		
103-2 The management approach and its components	2.4 Operational Performance 5.1.2 Power Saving Performance	54~56 91
103-3 Evaluation of the management approach		
203-1 Infrastructure investments and services supported	2.4 Operational Performance	54~56
203-2 Significant indirect economic impacts	5.1.2 Power Saving Performance	91
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103-2 The management approach and its components	3.1.1 A Stable Power Supply and Generation System 3.2.1 The Transition to a New Generation of Energy 3.2 Planning for New Sources of Energy	64~69 74~76 74~79
103-3 Evaluation of the management approach		
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	64~69 74~76
305-5 Reduction of GHG emissions	3.2 Planning for New Sources of Energy	74~79
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103-3 Evaluation of the management approach		
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103-2 The management approach and its components	4.1 The Smart Grid General Planning Framework and Action Plan 4.1.2 Smart Grid Action Plan	82~84 83~84
103-3 Evaluation of the management approach		
203-2 Significant indirect economic impacts	4.1.2 Smart Grid Action Plan	83~84
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103-2 The management approach and its components	5.2 User Communication and Management	92~93
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103-2 The management approach and its components	3.1.1 A Stable Power Supply and Generation System 3.2.1 The Transition to a New Generation of Energy 3.2 Planning for New Sources of Energy 4.2 Tracking Smart Grid Achievement	64~69 74~76 74~79 84~85
103-3 Evaluation of the management approach		
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	64~69 74~76
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103-2 The management approach and its components	4.2 Tracking Smart Grid Achievement 6.2 Toward the Goal of Low-Carbon Electricity	84~85 99~100
103-3 Evaluation of the management approach		
305-1 Direct (Scope 1) GHG emissions	6.3.2 Enhancing the Energy Efficiency of Taipower's Operation	102~103
305-5 Reduction of GHG emissions	6.2 Toward the Goal of Low-Carbon Electricity	99~100

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103-2	The management approach and its components	6.4.1 Response Measures to Air Pollution 6.4.2 Effluent Management 6.4.3 Waste Management	104~107 108~109 110~112
103-3	Evaluation of the management approach		
306	Effluents and waste	6.4.3 Waste Management	110~112
307	Environmental compliance	6.1.1 Environmental Policy and Goals 6.4.2 Effluent Management 6.4.3 Waste Management	96~97 108~109 110~112
Air Quality (Corporate-Specific Topic)			
103-2	The management approach and its components	6.4.1 Response Measures to Air Pollution	104~107
103-3	Evaluation of the management approach		
Energy Efficiency			
103-2	The management approach and its components	6.3.2 Enhancing the Energy Efficiency of Taipower's Operations	102~103
103-3	Evaluation of the management approach		
302-1	Energy consumption within the organization		
302-3	Energy intensity		
Demand Side Management and Energy Saving			
103-2	The management approach and its components	4.1 The Smart Grid General Planning Framework and Action Plan 5.1.1 Demand Side Management Measure 5.1.2 Power Saving Performance	82~84 88~91 91
103-3	Evaluation of the management approach		
203-2	Significant indirect economic impacts	5.1.1 Demand Side Management Measure 5.1.2 Power Saving Performance	88~91 91
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103-2	The management approach and its components	3.1.1 A Stable Power Supply and Generation System 3.2.1 The Transition to a New Generation of Energy	64~69 74~76
103-3	Evaluation of the management approach		
203-2	Significant indirect economic impacts		
Worker's Health and Safety			
103-2	The management approach and its components	7.2.1 Occupational Health and Safety	121~126
103-3	Evaluation of the management approach		
403-1	Occupational health and safety management system		
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		
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 Providing Quality Electricity Service 3.1.2 A Robust Transmission and Distribution System 5.1.2 Power Saving Performance	64~73 70~73 91
G4-EU11	Average generation efficiency of thermal plants by energy source and by regulatory regime	6.3.2 Enhancing the Energy Efficiency of Taipower's Operations	102~103
G4-EU28	Power outage frequency	3.1.2 A Robust Transmission and Distribution System	70~73
G4-EU29	Average power outage duration		

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: 14.56 million Customer power consumption (sold) by percentage: Industrial: 56%, Residential: 21%, Commercial: 15%, Others: 8%
	Value chain	IF-EU-000.B	User power supply: Industrial: 12.61 billion kWh, Residential: 4.67 billion kWh Commercial: 3.45 billion kWh, Others: 1.75 billion kWh
	Value chain	IF-EU-000.C	In 2020, there were 17,790 circuit kilometers of transmission lines and 389,119 circuit kilometers of distribution lines
	3.1.1	IF-EU-000.D	Total power generation of 18.39 billion kWh, thermal generation of 14.7 billion kWh (61.5%), nuclear generation of 3.03 billion kWh (12.7%), renewables generation of 0.34 billion kWh (1.4%), and pumped-storage hydropower generation of 0.31 billion kWh (1.3%)
	3.1.1	IF-EU-000.E	Total purchasing power of 5.51 billion kWh
Greenhouse gases emission and energy resource planning	6.3.2	IF-EU-110a.1	Scope 1 GHG emissions of 93.35 million tons, yet no regulations of emission limit and emission disclosure in the country
	6.3.2	IF-EU-110a.2	Emissions of 93.35 million tons of CO_2e in 2020
	6.4.1	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 6.4.1
	3.1.2	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	6.4.1	IF-EU-120a.1	(1) NO_x: 137 kg/GWh (2) SO_x: 102 kg/GWh (3) PM: 7 kg/GWh
Water resources management	6.4.2	IF-EU-140a.1	The total water consumption of thermal power plants was 9,20,0887.29 cubic meters
	6.4.2	IF-EU-140a.2	No violation of water resources regulations by Taipower in 2020
	6.4.2	IF-EU-140a.3	Please refer to 6.4.2 for the Water resources management
Coal ash management	6.4.3	IF-EU-150a.1	Total coal ash production in 2020 was 2.209 million tons, with a reuse rate of 89.7%
	6.4.3	IF-EU-150a.2	For the detailed status of coal ash accumulation, please refer to 6.4.3 Table of "Diameter, Height, and Actual Controlled Ash Level of Fly Ash Silo of Various Coal-fired Power Plants"
Energy affordability	2.4	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 2.5596 (dollar/kWh), (2) commercial 3.1787 (dollar/kWh), (3) industrial 2.4461 (dollar/kWh)
	2.4	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 2020 System Average Interruption Duration Index (SAIDI) of 15.931 minutes/household and the System Average Interruption Frequency Index of 0.230 (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 2020
Workplace health and safety	7.2.1	IF-EU-320a.1	(1) Total Recordable Incident Rate (TRIR) of 0.383%, (2) fatality rate of 0%, and (3) Near-Miss Frequency Rate (NMFR) of 0.174%
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 81% of the country's electricity consumption information
	5.1.2	IF-EU-420a.3	A total of 0.119 billion kWh of electricity were saved in 2020
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	Three labor penalties, 13 work safety penalties, and no information security penalties
	3.1.2	IF-EU-550a.2	(1) System Average Interruption Duration Index (SAIDI) of 15.931, (2) System Average Interruption Frequency Index (SAIFI) of 0.230, 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 | Assurance Statement

SGS

ASSURANCE STATEMENT

SGS TAIWAN LTD.'S REPORT ON SUSTAINABILITY ACTIVITIES IN THE TAIWAN POWER COMPANY's CORPORATE SOCIAL RESPONSIBILITY 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 Corporate Social Responsibility 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 on-site verification (2021/05/31~2021/06/18). 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 CSR 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		Level of Assurance
A	SGS ESG & SRA Assurance Protocols (based on GRI Principles and guidance in AA1000)	n/a
B	AA1000ASv3 Type 1 (AA1000AP Evaluation only)	Moderate

Assurance has been conducted at a moderate level of scrutiny.

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, CSR 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 Task Force on Climate-related Financial Disclosures (TCFD) 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 organisation, 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 organisation has chosen an appropriate level of assurance for this stage in their reporting.

AA1000 ACCOUNTABILITY PRINCIPLES (2018) CONCLUSIONS, FINDINGS AND RECOMMENDATIONS

Inclusivity

TPC has demonstrated a good commitment to stakeholder inclusivity and stakeholder engagement. 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. For future reporting, TPC may proactively consider having more direct two-ways involvement of stakeholders during future engagement.

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.

Responsiveness

The report includes coverage given to stakeholder engagement and channels for stakeholder feedback.

Impact

TPC has demonstrated a process on identify and fairly represented impacts that encompass a range of environmental, social and governance topics from wide range of sources, such as activities, policies, programs, decisions and products and services, as well as any related performance. Measurement and evaluation of its impacts related to material topic were in place at target setting with combination of qualitative and quantitative measurements.

GLOBAL REPORTING INITIATIVE REPORTING STANDARDS CONCLUSIONS, FINDINGS AND RECOMMENDATIONS

The report, TPC's CSR 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 boundaries, and stakeholder engagement, GRI 102-40 to GRI 102-47, are correctly located in content index and report. For future reporting, it is encouraged to have more descriptions of TPC's involvement with the management enhancement on supplier's health and safety related issues and how effort were given to mitigated the impacts. When reporting on goals and targets for material topics, the expected results are suggested to be set, if applicable, with quantitative objectives.

Signed:
For and on behalf of SGS Taiwan Ltd.

AA1000
Licensed Report
000-8/V3-MHFAJ

David Huang
Senior Director
Taipei, Taiwan
14 July, 2021
WWW.SGS.COM

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