Taiwan Power Company

2019 Sustainability Report

Reporting Principles

This is the 13th issue of the annual Sustainability Report of the Taiwan Power Company (hereinafter referred to as Taipower or the Company). The contents of this Sustainability Report have been compiled from data submitted by relevant units of the Company. The edition of the report followed the Sustainability Reporting Standards published by the Global Reporting Initiative (GRI) when compiling the report and disclosing information. This report has been verified by SGS Taiwan to ensure that the report meets the requirements of both the Core Option of the GRI Standards and the accountability principle standards (APS) in AA1000 (Type 1 Moderate Level).

In consideration of the changes in the economy and environment of Taiwan, as well as the three major development issues of technology upgrading, the reestablishment of humanistic spirit, and energy transition, the theme of the 2019 Taipower Corporate Sustainability Report is "Smart Power, Creating Sustainability Together." The theme is a response to the international green energy transition and the development of smart green energy and stability in power supply. The six chapters of this report explore a series of topics in detail: sustainable operation, stable power supply, environmental sustainability, human resources, innovation, research and development (R&D), and social co-prosperity. The contents of these chapters illustrate Taipower's commitment to sustainable value creation through investing in various types of capital.

Period Covered by the Report

The report covers the period of January 1 to December 31, 2018 (For the sake of complete disclosure and comparability, the report also includes some historical data).

Scope of the Report

This report covers Taipower's data and information regarding sustainability issues as well as achievements within the areas of management development, social responsibility and environmental sustainability.

Contact Taipower

Taipower establishes Taipower Sustainable Development Website to fully explain its performance on and the implementation results for various sustainability issues (including topics that are not covered in this report, such as Taipower's social commitments and contributions). The Company has also introduced a stakeholder section and questionnaires in the hopes of facilitating smooth communication with its stakeholders. The Sustainability Report of Chinese and English versions are provided on Taipower's website. In addition, the "Information Disclosure" section of Taipower's official website is updated regularly to provide the latest statistics on specific aspects of the Company's operations, including management, power generation, the environment and so forth. Taipower would like to receive any feedback regarding this Sustainability Report. Your input will enable Taipower to better meet your expectations in our next Sustainability Report to be published in the third quarter of 2020. You are more than welcome to contact us through the following methods:

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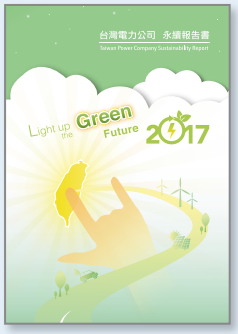
Taipower Sustainable Development Website: https://csr.taipower.com.tw

Sustainability Reports Published every August

2018

2017



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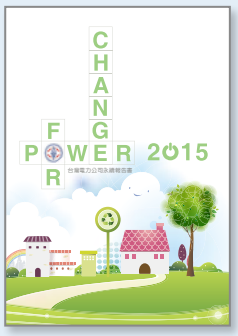

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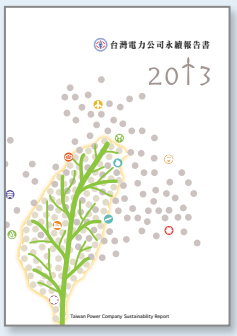

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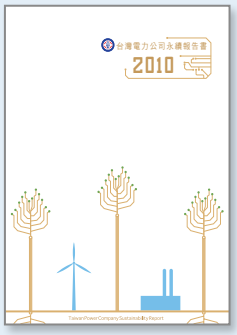

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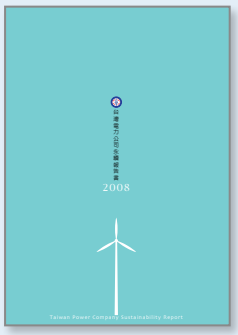

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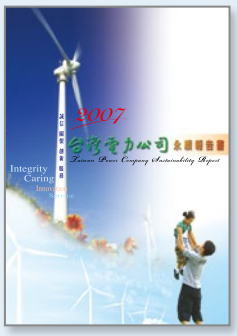

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Statement from the Chairman

For Taipower, 2018 was both a difficult year and a year in which we steadied ourselves to move foward. As environmental concerns increase in Taiwan, Taipower reviewed its past experiences, and considered a range of voices from civil society, local communities and environmental groups along with policy considerations as it worked to develop a sustainable future. Globally, focus has been increasingly on climate change and the challenge of limiting global warming to 1.5℃ above pre-industrial levels. As part of Taiwan's power industry, Taipower believes it has an important role to play in those issues and in improving both domestic and international society.

I believe that Taipower is up to the challenge of facing domestic social changes and global sustainability issues. Taipower's determination to embrace its corporate responsibility has helped it to win recognition from people and organizations in all walks of life. Taipower has achieved excellent results in various sustainable performance evaluations both domestically and internationally. Our perseverance has long been a top priority as Taipower works to enhance sustainability. We uphold the faith that the more Taipower devotes itself, the better Taiwan becomes. As such, every employee is working to fulfill our corporate citizenship responsibility. In this report, we will share Taipower's various efforts to achieve sustainability with all of our stakeholders.

Sharing our outstanding achievements

In 2018, Taipower supplied 233.3 billion kWh of energy. At the same time our System Average Interruption Duration Index (SAIDI) dropped to 16.187 minutes per household per year, a record low for Taipower. These results illustrate how closely our staff from the fuel procurement, generation, transmission, distribution and sales units are adhering to the spirit of serving the public with excellence.

As a cornerstone of domestic economic growth, Taipower's power supply quality provides a tremendous benefit to society. Thanks to the efforts of our staff last year, we were honored with many awards in 2018. These included recognition at the 2018 Asian Power Awards, the Asia Responsible Entrepreneurship Awards (AREA) Social Welfare Development Award and the National Brand Yushan Award's National First Award. We also received the Taiwan Corporate Sustainability Awards Top 50 Platinum Award, Sports Activist Awards, and a Leadership in Energy and Environmental Design (LEED) Platinum rating – the highest level of rating from the U.S. Green Building Council. As a company, Taipower truly appreciates the recognition these rewards represent. The honor these awards confer has motivated and encouraged us to continue working to develop a better future for Taiwan.

Strengthening sustainable development

Taipower's commitment to corporate sustainability is reflected in the three dimensions: corporate governance, environmental friendliness, and social co-prosperity. With respect to corporate governance, recent amendments to the Electricity Act have required Taipower to complete its tranformation to a holding company by 2023-2026. The amendments call for two subsidiaries to be set up: one to oversee generation and the other to manage transmission, distribution, and sales of electricity. These changes will introduce a new era for energy and we are actively planning for the future so that we can seize opportunities during the reform, and enable ourselves to face the challenges ahead.

In the dimension of environmental friendliness, a Sustainable Development Committee was established in 2009. The committee is tasked with systematically implementing sustainable policies. In April 2019, a Taipower Environmental White Paper was issued to lay out Taipower's vision and plan for environmental sustainability until 2030. The White Paper firmly establishes Taipower's long-term commitment to the environment.

In the area of social co-prosperity, Taipower has dedicated itself to promoting social programs. For example, the Taipower sport teams have visited remote towns and villages in Taiwan and provided opportunities for students to engage in ball games through our social care campaign. It is a great achievement to see the responses of participating children in their smiling faces.

Promoting smart innovation

Taipower is approaching its energy transition with a forward-looking vision that calls for continuing investment in smart grids, generation, storage, conservation and the integration of information and communication infrastructure to improve the efficiency of the power system and move us towards a sustainable, low-carbon environment. In order to improve public awareness of how smart grids operate, Taipower set up a smart grid display site at the headquarters building. The display provides a range of interactive models that encourage visitors to learn about green energy, technology and future technologies through interactive learning.

The introduction of new technologies such as virtual reality (VR), augmented reality (AR) and substation inspection robots is creating new training opportunities for the power industry. By embracing these technologies, Taipower is demonstrating its emphasis on human resources management, and illustrating its belief that employees are and always will be the Taipower's most precious intangible assets.

Finding opportunities in trends

In recent years, ubiquitous technologies such as the Internet of Things, cloud platforms, and smart mobile devices, have become extremely popular around the world. Taipower has prepared for the development of the power industry in the era of ubiquitous technology by composing a five-year plan (2019-2023) for operation strategies. The plan encompasses eight overall strategies and expands them into 45 action plans. In so doing, Taipower hopes to create greater economic, environmental, and social value, and to transform the company into a superior and trustworthy world-class power utility group.

Taipower's responsibility for providing stable power requires it to be a visionary and look at the big picture. The 2019 Taipower Sustainability Report with its theme of "Smart Power, Creating Sustainability Together" illustrates efforts Taipower has already made in the fields of smart power and sustainable operations. Yet, throughout the impending energy transition, Taipower is committed to working with all parties in order to achieve a low-carbon environment, create new opportunities for sustainable energy, and light up the lives of all with the fruits of our efforts!

Chairman Wei-Fan Yang

Taipower's Value Chain and Operational Elements

SDGs of Concern

Eight Major Strategies

A stable power supply and reduction of carbon emissions

Promotion and construction of the power grid

Strengthening of key technologies

Improvement of financial efficiency

Transformation into a power utility group

Enhancment of workforce value

Implementation of improved occupational safety

Refinement of customer service

Resources Input

Financial capital

Capital: NT$330 billion

Total expenditure in 2018: NT$606.8 billion

Manufactured capital

Power plants in operation: 24

Total installed thermal power plant capacity: 23,930 MW

Total installed nuclear power plant capacity: 4,510 MW

Total installed renewable energy capacity: 2,110 MW

Installed pumped-storage hydroelectric capacity: 2,600 MW

Installed capacity of cooperative IPP thermal power plants: 7,710 MW

Installed capacity of cooperative renewable energy power plants: 3,650 MW

Total length of power transmission lines: 17,737 circuit kilometres(ckt-km)

Total length of distribution lines: 375,265 circuit kilometres(ckt-km)

Number of substations: 615

Natural capital

	2016	2017	2018
Coal (million tons)	26.164	28.975	29.009
Gas (million cubic meters)	12,609	14,113	14,085
Oil (thousand of kilolitre)	2,427	2,663	1,601
Nuclear fuel (ten thousand pounds)	203.3	67.61	164.86

Environmental protection expenditure: NT$32.416 billion

Human capital

Total number of employees	Number of contract workers	Number of temporary workers
26,962	1,068	207

Intellectual capital

Number of research projects	Investment amount in R&D
269	**Total R&D expeditures:** NT$4.6 billion (consisting of NT$4.1 billion in expenses and NT$0.5 billion in capital expenditures)

Social capital

Number of customers: 14.2 million

Operation Assistance Fund for Promoting Electricity Development: NT$2.725 billion

Demand response capacity: 2,420 MW

Cooperative power supply partners:
51 cogeneration and 23,776 contracted renewable energy customers

Taipower is a vertically integrated power business group. The Company is committed to creating multifaceted value for stakeholders, and also provides the public with electricity that is needed for its diverse development needs. Taipower bears the great responsibility of offering a stable power supply, implementing a green energy transition, and integrating the capital inputs and resources associated the six major capitals in its value chain. These include generation, transmission, and distribution and sales of electricity. Throughout, Taipower continues to march towards its goal of becoming a sustainable, world-class energy group.

Generation

Power Generation Division

Providing services in operations, development, maintenance, and management of power generation by hydro, thermal, and renewable energy.

Power generation by Taipower-owned facilities in 2018

Thermal power
148.3 billion kWh

Renewable energy
4.3 billion kWh

Pumped-storage hydroelectricity
3.4 billion kWh

Nuclear Power Division

The major items for nuclear power generation include safe operation, power plant design & management, public communication and the final disposal for radioactive waste.

Nuclear power
26.7 billion kWh

Purchased electricity by sources

Amount of electricity purchased by sources in 2018

Privately-owned thermal power plants
38.9 billion kWh

Cogeneration
4.6 billion kWh

Renewable energy
7.1 billion kWh

Transmission

Transmission System Division

The major items for the power grid include planning, design, construction and operation.

EHV transmission lines
345 kV

General transmission lines
161 kV

Underground cables
69 kV

Distribution and Service

Distribution and Service Division

The major items for the Distribution and Service Division include managing the sale & purchase of electricity, customer services, and building-operation and the maintenance of the power distribution network.

The number of customers
14.2million

The percentage of power consumption for customers

Industrial: 56.4%

Residential: 20.2%

Commercial: 15.5%

Other: 7.9%

Performance

- **Earnings before tax:** NT$28.3 billion
- **Income from electricity fees:** NT$569.9 billion

Corresponding chapter **Sustainable Operation**

- **Net amount of generated and purchased power:** 233.3 billion kWh
  - –Generated power: 182.7 billion kWh
  - –Purchased power: 50.6 billion kWh
- **Total power sold:** 219.1 billion kWh
- **Facility utilization rate:** 86%
- **Line loss rate:** 3.94%

Corresponding chapter **Stable Power Supply**

- **Greenhouse gas emissions:** 98,263 kt CO_2e
- **Air pollution emissions (kg/GWh)**
  - –Particulate matter (PM) emissions: 20
  - –Sulfur oxide (SOx) emissions: 182
  - –Nitrogen oxide (NOx) emissions: 222

Corresponding chapter **Environmental Sustainability**

- **Number of newly recruited employees:** 1,812
- **Total participants in education and training:** 63,990
- **Incidents of work-related injuries:** 15
- **Ratio of work-rated injuries:** 0.05

Corresponding chapter **Human Resources**

- **Number of research reports:** 191
- **Number of papers published:** 105
- **Number of patents/intellectual property:** 37

Corresponding chapter **Innovation and R&D**

- **Level of customer satisfaction:** 95.5 (out of 100)
- **Rounds of charity event:** 1,598

Corresponding chapter **Social Prosperity**

Value Creation

Provider of High-Quality Power Services

- Build a stable and efficient power supply system to enhance supply reliability
- Strengthen customer relation management and improve the level of customer satisfaction
- Improve system and data transmission through the construction of an optical fiber network that will accelerate system response capabilities
- Strengthen asset management through the utilization of the Internet of Things (IoT) architecture and big data analytics
- Build a smart grid that features self-monitoring, diagnosis, protection, and recovery functions

Intergrator of Energy Networks

- Smart energy resource networks and transaction platforms are the cores that effectively integrate and distribute energy supply and demand
- Strengthen partnerships between development, engineering, operation management, IPPs, and supply chains for various types of power resources
- Ensure the security of fuel supply, enhance coal procurement performance, and transition toward natural gas supply
- Enhance power generation efficiency and construct business models for energy resource recycling
- Deploy the distributed power generation and energy storage system and implement demand-side management through smart grids
- Promote corporate transformation and establish a global energy conglomerate whose core competitive advantage is its energy network

Adopter of Smart Living

- Satisfy customers' diverse electricity needs by making use of new technologies to provide positive and personalized services
- Combine the smart grid with smart home appliances and buildings to enhance the convenience and quality of life for the general public
- Use smart meters and big data to understand customer behavior in electricity consumption; provide value-added services so that customers can apply smart technology when using electricity, thus achieving energy conservation and carbon reduction.
- Combine the smart family energy management system with various approaches of demand-side electricity management and increase the effectiveness of electricity consumption

Agent of Environmental Friendliness

- Develop renewable energy, and improve the safety of grid connections for renewable energy
- Establish an attitude of sustainability and attach importance to ecological conservation to implement environmentally friendly policies
- Increase the share of low-carbon power generation and dedicate ourselves to the reduction of carbon consumption and emissions, and gradually transform into a green enterprise
- Encourage energy conservation and promote electricity consumption efficiency
- Strengthen the security of nuclear power plant decommissioning and the final disposal of spent nuclear fuel & low-level radioactive waste

Practitioner of Corporate Social Responsibility

- Emphasize corporate governance and the shaping of corporate ethics
- Promote corporate humanistic culture, deepen social care, and create a community of co-prosperity
- Establish a proactive, mutually caring, and discipline-oriented industrial safety culture
- Establish diverse communication channels to build trust and develop win-win relationships between Taipower and the general public

Performance of Sustainability

Environment

- Released the first Taiwan Power Company ***Environmental Policy White Paper***
- First reuse of coal ash from power plants and won the first ***Taiwan Circular Economy Awards***
- Taipower Headquarters building received a platinum rating from ***Leadership in Energy and Environmental Design (LEED)***
- Obtained ***17,113*** renewable energy certificates (accounting for more than ***50%*** in the national total)
- The number of renewable energy, grid-connected projects reached ***18,625***
- Guarded air quality by voluntarily reducing loads and emissions ***995*** times
- Reuse rate of coal ash reached ***82.9%***

Society

- The number of participants in education and training sessions reaching ***63,990***
- Employees obtained a total of ***4,252*** professional certificates
- Taipower's industrial safety and health expenditure is approximately NT$***313,814,000***
- The ratio of work reinstatement after parental leave is ***96.91%***
- Score for customer satisfaction in 2018 is ***95.5*** (out of 100)

Governance

- ***No. 1*** in Corporate Governance Evaluation for state-owned enterprises for three consecutive years
- Taipower won the Top 50 Taiwan Corporate Sustainability Awards - ***Platinum Award for Energy Industry Division***, the General Performance ***Top 50*** Award, and the ***Talent Development Award***
- Taipower was the first state-owned enterprise in Taiwan to win the ***Asia Responsible Entrepreneurship Award***
- Net amount of generated and purchased power: ***233.3 billion*** kWh
- System Average Interruption Frequency Index was ***0.227*** times/household

Transition of Energy and Implementation of a Smart Grid

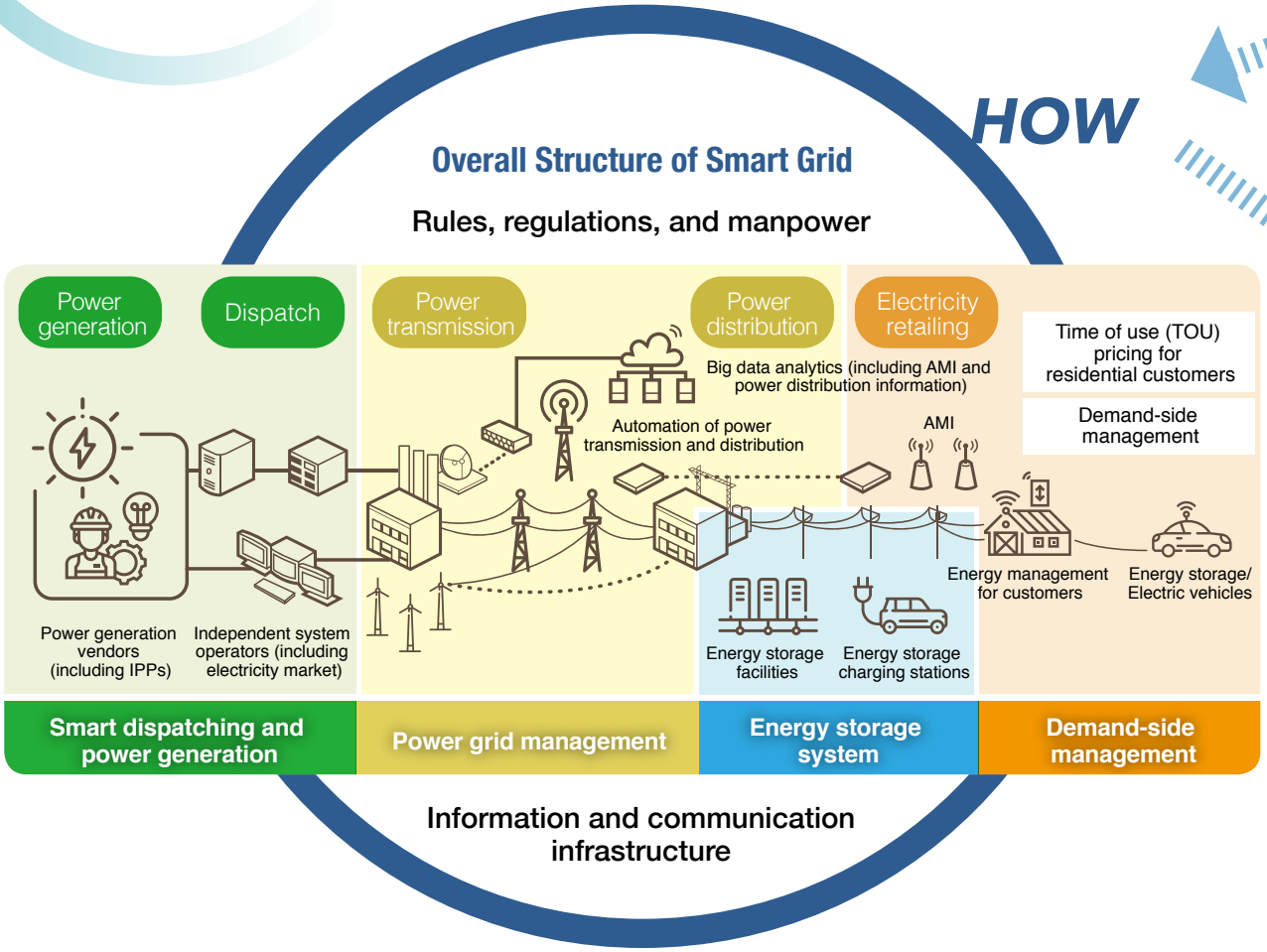
In response to the challenging task of energy transition, Taipower will gradually build up the software and hardware facilities required for a smart grid. Currently, the Company has formulated six major themes including smart dispatching and power generation, power grid management, energy storage systems, demand-side management, information and communication infrastructure and rules, regulations, and manpower. The Company will fully promote the smart grid, which integrates IoT and big data into the four areas of electricity generation, transmission, distribution, and sales.

WHY

- During the traditional process of power transmission, customers and small, renewable-energy power-generating facilities are unable to report back to the independent system operator on real-time demand and the state of electricity consumption.
- As renewable energy is developing rapidly, a large number of renewable energy sources with intermittent power generation will be connected to the traditional power grid system. If information is not circulating between the two, it is likely that the limit of the regional power grid's operation will be exceeded due to sudden increases in the volume of power generation or voltage. If this occurs it will result in difficulties with power dispatching.
- To maintain the supply equilibrium of electricity, Taipower needs to construct a modern system – a smart grid, more than ever.

HOW

Overall Structure of Smart Grid



Work schedule of the smart grid	Initial construction	Promotion and raising awareness
	2011~2015	2016~2020

Energy Generation

Taipower is committed to increasing the percentage of grid-connected capacity for renewable energy. Artificial intelligence and big data are utilized to strengthen predictive and analytical abilities for electricity demand consumption. The scheduling of operations for power-generating units may be done through smart dispatching, which solves the problem of renewable energy intermittency and will eventually achieve equilibrium in the supply and demand of the electric power system.

Energy Storage

When the percentage of renewable energy increases, energy storage will transform intermittent renewable energy into stable and easily dispatched electricity; if there is an oversupply of renewable energy, it is possible to store the extra power for release later when the electricity generation is insufficient.

Stable Power Supply

WHAT

Energy saving

Energy-saving awareness campaigns for electricity customers are launched to encourage the use of smart meters and smart home appliances. The campaigns are intended to help customers understand the calculation of electricity bills, usage analysis, and energy-saving advice. Taipower can also obtain data on peak hours through this campaign allowing the Company to encourage customers to reduce electricity consumption during the peak hours and transfer some electricity usage to off-peak hours. This way, electricity usage is balanced, line loss reduced, and energy saved.

GOAL

Two-way communication is made possible between the end of power delivery and the end of power consumption so as to ensure stable supply of electricity

The communication system includes energy generation, energy storage, and energy saving. With the introduction of advanced information, communication technology and equipment, renewable energy management systems, the Internet of Things, big data analytics and other analytical technologies, Taiwan is able to build a smart power grid that makes good use of green energy, is high-quality, highly efficient, and environmentally friendly.

Wide application

2021~2030

A Century of Power Generation and Reviving Humanistic Spirit

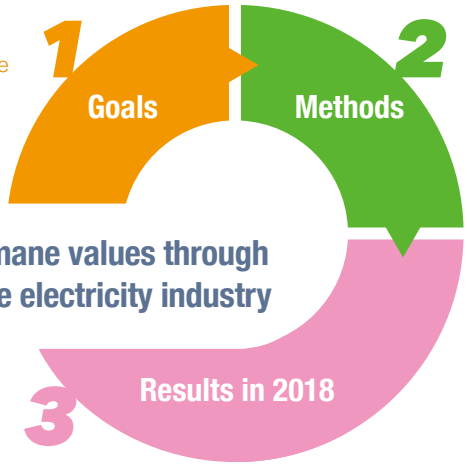
Since Taiwan's first electric lamp was lit in 1888 and the first hydroelectric power plant was opened in 1905, Taipower has seen more than a century of electricity development. With the industrialization of Taiwan and the popularization of electricity, Taipower has gradually built up power plants and facilities throughout Taiwan. In doing so, the Company has become an important cultural asset in the island's history.

In the past, the responsibility for saving Taiwan's historical heritage was scattered between different organizations and units. Then, two years ago, Taipower started a Preservation and Maintenance of Vital Cultural Heritage Project. This led to the establishment of a dedicated unit for historical documentation and data. After two years of planning, Taipower launched an exhibition on Power Infrastructure as Landscape: Taiwan Power's Cultural Heritage in 2018. The exhibition was critically acclaimed and a dedicated book depicting Taipower's history and related literature was published, allowing the general public to witness the achievements and architecture of Taipower.

Taipower is committed to fulfilling its social responsibilities and has dedicated itself to social welfare and charity. For the 2018 Taichung World Flora Exposition, Taipower recruited more than 1,000 volunteers to serve the public who visited the exposition. This demonstrated Taipower's humanity and care for society, in contrast to the stereotypical image of engineering culture commonly associated with the Company by the public.

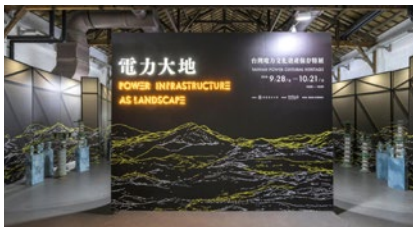
- Conduct in-depth research related to heritage areas
- Develop a thorough understanding of the history of Taiwanese cultural heritage
- Communicate with the society through cultural heritage
- Preserve all types of cultural heritage

Cultivating humane values through a century of the electricity industry



- Established the Project of Preservation and Maintenance of Vital Cultural Heritage
- Established the Historical Documentation and Data Unit within the Secretariat
- Inventory and study cultural heritage and establish management mechanisms
- Promote related tasks and inventory all levels and units
- Hold seminars and exhibitions

Power Infrastructure as Landscape Special Exhibition



Five major themes

- River Landscape
- Watershed Landscape
- Landscape of the Voices
- Mountain Landscape
- Museum of Memories

Events

- Inventory the cultural heritage of hydroelectric power plants
- Set up exhibition and preservation spaces for cultural and historical heritage
- Learn about power tower climbing
- Make a power tower model out of soft candy

Effectiveness

The exhibition took place at Warehouse No. 3 in the Songshan Cultural and Creative Park. Approximately 20,000 people visited the exhibition, and the Facebook page of the event reached more than 170,000 people; wide media exposure and campaigns in print, radio, and online media were launched, and there were 30 media reports.

A breath of new life in Taipower's old buildings

The team which rented the old buildings fused their building structure with design styles commonly seen in Taiwan during the 1950s and 1960s. In January 2019, the old buildings were redesigned and repurposed as compound spaces containing light meal bistros and office spaces. Through a series of humanistic seminars and forums, memories of communities bygone eras are coming back.

A makeover for habitats containing old trees and transformation of the areas into recreational spaces

This was a self-initiated habitat improvement for the sacred garlic pear (Crateva religiosa Forst. f.) and included an overall makeover of the surrounding environment. The surrounding fence was torn down and the electricity facilities were moved. A floral space and an open-air bench were put in place with no excavating involved. Taipower made efforts to bring the area's beauty to life and won the first "Taipei Tree Preservation Award" for its efforts.

Taipower's volunteer group of 1,000 people served as elite helpers at the Taichung Flora Exposition

Formation of six major working groups → **Recruited a volunteer group of 1,000 people** → **Taipower employees became part of a 2,160-hour live action commercial for the Company**

The 2018 Taichung World Flora Exposition, which kicked off in November 2018, required the participation of approximately 20,000 volunteers. In response to the vision of transforming Taichung into a "volunteer capital," about 1,000 employees formed a Taipower volunteer service group and engaged in volunteer work at the exposition. This was a great opportunity to show Taipower's support and passion for the 2018 World Taichung Flora Exposition and Taichung City Government, and enhanced the corporate image of the Taiwan Power Company.

For every time slot, there were 18 Taipower volunteers spread throught the main exhibition area. Taipower staff accounted for 7% of all volunteers in the main exhibition area. Volunteers were equipped with accessories such as Taipower signature visors and sleek leather waist packs.

Six major working groups were formed by Taipower units located in Taichung. These included a manpower group, a volunteer dispatching group, a general affairs group, an image and publicity group, a procurement group, and an execution & contact group.

Upgrading Techniques and Preserving Air Quality

Thank to technological innovation, Taipower has constantly improved the efficiency of its power plants and reduced air pollution emissions. In recent years, Taipower has invested over NT$60 billion in northern, central, and southern Taiwan to improve air pollution prevention equipment in power plants. In 2018, Taipower fully supported the central and local governments, and adopted load reductions at coal-fired power plants when the air quality was poor, and when the electricity supply was assessed as being sufficient. As of January 2019, Taipower had continued to fulfill its responsibility

Status quo:
Reduced air pollution emissions every year

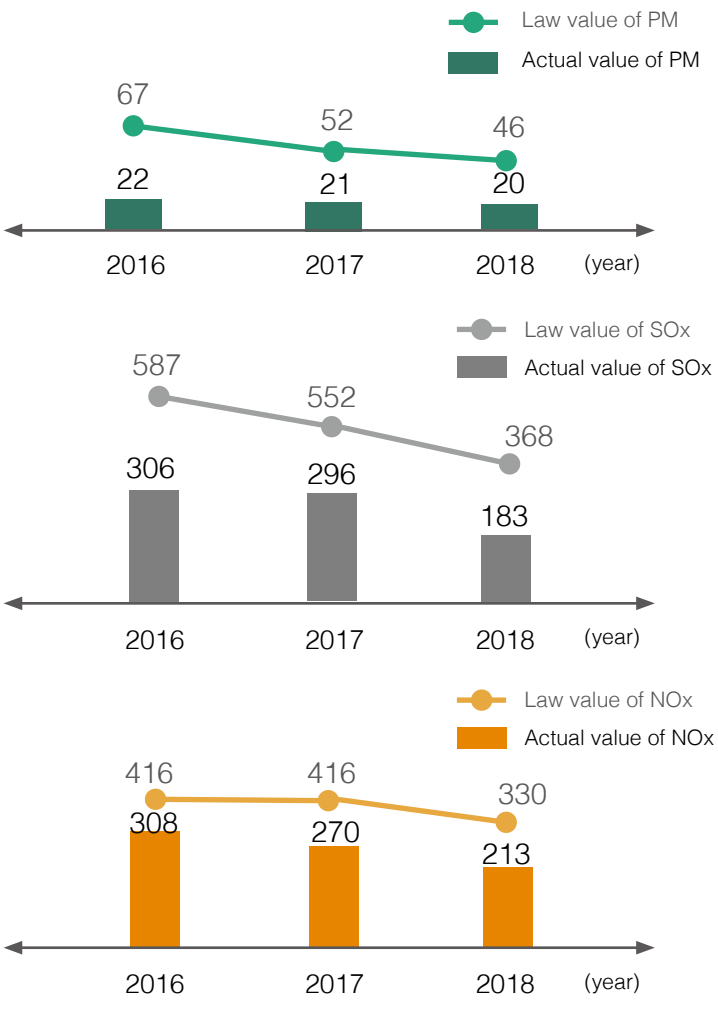
For three consecutive years, Taipower's actual air pollution emissions have been far lower than the statutory minimum values and have been declining year by year. To continue these improvements, Taipower continues to introduce various air pollution improvement measures and strengthens management.

Short-term countermeasures

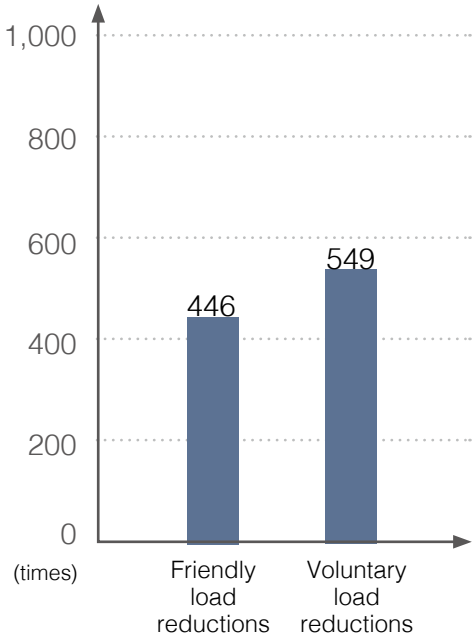
In order to improve air pollution prevention, after having assessed that the power supply was secured, Taipower completed its goal of reducing loads and emissions in 2018 during periods when air quality might have worsened.

Stable reduction in air pollution emissions

Unit: kg/GWh



Number of load reductions in 2018



to provide a stable supply of electricity while completing 995 load reductions to cut emissions. Taipower guards the air quality together with the public. In the future, Taipower will continue to manage air pollution at its source, adjust its power generation structure, make renewable energy development a first priority, and gradually replace coal-fired power plants with gas-fired power plants in order to provide stable and clean electricity.

Medium-term to long-term improvement measures

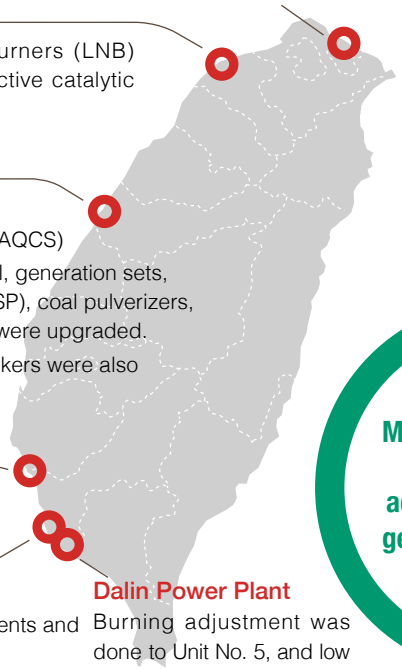
In addition to its short-term countermeasures, Taipower also manages air pollution at its source by seeking to construct the infrastructure for low-carbon power generation. In addition to upgrading the facilities of existing power plants, the Company will develop renewable energy sources as a first priority. Moreover, the Company will create an environment in which grid-connections are easy, and increase the ratio of gas-fired power plants to reduce emissions.

Managing emissions at source and adjusting the power generation structure

Complete upgrades of existing power plants

Xiehe Power Plant
Used low sulfur (less than 0.3%) fuel oil

Datan Power Plan
Replaced low NOx burners (LNB) and facilities with selective catalytic reduction (SCR)



Taichung Power Plant

- Upgraded and improved its Air Quality Control Systems (AQCS)
- During the period of overhaul, generation sets, electrostatic precipitators (ESP), coal pulverizers, and low NOx burners (LNB) were upgraded.
- Two A-frame indoor coal bunkers were also constructed.

Xingda Power Plant
Upgraded facilities with selective catalytic reduction (SCR)

Nanbu Power Plant
Replaced core components and low NOx burners (LNB)

Dalin Power Plant
Burning adjustment was done to Unit No. 5, and low NOx burners (LNB) for Unit No. 6 were replaced

Increasing the percentage of gas-fired power generation

Construction plans for gas-fired power generation including:

- Phase I plan for replacement and reconstruction at Tongxiao Power Plant
- Additional power generating units for Datan Power Plant
- Phase II plan for renewal and reconstruction at Tongxiao Power Plant
- Placement and reconstruction plan for Hsieh-ho Power Plant
- Renewal plan for Xingda Power Plant
- An expansion plan for generating units at Taichung Power Plant

Developing renewable energy as a first priority and creating a friendly environment for grid connection

In addition to actively deploying renewable energy such as offshore and onshore wind turbines, solar power, geothermal and micro-hydroelectric power generation, Taipower is continuing to strengthen power grid construction and creating a friendly grid-connected environment so that the private sector can apply for renewable energy developments. Taipower has done its best to promote renewable energy development.

Expected reduction

- PM reduced by ***398*** tons/year
- SOx reduced by ***9,118*** tons/year
- NOx reduced by ***14,080*** tons/year

1 Taipower and Sustainability

Economic and Financial Capital Implications for Taipower

As a state-owned power utility, Taipower has been the driving force behind Taiwan's economic development and continues to play a pivotal role in energy transition and government policy implementation. In this role, it is necessary to maintain a balance between reasonable electricity rates, energy quality and energy security. To this end, Taipower needs to maintain a stable corporate governance system and continually improve its financial efficiency. With sound utilization of financial capital and investment planning, Taipower is able to establish a foundation for sustainable operations so that it can bear the responsibility of national energy planning and household energy use. Taipower does this while moving towards its goal of becoming a world-class power utility group.

SDGs	Connections between SDGs and Taipower	Associated sections and issues
8 DECENT WORK AND ECONOMIC GROWTH	Achieving full and productive employment and decent work for all, including the younger generation and those physically/mentally challenged. Following the principle of equal pay for equal work, promoting occupational safety and protecting labor rights.	– Corporate Transformation – Operational Performance
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	Improving the energy efficiency and resilience of power infrastructure. Adopting clean technology and improving the grid connection of renewable energy. Improving the resilience and reliability of power grids and promoting the innovative development of eco-friendly technologies.	– Corporate Transformation
16 PEACE, JUSTICE AND STRONG INSTITUTIONS	Emphasizing corporate governance, integrity management, and information disclosure. Ensuring smooth flow of communication and ensuring inclusive and representative decision-making at all levels.	– Corporate Governance – Stakeholders and Material Topics

Principal Investments

- Implementing sustainable business governance and planning across 8 general strategies for the future
- Established a Sustainable Development Commission (SDC) to promote 3 aspects of planning including management, environment and society
- Planning three stages of corporate transformation and preparing to transform into a holding company by 2026
- Implementing risk assessment and response planning to ensure operational stability

Performance Highlights

- Won the Social Empowerment Prize at the ***Asia Responsible Entrepreneurship Awards 2018***
- Ranked ***Number 1*** by the ***Corporate Governance Evaluation of State-run Enterprises*** for three consecutive years
- The average attendance rate at Board of Directors meetings was ***93.6%*** for directors, and ***97.2%*** for independent directors

Future Plans

Taipower will continue to enhance its financial efficiency and keep cost and electricity rates reasonable by improving operational efficiency, developing diversified businesses, improving procurement performance of fuel and controlling operation and maintenance costs. In the future, Taipower will continue to devote itself in transforming into a holding company and achieving its goal of becoming a prestigious world-class power utility group.

Awards and Recognition

Sustainable Governance

- The *2018 Social Empowerment Prize at the Asia Responsible Entrepreneurship Awards*. Taipower was the first state-owned enterprise in Taiwan to win the award
- The *2018 Common Wealth Magazine Corporate Citizen Award* in the large-scale enterprises category
- The Platinum Award at the *2018 Taiwan Academy of Corporate Sustainability Awards* for the energy industry, a TOP50 Corporate Sustainability Award, and a People Development Award. An Excellent Movie award at the *2019 Taipei Golden Eagle Micro-movie Festival* along with awards for Best Original Script, Excellence in Cinematography, Excellence in Social Inclusion, and Excellence in Environmental Resources
- First Prize at the *2018 National Brand Yushan Award*'s, held by Republic of China Enterprise Competitiveness Development Association
- *The highest level (Platinum) of certification from Leadership in Energy and Environmental Design (LEED)* and the highest honor *Platinum Award* for Excellent Intelligent Green Building Renovation from the *2018 APIGBA Awards*
- A series of awards from the Ministry of Labor's Sports Administration in 2018: a *Sponsorship Award – Gold Class*, a Sponsorship Award – Long-Term Sponsorship and a *Promotion Award Gold Class*
- The *First Tree Benefit Award* for Authority Management, from the Department of Cultural Affairs, Taipei City Government
- The *Silver Award* from the Environmental Protection Administration (EPA)'s *27th ROC Enterprise Environmental Protection Awards*

Construction Management

- At Asia Power Magazine's *2018 Asian Power Awards*, Taipower won the *gold award* for Transmission & Distribution Project of the Year, the *gold award* for Gas Power Project of the Year, the *gold award* for Nuclear Power Project of the Year and *silver awards* for Power Plant Upgrade of the Year and Smart Grid Project of the Year
- The *2018 Gold Medal for Public Works* awarded by the Executive Yuan's Public Construction Commission
- The Chinese Taipei Society for Trenchless Technology's *2018 Excellent Trenchless Technology Award*

Operations Management

- *Ranked Number 1* by the Ministry of Economic Affairs' *Corporate Governance Evaluation of State-owned Enterprises* for three consecutive years
- Ranked 13th in Cheers Magazine's 2018 annual survey on the "*Top 100 Favorite Enterprises Among the Young Generation*" and retained the *number 1* spot among public services
- *First Prize* from the Ministry of Education's *2018 Central Government Promotion of Employee Learning Systems*
- *First Prize* in the Ministry of Economic Affairs' Department of Personnel's *2018 Personnel Affairs Performance Evaluation of the State-owned Enterprises and Institutions Group*

1.1 Taipower Profile

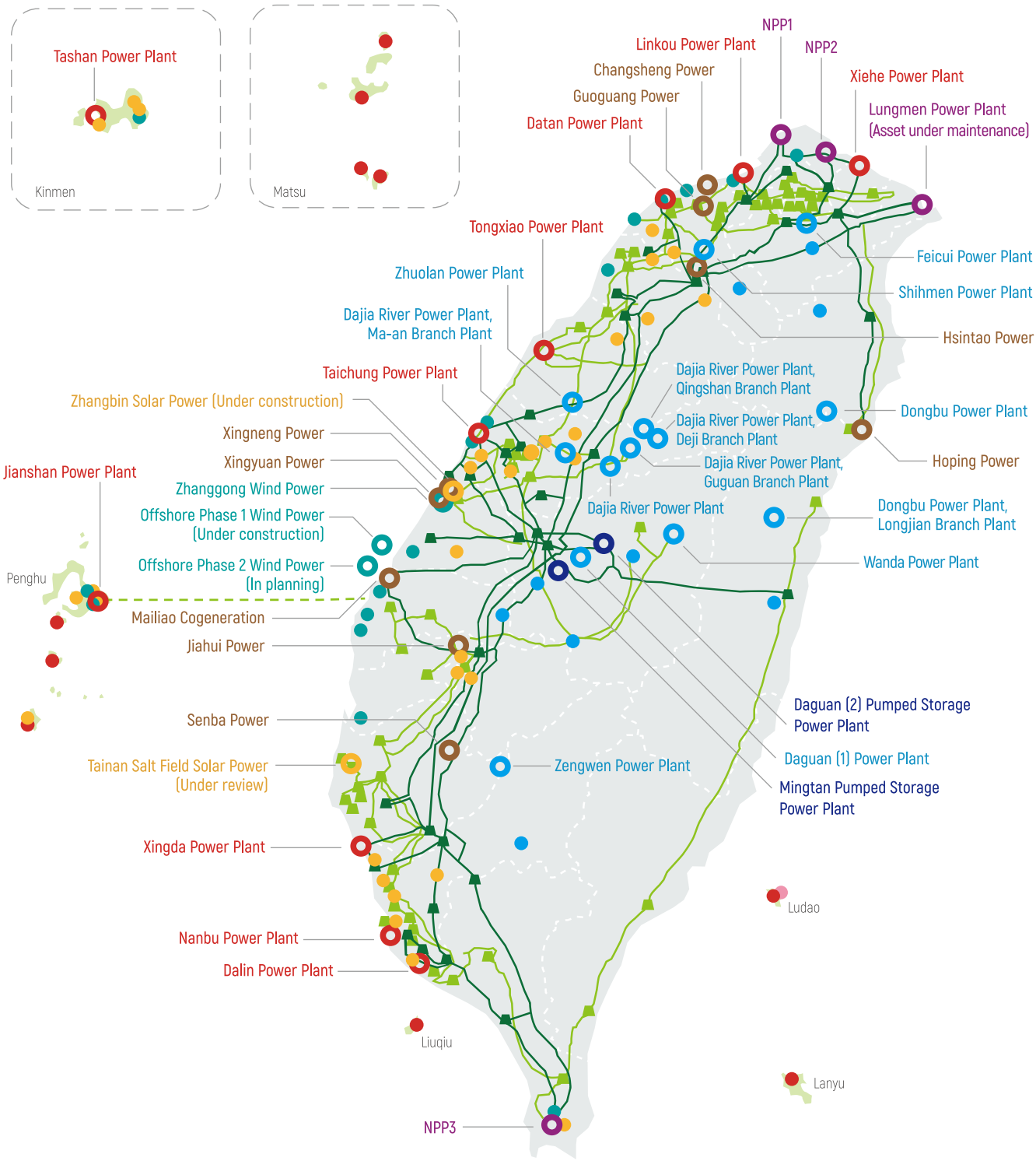
1.1.1 Introduction

The Taiwan Power Company (Taipower), established on May 1, 1946, is a vertically integrated, state-owned enterprise engaged in the generation, transmission, distribution and sale of electricity. Revenue from electricity sales accounted for 90% of Taipower's annual revenue in 2018. As of 2018, the Taipower system (including independent Power Plants, IPPs) had a total installed capacity of 44.51 GW from different energy sources including hydro, renewable energy and thermal. There were 615 substations operated by Taipower, 17,737 circuit kilometers of transmission lines and 375,265 circuit kilometers of distribution lines.

Like much of the global power industry, Taipower is focused on the trend of developing sustainability in the electricity market of the future. Taipower has revised its corporate mission in recent years and promoted organizational transformation. In January 2016, the Company established four business divisions, namely, the Power Generation Division, the Nuclear Power Division, the Transmission System Division, and the Distribution and Service Division. As a result, 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 into a holding company which aims to promote market competition, enhance business operation efficiency and promote corporate sustainability. This will allow Taipower to become a prestigious, world-class power utility group that provides its customers with the highest quality of service.

Founded	May 1, 1946
Coverage	Taiwan, Penghu, Kinmen and Matsu areas
Headquarters	Taipei
Capital	NT$ 330 billion
Stock	96.92% government-owned; 3.08% private owned
Total Assets	NT$2,028.178 billion
Operating Revenue	NT$587.56 billion
Employees	26,962
Customers	14.2 million
Installed Capacity	44.51 GW in the Taipower system Taipower-owned: 33.16 GW
2018 Power Generated and Purchased	233,289 GWh

1.1.2 Taipower's Power Plants and Power Grid



1.1.3 Mission and Vision

The power industry is faced with an "energy trilemma," as it seeks to achieve three goals: energy quality, energy security, and environmental sustainability. In response to global climate change, domestic energy transition, and the competition resulting from the liberalization of the electricity market, Taipower revised its corporate mission, vision and management philosophies in 2015. It is expected that these changes have headed Taipower in the right direction and that the employees will continue to hold positive attitudes at work allowing the Company to transform into an excellent and sustainable power utility group.

Our Mission

To supply stable and eco-friendly power at a reasonable cost to support economic and social development

Power is a crucial cornerstone of people's daily lives and corporate growth. Thus, power reliability has always been a fundamental mission for the Company. Taipower incorporates IPPs, cogeneration and renewable energy suppliers into its power supply system to ensure delivery of reliable electricity at a reasonable cost. To advocate for eco-friendly development, Taipower will continue to actively develop renewable energy and remains commited to introducing low-carbon, clean energy. In response to the competitive market, Taipower is strengthening its customer relationship management. To deal with the varying needs of residential and corporate customers, Taipower will deliver differentiated services through specific technologies and smart services that enable customers to lead more convenient lives.

Our Vision

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

- **Excellence:** Taipower will endeavor to improve its management and business performance in order to compete with international benchmark power companies while constantly improving itself so that it can grow along with its customers and society. This will allow the Company to evolve into an outstanding and sustainable power utility group.
- **Trustworthiness**: Earning the public trust has long been a top priority. As a company, Taipower maintains a professional, down-to-earth, diligent and responsible attitude. As the organization strives to improve its operations and the reliability of the power supply, it is seeking an open, diverse, green and culture-oriented attitude toward enhancing corporate governance. Guided by the philosophies of integrity, caring, service and growth, Taipower will build stakeholders relationships based on mutual assistance and trust so as to become an indispensable partner of the public.
- **A world-class power utility group**: Taipower will continue to aggressively develop its corporate and associated operations in order to cultivate competitive advantages and face the wave of electricity market liberalization. Taipower will capitalize on opportunities for business expansion into emerging sectors such as energy saving and green energy. Collaborating with business partners to enter offshore markets will also help the business grow.

1.1.4 Management Philosophy and Strategy

Management Philosophy

Taipower's corporate culture values **people first** and the **pursuit of excellence**.
"People first" conveys a sense of **integrity** and **caring**.
"In pursuit of excellence" conveys a sense of **service** and **growth.**

To conduct business cleanly and without forgery or violation of laws and ethics; to build mutual trust within teams through communication; to be genuine and keep the promises in order to gain the trust of employees and of the public.

To take initiative to understand the needs of people, the environment and society and to fulfill our corporate social responsibilities of caring, green sustainability, altruism and co-prosperity.

To supply safe and reliable power and to provide accountable and enhanced services that gain recognition from domestic and foreign customers.

To establish an organization with a knowledge sharing culture that helps staff develop critical thinking and keen observation. By facing challenges and improve problem-solving skills, we will be able to have growth in the workplace, in teams and in our lives.

Future 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 achieve this, Taipower manages the development of green energy, the reduction of carbon emissions and the saving of energy while ensuring sustainability through the amendments to Electricity Act. Taipower conducts an annual rolling forecast review of its business strategies by examining and analyzing current operations, summarizing important factors affecting operations and accordingly setting eight strategies as a direction for the next five years. Under its general strategies, Taipower establishes 27 corporate goals and focuses on annual action plans. Through the step by step implementation of strategies and achievement of targets, Taipower continuously strengthens its structure and competitiveness.

Connections between Taipower's Strategies and Goals

8 Strategies	Goals in 2019
Stable power supply and reduction of carbon emissions	• Completing quality, major power source development plans on time • Ensuring the stable operation of power-generating units • Planning countermeasures for carbon reduction • Promoting the decommissioning of nuclear power-generating units as well as handling and processing of nuclear waste • Ensuring the safe and stable operation of nuclear power plants
Promoting the construction of the power grid	• Improving the resilience and power supply capabilities of the power grid • Enhancing dispatching of renewable energy and grid connections • Promoting the application of the smart grid
Strengthening key technologies	• Research and application of key technologies • Planning and construction of Power interchange platforms
Improving financial efficiency	• Complying with rate control mechanism and reaching the annual earnings target • Improving the provision of fuels, materials and operational performance • Controlling capital expenditure in the electricity industry • Promoting diversified businesses and investments
Transforming into a power utility group	• Planning the transformation into a holding company with subsidiaries* • Ensuring internal communication
Enhancing the value of the workforce	• Developing and passing down core talents and technology • Strengthening talent cultivation and learning effectiveness • Promoting talent assessment and strengthening the function of management
Implementing occupational safety	• Strengthening concepts of industrial safety and educational training • Establishing a mobile CCTV monitoring control system • Establishing an employee health management system • Building a healthy workplace • Industrial safety performance
Refinement of customer services	• Strengthening customer relationship management • Providing customers with value-added services • Promoting demand response and energy conservation

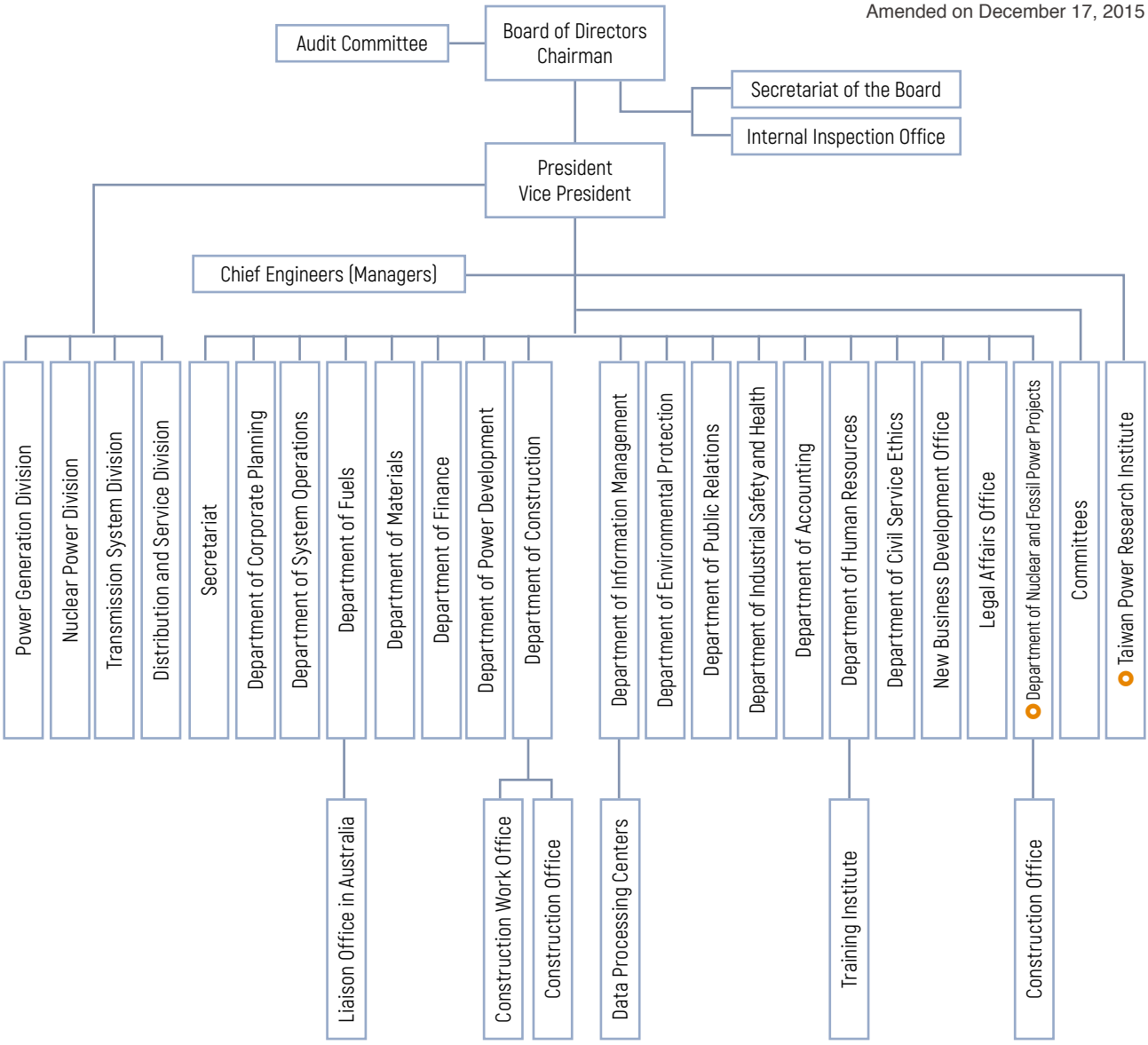
1.2 Corporate Governance

1.2.1 Organizational Structure

Currently, Taipower consists of 17 departments and offices along with four business divisions that include the Distribution and Service Division, the Transmission System Division, the Nuclear Power Division and th Power Generation Division. In addition, subordinate units such as the Taiwan Power Research Institute and the Department of Nuclear and Fossil Power Projects and commissions have been established based on the needs of specific operations. In consideration of the recent amendments to the Electricity Act, Taipower is planning its transformation into a holding company consisting of 2 subsidiaries, namely, the Generation Company (Genco) and the T&Dco with a Public Retailer.

Taiwan Power Company - Organizational Structure Chart

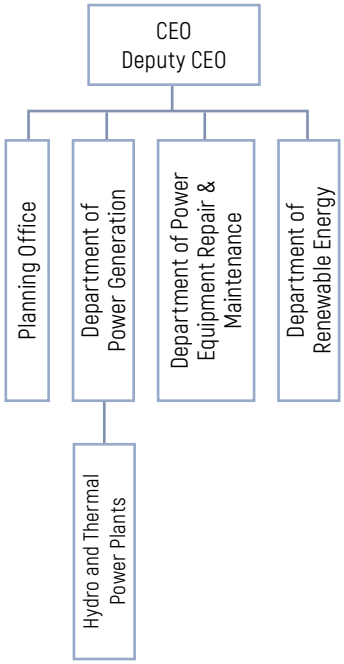
Amended on December 17, 2015



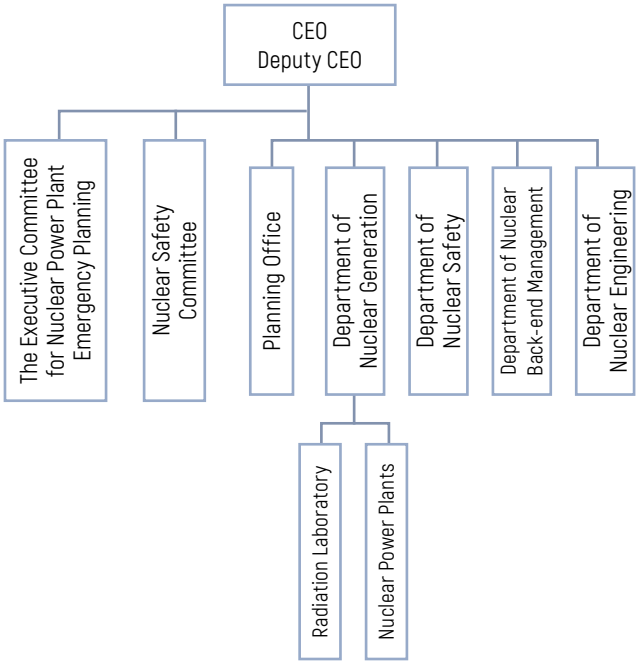
Note: 1. ○ Denotes units that are not located at the headquarters.

2. The Taiwan Power Research Institute reports to the President directly.

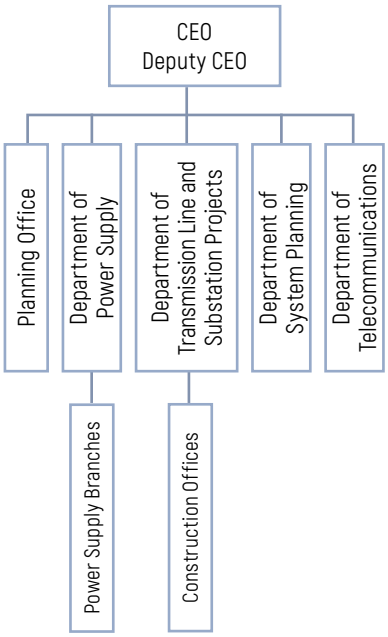
Power Generation Division Organization Structure Chart



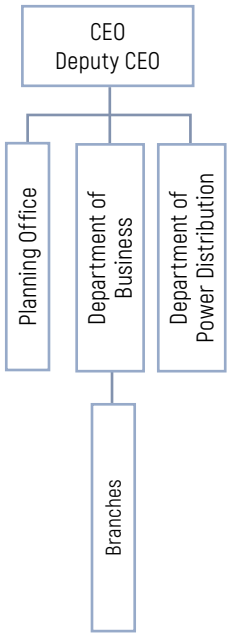
Nuclear Power Division Organization Structure Chart



Transmission System Division Organization Structure Chart



Distribution and Service Division Organization Structure Chart



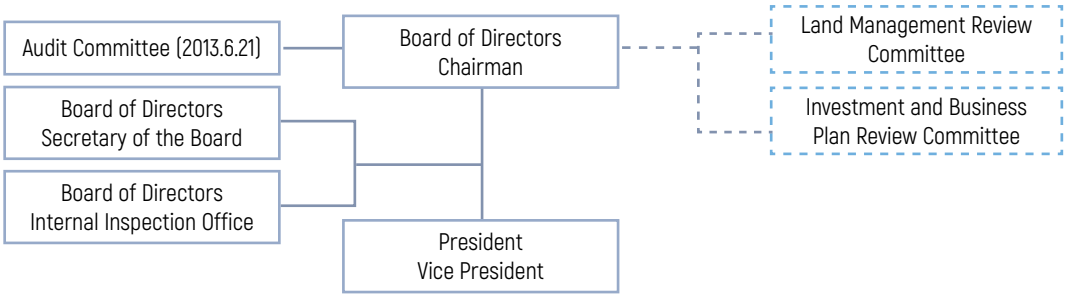
1.2.2 Board of Directors

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, and one of the elected shall be an independent director. The term of service for directors (including independent directors and managing directors) lasts for two years and are eligible for re-election. Pursuant to the Administrative Law of State-Owned Enterprises, at least one fifth of the directors of each state-run enterprise that represent state capital shall be recommended by the relevant labor union. Thus, the fifteen directors of

Taipower's board include five managing directors (one of whom serves as an independent director), three independent directors, and three labor directors that represent Taipower employees. In addition, the Audit Committee (consisting of the three independent directors) was established as the result of a Board of Director's election during the shareholders' meeting held on June 21, 2013. The Audit Committee replaced the previously-existing position of Supervisors.

Board of Directors Organization Structure Chart



Members of the 2018 Board of Directors

Title	Name	Concurrent Position	Remarks
Chairman (Managing Director)	Yang, Wei-Fuu	Chairman of Taipower	Appointed by the Ministry of Economic Affairs
President (Managing Director)	Chung, Bin-Li	President of Taipower	Appointed by the Ministry of Economic Affairs
Managing Director	Lin, Faa-Jeng	Chair Professor, Department of Electrical Engineering, National Central University	Appointed by the Ministry of Economic Affairs
Managing Director (Independent Director)	Fang, Liang-Jyi	Member of the Atomic Energy Council, Executive Yuan	Nominated by the Ministry of Economic Affairs
Director (Independent Director)	Hsu, Jyh-Yih	Professor, Department of Management Information Systems and Department of Applied Economics, National Chung Hsing University	Nominated by the Ministry of Economic Affairs
Director (Independent Director)	Liu, Chi-Chun	Professor, Department of Accounting, National Taiwan University	Nominated by the Ministry of Economic Affairs
Director	Liu, Pei-Ling (Female)	Distinguished Professor, Institute of Applied Mechanics and Director of the Center of Innovation and Synergy for Intelligent Home and Living Technology, National Taiwan University	Appointed by the Ministry of Economic Affairs
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	Appointed by the Ministry of Economic Affairs
Director	Cheng, Eng-Two	Head of the Third Division, State-Owned Enterprise Commission	Appointed by the Ministry of Economic Affairs
Director	Kuo, Chao-Chung	Senior Technical Specialist, Department of Industrial Technology, Ministry of Economic Affairs	Appointed by the Ministry of Economic Affairs
Director (Labor Director)	Liao, Chan-Ping	Taipower Technical Specialist (Taiwan Power Labor Union Representative)	Position filled by the elected representative of the Taiwan Power Labor Union and officially invited by the Ministry of Economic Affairs
Director (Labor Director)	Huang, Lien-Chung	Taipower Technical Specialist (Taiwan Power Labor Union Representative)	
Director (Labor Director)	Tsuei, Kuo-Li	Taipower Technical Specialist (Taiwan Power Labor Union Representative)	
Managing Director	Hsu, Yu-Chin	Deputy Minister of Science and Technology	Resigned in December 2017
Director	Shih, Tsuen-Hua	Director-General of the Department of Issuing, Central Bank of the Republic of China (Taiwan)	Resigned in January 2018

Note: Managing director Hsu, Yu-Chin and director Shih, Tsuen-Hua resigned in December 2017 and January 2018, respectively, and their seats have not yet been filled. As a result, the Board of Directors currently has only 13 members.

Function and Effectiveness of the Board of Directors

The Board of Directors bears responsibility for establishing and maintaining the vision of the Company, determining corporate strategies, supervising the management and being accountable to the stakeholders. As a state-owned enterprise, Taipower not only operates its own businesses, but also plays the role of public policy executor. The following section covers the operations of the Board of Directors:

Board of Directors Operations

In 2018, the Board convened 12 meetings, with an average attendance rate of 93.6% for all directors. The minutes of the monthly Board meetings are disclosed on both Taipower's intranet and official website. Meeting resolutions to be executed by respective divisions are recorded and their execution status' are tracked.

Board of Directors Project Review Meetings

The Board of Directors has established the Land Management Review Committee and the Investment and Business Plan Review Committee. Both committees are responsible for reviewing material and/or important issues proposed by relevant departments in advance and providing specific opinions to the Board before board meetings. In 2018, the Land Management Review Committee convened 8 meetings and the Investment and Business Plan Review Committee convened 11 meetings.

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 meeting resolutions during recess of the Board of the Directors. In 2018, four Managing Directors' Meetings were convened, with an attendance rate of 100% for all managing directors.

Operation of Independent Directors and the Audit Committee

Taipower's Audit Committee is comprised solely of independent directors serving on the Board. The committee is responsible for the review and approval of modification to the Company's internal control systems and their effectiveness, the acquisition and disposal of assets, the loaning of funds, the appointment/dismissal of heads of finance, accounting or internal audits, and financial reports, etc. In 2018, the Audit Committee held five meetings in total.

Pursuant to the Securities and Exchange Act, when independent directors raise dissenting or reserved opinions at Board meetings, the said opinions shall be duly noted in the meeting minutes and published on the "Market Observation Post System (MOPS)." In 2018, independent directors had an average attendance of 97.2% and expressed no dissenting or reserved opinions. They actively participated in the operation of the Audit Committee and the Review Commission and performed their duties to assist in corporate governance.

Effectiveness of the Shareholders' Meeting

Taipower held its Shareholders' Meeting on June 22, 2018 in accordance with the provisions of the Company Act and Taipower's Articles of Association. The meeting was held to report to the shareholders, acknowledge and discuss specific matters with participants, as well as elections – including the presentation of the 2017 Business Report, the Audit Committee's 2017 Financial Statement and Loss Appropriation Report, the 2016 Closure of Accounts and Loss Appropriation Report which was also reviewed and certified by the National Audit Office, the 2017 Partial Adjustments to Property, Plant and Equipment Durability Report, the 2018 Partial Adjustments to Property, Plant and Equipment Durability Report, and the 2017 Corporate Bond Report.

Performance Assessment of the Board of Directors

In order to improve Taipower's corporate governance and the efficacy of its Board of Directors, Taipower established a Board of Directors Performance assessment criteria in 2016 by referring to the Corporate Governance Best Practice Principles for TWSE/TPEx Listed Companies. At the end of each fiscal year, the Company conducts a performance assessment on the Board of Directors in accordance with the process and criteria prescribed in the procedure and reports the results of the assessment during the Board meeting in March of the following year. The performance assessment of the Board of Directors for 2018 has already been implemented in accordance with the pertinent regulations and the results were duly disclosed through the Board of Directors section of Taipower's official website.

With the guidance and supervision of the Board Directors, Taipower continued to strengthen its internal control systems for corporate governance in 2018 by implementing three defense mechanisms for internal control. This initiative led to Taipower being honored with the Number 1 ranking in the corporate governance evaluation for state-owned enterprises.

Disclosure and Transparency of Corporate Governance Information

Information on the organizational structure of the Board of Director and the Audit Committee as well as details of the operation of the Board are disclosed in the Board of Directors and Corporate Governance sections of Taipower's official website. The information was also added to the 2019 Taipower Annual Report to the Shareholders' Meeting and disclosed on the Market Observation Post System (MOPS).

Continuing Education for Directors

In 2018, a total of 33 directors (including independent directors) participated in corporate governance related training courses. Attendants completed a total of 126.5 training hours. The corporate governance topics of the courses, forums, and seminars included finance, risk management, sales, commerce, legal affairs, accounting, and CSR, among other subjects.

Planning of Future Operations of Board of Directors

To ensure improvement in the operational performance of the Board of Directors, the following plans have been made for 2019:

Improving Directors' Knowledge and Understanding of Taipower's Operations

To increase awareness of business initiatives and significant issues of public concern, Taipower will arrange for 2-3 presentations during monthly board meetings with a rolling forecast review of monthly topics. Adjustments may be made to the presentation schedule at any time depending on the actual operational needs. In the near future, Taipower will continue to arrange for directors to visit/inspect the sites of the Company's major projects. The management will also invite directors to participate in relevant task forces so they can offer consultation on relevant issues and in order to raise the directors' awareness of Taipower's operations and ensure their professional input is included in the decision-making process.

Continual Improvement of the Performance Evaluation System

Taipower will keep abreast of local and global trends in corporate governance so as to implement continual reviews and improvements to its performance evaluation system for the Board of Directors and the aforementioned commissions. This will help the Company move towards an ideal performance evaluation system, which in turn will boost Taipower's efficacy in corporate governance.

Mechanism to Recuse 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 interest. 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 (i.e., 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 labor directors 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 many not collect the remuneration paid to other directors. In 2018, the remuneration for Taipower directors (including the chairman, independent directors and labor directors) constituted 0.04% of the Company's net income after tax.

1.3 Corporate Sustainable Governance

1.3.1 Sustainable Development Commission

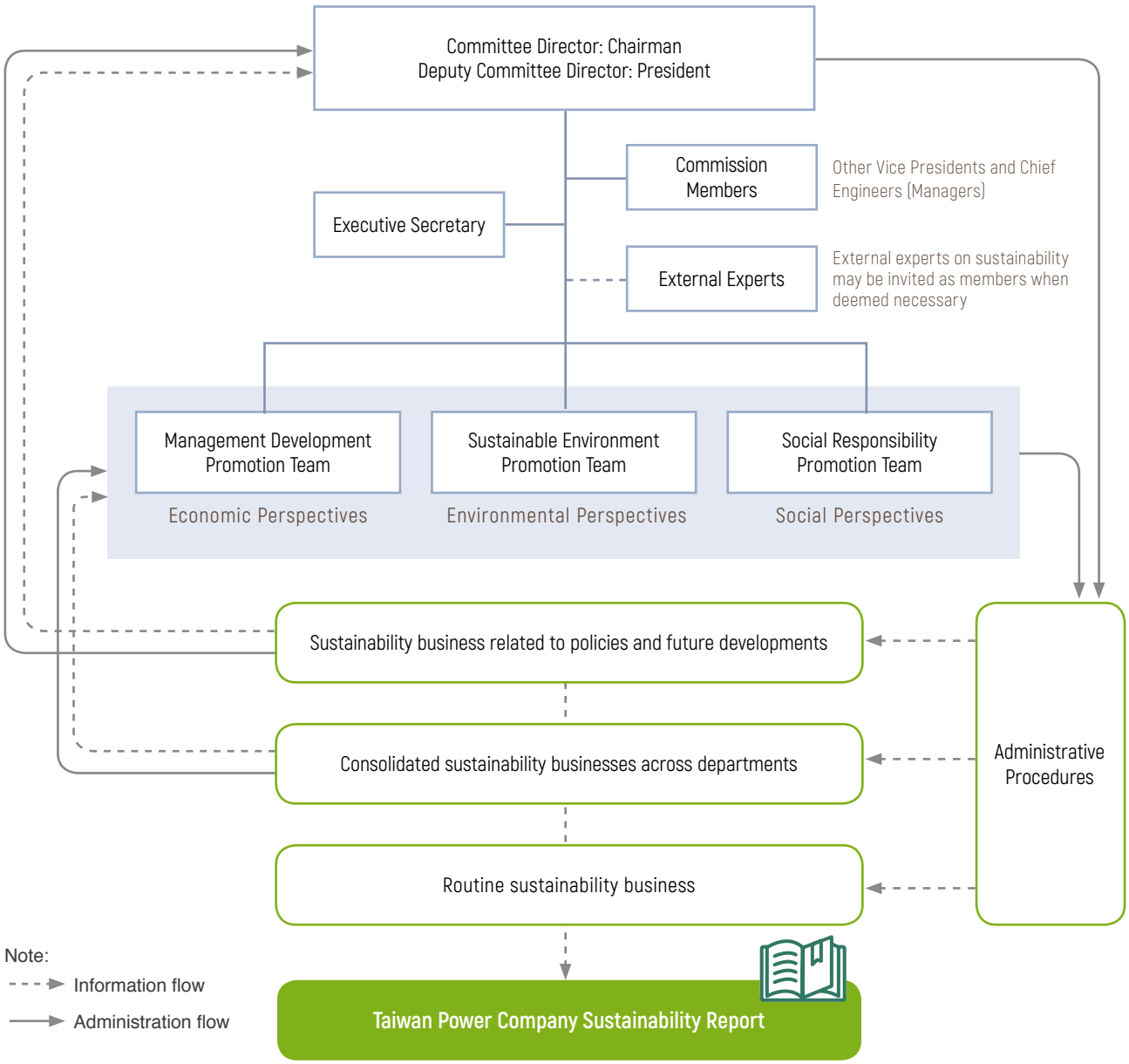
In 2009, Taipower established a Sustainable Development Commission (SDC) dedicated to sustainable development programs and initiatives. To ensure the SDC are more aligned to Taipower's needs for sustainable development, adjustments will be made to its structure and functions after approval by the Chairman.

Sustainable Development Commission Structure and Formation

The Chairman is the person in charge of the SDC as it leads Taipower toward sustainable development. The President serves as the SDC's Deputy Director and the membership of the commission is composed of the Company's Vice Presidents and Chief Engineers (Managers). This ensures a top-down approach to 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.

Structure of Sustainable Development Commission



Operating Mechanisms of the Sustainable Development Commission

The SDC is responsible for making long-term development strategies and steering the Company on the right path by identifying critical issues. The SDC reports on its strategies and plans in management meetings and annual business review meetings. These meetings aim to integrate resources across departments and assure effective negotiations over critical issues. In addition, the SDC is responsible for setting specific mid-term objectives and their corresponding strategies, as well as action plans and solutions to achieve those objectives. These plans are incorporated into the annual Future Management Strategies Report which states Taipower's overall strategies and objectives as well as operational issues and action plans that concern sustainable development. The report also reviews the rolling plan for Taipower's future development. After future management strategies have been reviewed in management meetings, task forces carry out short-term annual strategic action planning and update their progress status regularly.

Task forces meetings, management meetings and the SDC are responsible for short, medium and long-term strategic planning and execution, respectively. Their responsibilities and performance in 2018 are shown below.

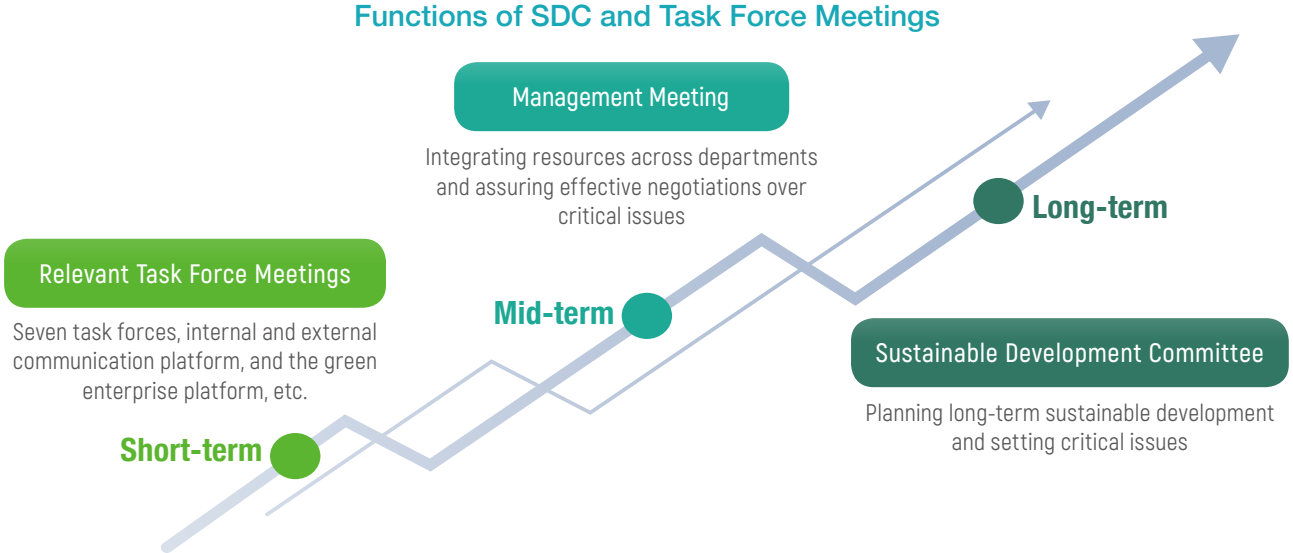
Strategic Category	Meeting Responsible	Responsibilities	Operational Performance in 2018
Medium/Long-term strategy	Sustainable Development Commission	Planning long-term sustainable development and identifying critical issues	3 meetings were held
	Management Meeting	Formulation and execution of mid-term management strategies	20 meetings were held (once a fortnight)
Short-term strategy	Task force meeting/ project platform	Formulation and execution of short-term annual strategies	Irregular meetings held by each task force

In 2018, the SDC held meetings to discuss the following topics – Restoration Strategies for Monuments and Historic Buildings, Future Operational Strategies (2019-2023) and Environmental impact assessments of Future Thermal Power Plants.

First of all, in the aspect of social communication, Taipower actively promotes the preservation of cultural heritage based on the responsibility of historical inheritance and sustainable management. Taipower values cultural relics and historical files in hope of serving as the media center to spread information on corporate sustainable development and increase public awareness of sustainability. In the aspect of the operation, in response to global trends and the Amendments to the Electricity Act, Taipower values the innovation of each business unit and market liberalization, and discusses future adjustment in organization. In regard to promote sustainability, Taipower actively contributes to environmental protection which is not only a global trend but public opinion. To cope with rising public expectation, Taipower will deal with environmental issues cautiously and properly.

With regard to sustainable development, Taipower plans to transform from "power supplier" to "energy networks integrator" and from "service industry" to "smart industry". Taipower manages to provide smarter services, develop closer customer relationship and become a responsible and irreplaceable power industry.

Functions of SDC and Task Force Meetings



Operating Mechanisms of the Sustainable Development Committee

With three functional teams, the SDC is able to analyze changes in the external environment and policies. Based on this analysis, the SDC plans Taipower's long-term sustainable development and identifies critical issues that will be reviewed and commented on by Vice Presidents and external experts. Under the guidance and supervision of the Chairman, the SDC also summarizes its annual achievements.

The routine business of each team is executed in line with Taipower's administrative procedures. When it comes to cross-department business, coordinators arrange meetings for discussions and conclusions in accordance with Taipower's bylaws. Key issues concerning corporate strategy and future development are submitted to the SDC for resolution.

Key Tasks of the SDC

Management Development Promotion Team

The Management Development Promotion Team devotes itself to management planning and reforms. It assists Taipower to become a world-class power utility group and to pursue excellence. The group gives Taipower guidance and direction by establishing corporate vision and philosophy, management structure and planning. In addition, the team carries out management improvements, power industry liberalization, organizational transformation and diversified management so as to strengthen Taipower's corporate operations.

Sustainable Environment Promotion Team

The Sustainable Environment Promotion Team is committed to helping Taipower build a green corporate image, develop low-carbon energy and fulfill its mission of being eco-friendly. The team formulates environmental policies, plans environmental goals, and takes measures to make the Company more eco-friendly.

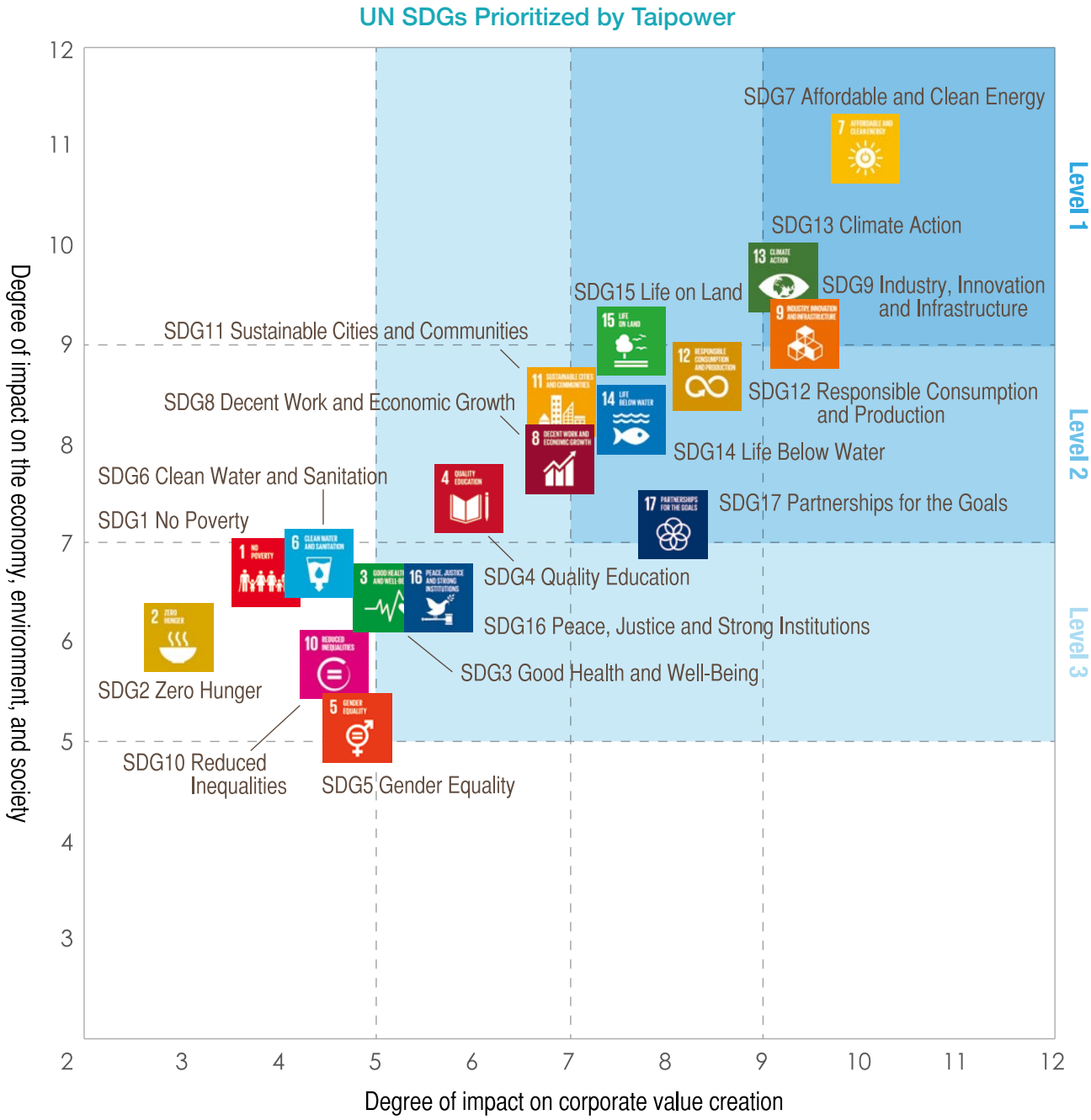
Social Responsibility Promotion Team

The Social Responsibility Promotion Team has two primary roles. First, the team helps Taipower implement its principle of "putting people first" by enhancing com-pany culture through cultural (e.g. the gallery) and employee care activities (e.g. Employees' Heart-to-Heart). Second, the team helps Taipower build corporate citizenship and make contributions to social charities by increasing social engagement.

1.3.2 Sustainable Development Strategies and Goals

Taipower's"Future Business Strategy" builds a business blueprint and states Taipower's major tasks and action plans for long-term development based on future directions and critical issues.

To build consensus, Taipower organized an SDG training camp in February 2019. The camp brought together planners and colleagues from each business unit to study and prioritize goals from among the 17 Sustainable Development Goals (SDGs) announced by the UN in 2015. Through the camp, the Company gained a better understanding of the connections between Taipower's sustainability strategies/goals and the UN SDGs. Moreover, participants proposed corresponding strategic goals for present business and future planning. Through brainstorming, three priorities were identified, namely, SDGs 7, 9 and 13 ('Affordable and Clean Energy,' 'Industry, Innovation, and Infrastructure' and 'Climate Action'). Taipower's future business strategies will be developed in line with these goals. This approach will help the Company identify potential opportunities and clearly demonstrates its determination to achieve the UN's SDGs.



2019 UN SDGs Priority and Corresponding Directions

SDGs	Implications for Taipower	Taipower's Corresponding Strategies	Value Chains Affected	Potential Development Directions
 **SDG7 Affordable and Clean Energy**	Developing and introducing new renewable energy technologies to ensure the optimal energy mix. Providing affordable, safe, stable, reliable, and low-pollution energy at reasonable costs.	• Supplying stable and low-carbon power • Refining customer experiences	Fuel, Generation Transmission Distribution, Sales, Customers	• Developing innovative energy services • Promoting renewable energy plans • Developing energy storage technology • Maintaining the usability of nuclear technology and the operation of power plants • Improving air quality by investing in thermal power plants • Increasing efficiency of power generation • Promoting circular economy
 **SDG 9 Industry, Innovation, and Infrastructure**	Building resilient power infrastructure and reliable systems by using new and innovative technologies.Promoting industrial and economic development by improving smart applications and the efficiency of power systems.	• Promoting grid construction • Strengthening key technologies	Generation, Transmission, Distribution, Sales, Customers	• Deploying a smart grid, providing access to smart meters and their commercialization • Developing low-carbon technologies • Developing solar panels recycling and disposal • Developing domestic nuclear decommissioning capabilities and keeping core talent and tech-niques to response to future policies and inter-national trends • Increasing investment in R&D • Building cross-departmental collaboration, investing in energy and other infrastructure to develop innovative technologies • Widening Engagement in demand side mana-gement
 **SDG13 Climate Action**	Being aware of domestic and global issues and policies. Reducing carbon emission factors to meet domestic policy ob-jectives. Identifying the impacts and risks of climate change on corporate development to take precautions.	• Supplying stable and low-carbon power • Promoting grid construction	Fuel, Generation, Transmission, Distribution, Sales, Customers	• Establishing emissions reduction targets and action plans • Increasing the efficiency of all power plants to reduce carbon emissions and warm effluents • Developing renewable energy • Maintaining the usability of nuclear technology and the operation of power plants • Improving customers' engagement in demand side management • Doing research on carbon dioxide reuse and recycling technologies • Strengthening the resilience of all infrastructure in value chains • Being aware of domestic and global trends

1.4 Corporate Transformation

1.4.1 Methods of Promoting Transformation

According to Article 6 of the Electricity Act, the Company must complete its transformation in six years following the promulgation of the Amendment to the Electricity Act (the electricity industry's regulatory authority may submit to the Executive Yuan a request for a postponement of the effective date of implementation based on its assessment of the development of the electricity market to no later than January 2026). The Company has gradually inventoried the required operational procedures and documents related to the transformation. Plans have been made that call for transformation to occur in three stages. These include preparation, assignment of responsibility, and adjustments and supporting measures. The company is making steady progress on the various steps required for transformational operations.

Transformation preparation

- Completing the pilot planning research
- Establishing the positioning of the holding company and its subsidiaries and their control modes
- Establishing the functions and organizational structures of the holding company and its subsidiaries
- Starting on the preparation of establishing subsidiaries
- Starting the compilation and research for the demerger plans
- Researching critical issues concerning the transformation

Assignment of responsibility

- Inventory of businesses contained in the holding company and its subsidiaries / division of labor / planning of authorities and responsibilities
- Design of organizational structure of the holding company and its subsidiaries / human resources allocation
- Assessment and planning for the financial situation of the holding company and its subsidiaries
- Design of overall systems and operational procedures for the conglomerate
- Completing internal review processes for the transformation plan

Adjustments and supporting measures

- The transformation plan and the budget review process of the newly established subsidiaries
- Trial run of operations mechanisms for the conglomerate
- Review and adjustment of the conglomerate system
- Prerequisites of establishing new subsidiaries
- Executing statutory procedures for the company's demerger

Introducing external resources and providing planning suggestions

The Company has commissioned research international team to address the "Planning of Strategy, Response, and Enforcement of Electricity Market Liberalization, ""Planning of the Transformation into a Holding Company," "Planning of the Transformation into a Subsidiary of Power Generation Company" and "Transformation into a T&D Co. with Public Retailers as subsidiaries." It is expected that these research plans will provide preliminary suggestions on the transformation strategy, positioning of holding company and its subsidiaries, as well as on function and control modes. The research results will be useful in the follow-up preparations for planning the businesses, organizations and human resource allocations of the holding company and its subsidiaries.

Establishing a corporate transformation discussion platform and researching transformation-related issues

In 2017, the Company established a Transformation Promotion Commission. The Chairman and the President acted as the Convener and the Deputy Convener of the Commission, respectively, and a transformation team for each system and division was set up under them. The Commission also invited representatives of the Taiwan Power Labor Union to participate. The Commission has been focused on the direction of transformation planning as well as identifying critical issues and promotional practices. This work has entailed discussing, reviewing, implementing, regularly tracking and reporting results level by level. As of 2018, the Convener has held 25 cross-departmental discussion meetings.

Actively engaging in internal and external communication to reach consensus

In order to fully communicate with internal and external stakeholders during the transformation process, Taipower established a cross-unit transformation communication team in June 2018 and continues to cooperate and communicate with staff and the labor union internally. In 2018, more than 30 transformation promotion seminar sessions were held throughout the year. Externally, the Company has sent representatives to visit the supervising agency and competent authorities from time to time in order to explain the progress of the Company's transformation, the results of the inventory, and the challenges ahead.

Results of Internal and External Communication

Internal communication

- 20 communication sessions for employees
- 10 labor union communication sessions

External communication

In 2018, Taipower representatives visited the Ministry of Economic Affairs as well as the ministry's Bureau of Energy, State-owned Enterprise Commission, Department of Personnel and the Executive Yuan's Atomic Energy Council.

1.4.2 Core Philosophies of Transformation

In order to maximize the benefits from a stable power supply and a competitive market, Taipower will face an increasingly open market and the challenges that come with it. In the future, Taipower's two core philosophies will be "responsibility" and "preparing for competitiveness" as it transforms into a power holding group.

Undertaking Responsibility

As a state-owned power utility group, Taipower will continue to play an important role in implementing government policies such as maintaining a stable power supply and completing the energy transition. The Power Generation Company and the T&Dco with Retailer as subsidiaries in the Taipower Group will strive to fulfill their statutory requirements with respect to the scopes of their businesses. The holding company will play the role of general manager, coordinating with and integrating the subsidiaries in order to complete the missions of the Taipower Group.

The three state-owned companies within the Taipower Group will be regulated by the relevant laws and regulations for state-owned enterprises, and must also meet supervising agency requirements. The holding company will be responsible for guiding, coordinating, and reporting on all business management affairs to top executives. The subsidiaries will conduct various businesses within their respective operational scopes under the supervision of the holding company.

Preparing for Competitiveness

Currently, the Electricity Act has fully opened customer purchasing options for renewable energy. In the future, power generation and the sale of electricity may also be opened to market. The Taipower Group must prepare to face the challenges of market competition by exploring new growth areas and consolidating its existing businesses. In order to efficiently operate, the holding company needs to execute the tasks of devising group strategy, resource allocation, and synergy consolidation, as well as to manage the subsidiaries in the mode of strategic management and control, while taking into account the Group's comprehensive efficiency and business flexibility.

The power generation company will follow trends within the industry to create a competitive edge and strengthen its core technologies. The T&D Co. with Public Retailer will operate in the industries of transmission, distribution and retail electricity. The transmission and distribution utility businesses will be designed to act independently while focusing on cost awareness, operational control and maintenance expenses, and response to energy transition needs by actively constructing a smart grid that generates stable revenue. Although the power sales industry is currently a utility, it is still necessary to improve customer management and service, enhance the added value of the business through innovative applications, and cultivate competitiveness in order to overcome the challenges of further opening up of the power retail market in the future.

1.4.3 Five Major Planning Themes of Transformation

Taipower's transformation from a general electric enterprise to a power utility group is unprecedented in scale. Currently the company is mainly focusing on five transformation themes: the power generation industry, the transmission and distribution utility industry, the public retail industry, group management and control models, and the group's financial model. Taipower is actively researching and planning for the transformation in the hopes of accomplishing a steady implementation.

The transformation of the power generation industry

As a state-owned enterprise, the transformation of the power generation industry will require the active development of renewable energy and natural gas power generation in accordance with the energy transition policy and the priorities set by the Electricity Act. Since the transformation will occur in an increasingly competitive business market, it is also necessary to plan ahead for operational efficiency, business development and business sales models.

The transformation of the power transmission and distribution industry

In consideration of the power grid's role as a public good, the transformation of the power transmission and distribution industry must be deigned to be independent and to ensure fair and equitable use of the power grid. In addition, for relevant direct/wheeling power supply, dispatch and ancillary services, Taipower will establish a user payment mechanism, designate reasonable rates, and maintain a stable power supply and reasonable cost targets through the construction of the smart grid and energy storage systems.

The transformation of the electricity retailing utility enterprise

As a public utility, the transformation of the Electricity Retailing Utility Enterprise will require Taipower to carry out power purchase combination planning and contract content negotiation pursuant to electricity carbon emission factors, statutory electricity reserve capacities, and final obligations to supply electricity as specified in the Electricity Act. In conjunction with the Energy Saving and Carbon Reducing Policy, Taipower will bolster its promotional work and related application services.

A holding company with subsidiaries

As a holding company with subsidiaries, Taipower must account for both the Group's synergies and flexibility in business management when developing control modes. After the finalization of assigned responsibilities, planning must move towards a strategic management and control mode and the functional design of the holding company and its subsidiaries along with business planning and organization, and human resources allocation. These must be considered from the perspectives of accountability, strategic planning, group management, and the establishment of synergies.

Financial centralized management

With regards to group finance, it is necessary to properly plan the distribution of assets, liabilities, income and costs of the holding company and its subsidiaries with the objectives of unbundling and maximizing the value of the group. It is also necessary to conduct analysis and planning of the operation of cash flows, financial statuses, and fund management practices of the holding company and its subsidiaries, so as to guarantee the reasonable operation of the group and each company.

1.5 Stakeholders and Material Topics

1.5.1 Stakeholder Identification

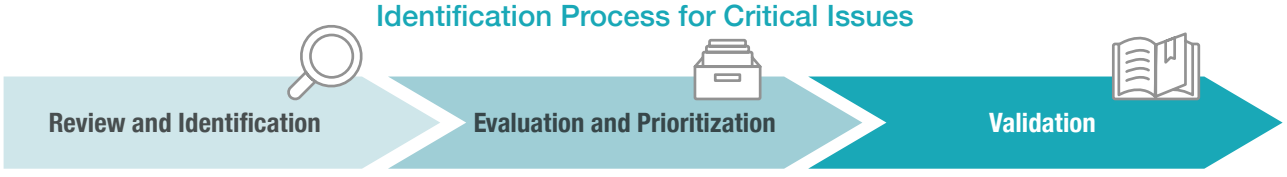
Taipower has spared no effort in building mechanisms for developing mutual trust and communication with its stakeholders. A survey was conducted to identify the main groups of stakeholders from the Company's 34 business units in accordance with the five principles outlined in the "AA1000 Stakeholder Engagement Standards (2011)." Taipower's significant stakeholder groups have been compiled 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.

Stakeholders	Party
Board of Directors	Directors
Shareholders	All shareholders
Employees	Employees and the union
Partners	Contractors, IPP service providers, 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
People's representatives	Legislators and elected village/township representatives
Media	Printed, electronic and online media
Private organizations	Environmental conservation groups, enterprise associations, academic organizations
Customers	General and large customers
Residents / general public	Residents from the surrounding community and the public

1.5.2 Identification of Key Critical Issues

In order to identify issues that relate to sustainable operations and our stakeholders, the Company uses the GRI Standards for materiality analysis to review and identify issues relevant to Taipower. A total of 394 questionnaires were returned for the identification of issues in 2018. Of all the questionnaires, 99 were filled out by Taipower employees (including 37 from in top management), and the remaining 295 were filled out by other stakeholders. A total of 394 questionnaires were collected.

Identification Process for Critical Issues



- Review key sustainability issues from the previous year.
- Review major domestic and foreign developments, such as climate change and amendments to pertinent domestic regulations.
- Review contents including issues of Taipower management, power industry benchmarks, internal/ external stakeholder opinions and major news events
- Identified 27 critical issues

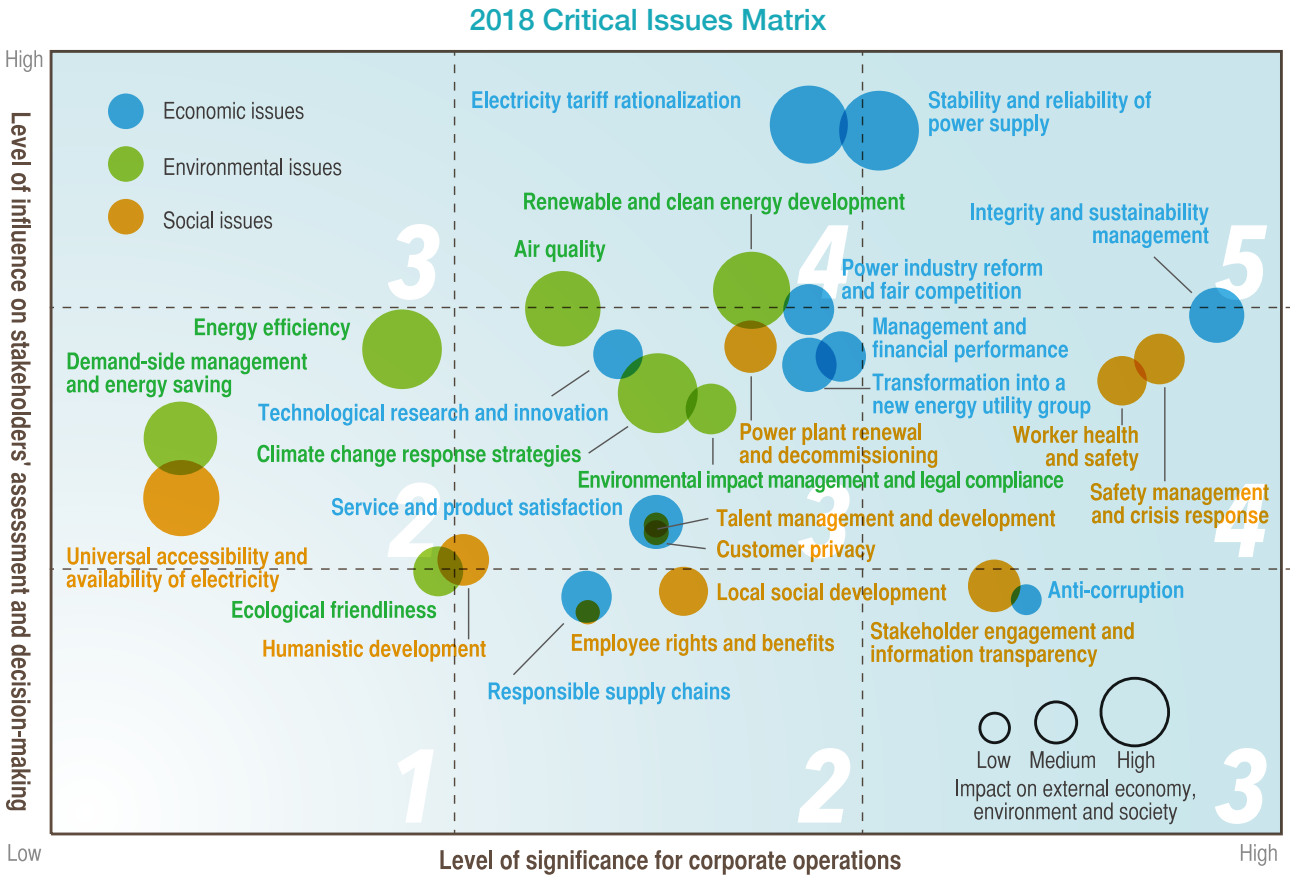
- Consider the extent of impact the issues could have on Taipower and different stakeholders through 62 employee questionnaires to determine the extent of impact on the economy, society and environment; 37 top management questionnaires to determine the materiality of each topic for business operations; along with 295 questionnaires that cover different categories of stakeholders to analyze the extent of impact of relevant issues on stakeholders concerning their assessments and decision-making

- Review and verify of the materiality matrix by Taipower's senior management.
- Determine the contents and structure of Taipower's Sustainability Report based on the results of the analysis.

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

Original Critical Issues	New Critical Issues	Reasons for Adjustments
Power plants decommissioning	**Power plant renewal and decommissioning**	In line with government policies and energy transition trends, Taipower has adjusted its energy ratios. In the past, the Company focused on the safe decommissioning of nuclear power plants. Taipower is now renewing its power plants based on the power sources development plan, to ensure a stable power supply and compliance with regulatory requirements.
Environmental impact management	**Environmental impact management and compliance**	Reference is made to benchmark enterprises and adjustments are made based on the content of Taipower's existing critical issues list, as well as disclosure of the Company's compliance with environmental laws and regulations and information on penalties and fines received.
Enterprise humanistic spirit and social co-prosperity	**Humanistic development**	Taipower has contributed to local infrastructure, cultural development and assistance to the disadvantaged for many years. Last year, the two themes overlapped in terms of social co-prosperity. To avoid confusion, the Company has followed the lead of other benchmark enterprises by adjusting the name of this theme. Humanistic development focuses on culturally-related actions promoted by Taipower, and local social development that results from the cooperation policy for local development and care.
Social commitment and contribution	**Local social development**	
Integration of facilities and ecology	**Ecological friendliness**	Taipower promotes a variety of ecologically friendly measures. This topic is not simply confined to ecologically friendly practices around electricity facilities but also includes a variety of other efforts.

1.5.3 Identification Results of Critical Issues



According to 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. All issues located in Block 5 (of the matrix) are classified as critical issues regardless of the extent of their external impact (this is 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 critical issues. A total of 20 issues have been identified within the scope of this report.

The material issues identified in Taipower's sustainability reports over recent years have faithfully reflected the changes in domestic/international sustainability trends and pertinent laws. Examples include the stability and reliability of power supply, integrity and sustainability management, electricity industry reform and fair competition, etc. These are important operational policies that Taipower has implemented proactively in recent years. Additionally, the working environment of the power industry itself has certain risks. Therefore, safety management and crisis handling along with worker health and safety are also emphasized by Taipower. Issues such as electricity tariff rationalization, the development of renewable and clean energy, and the energy efficiency are also covered to the meet government requirements for promoting the reform of the power industry.

This report includes detailed descriptions of the 20 material sustainability issues identified in the matrix. In addition, in light of recent management and operations goals, this report also covers relevant information on two issues that are not of material importance. The impact of these issues to internal/external boundaries, the relevant GRI Standards and their respective chapters are summarized as follows:

Topics	Location of incidence for economic/ environmental/social impact						Relevant GRI Standards	Management policy and corresponding chapters
		Business relationships		Other social relationships				
	Within Taipower	Partners	Customers	Private organizations	Government agencies	Residents/ general public		
Material Topics								
Integrity and sustainability management	✓				✓		General Disclosures: Governance Economic: Anti-corruption Environmental: Environmental Compliance Social: Socioeconomic Compliance	1.1 Introduction of Taipower 1.2 Corpora te Governance 1.3 Corporate Sustainable Governance 6.1 Integrity and Compliance
The reasonableness of electricity rates	✓				✓		Economic: Indirect Economic Impacts	1.7 Operational Performance
Stability and reliability of power supply	✓	✓			✓		Economic: Indirect Economic Performance	2.1 Planning for New Sources of Energy 2.3 Providing Quality Electricity Services
Transforming into a new energy utility group	✓				✓		Taipower-specific issues	1.4 Corporate Transformation
Management and financial performance	✓				✓		Economic: Economic Performance	1.7 Operational Performance
Technological research and innovation	✓	✓					Economic: Indirect Economic Performance	5.1 General Planning for Smart Grids 5.2 Action Plans for Smart Grids 5.3 R&D in Green Power
Power industry reform and fair competition	✓		✓		✓		Taipower-specific issues	1.4 Corporate Transformation
Service and product satisfaction	✓		✓				Taipower-specific issues	2.3 Providing Quality Electricity Service 6.2 Stakeholder Communication and Engagement
Renewable and clean energy development	✓	✓		✓			Economic: Indirect Economic Impacts Environmental: Emissions	2.2 Development of Renewable Energy 3.3 Minimizing Environmental Impact
Climate change response strategies	✓	✓		✓	✓		General Disclosures: Governance Economic: Indirect Economic Impacts Environmental: Emissions, Energy	1.3 Corporate Sustainable Governance 1.6 Risks and Opportunities 3.1 Sustainability and Strategies for Low-Carbon Electricity 3.4 Strengthening Environmental Management
Environmental impact management and compliance	✓	✓		✓	✓	✓	Environmental: Effluence and Waste, Water and Effluents, Energy	3.3 Minimizing Environmental Impact 3.4 Strengthening Environmental Management

Topics	Location of incidence for economic/ environmental/social impact						Relevant GRI Standards	Management policy and corresponding chapters
		Business relationships		Other social relationships				
	Within Taipower	Partners	Customers	Private organizations	Government agencies	Residents/ general public		
Air quality	✓			✓	✓	✓	Environmental: Emissions	3.3 Minimizing Environmental Impact
Energy efficiency	✓		✓		✓		Environmental: Energy, Emissions	3.2 Reducing Use of Energy and Resources
Demand side management and energy saving	✓		✓				Economic: Demand-Side Management Environmental: Energy	2.4 Demand-Side Management and Power-Saving 3.2 Reducing Use of Energy and Resources
Stakeholder engagement and information transparency	✓	✓	✓	✓	✓	✓	General Disclosures: Stakeholder Engagement Social: Operations implemented with local community engagement, impact assessments and development programs	1.5 Stakeholders and Material Issues 6.2 Stakeholder Communication and Engagement 6.4 Corporate Humanistic Culture and Community Outreach
Power plant renewal and decommissioning	✓				✓		Economic: Indirect Economic Performance	2.1 Planning for New Sources of Energy
Accessibility and availability of electricity	✓				✓		Economic: Indirect Economic Performance	2.1 Planning for New Sources of Energy 2.3 Providing Quality Electricity Service
Safety management and crisis response	✓				✓		Social: Local Communities	1.6 Risks and Opportunities
Worker health and safety	✓	✓					Social: Occupational Health and Safety	4.3 A Sound Working Environment
Humanistic development	✓			✓		✓	General Disclosures: Corporate	6.4 Corporate Humanistic Culture and Community Outreach
Non-Material Issues								
Talent management and development	✓						Social: Labor/Management Relations, Benefits for Full-time Employees	4.1 Human Resource Management Strategies 4.2 Enhancement Measures for Human Resources 4.3 A Sound Working Environment
Responsible supply chain	✓	✓					Environmental: Supplier Environmental Assessment Social: Supplier Social Assessment	6.3 Strengthening Supplier Management

1.6 Risks and Opportunities

1.6.1 Risk Management

In regards to risk management, Taipower is committed to effectively identify potential risk factors in order to avoid negative impacts, and to seize upon potential opportunities as new turning points in the sustainable development of Taipower. At present, Taipower is identifying, ranking, and responding to potential internal and external risks with a sound risk management system.

Risk Management Policies

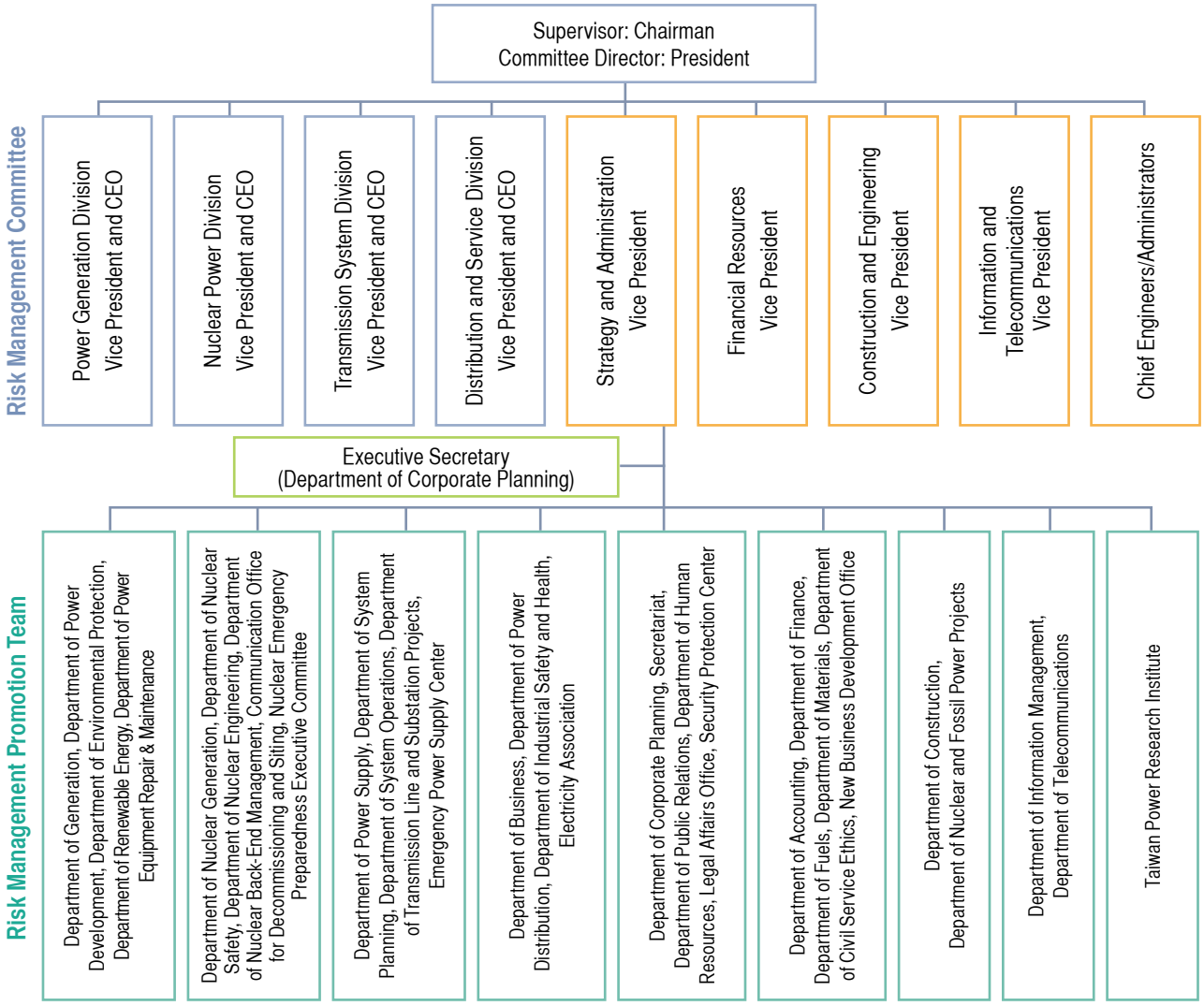
Taipower has established four risk management policies as guidelines for organizational risk management. They are as follows:

- Provide the necessary resources to establish, maintain and continually improve the effectiveness of the risk management system, and 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 the supervisor, the President acts as the committee director and a Risk Management Commission operates as a task force. The Commission is comprised of the CEOs and VPs from the four major divisions (Power Generation, Nuclear Power, Transmission System, and Distribution & Service) and three major systems (Strategic Administration, Financial Resources, and Construction & Engineering). The Vice President of Information and Telecommunications and 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.

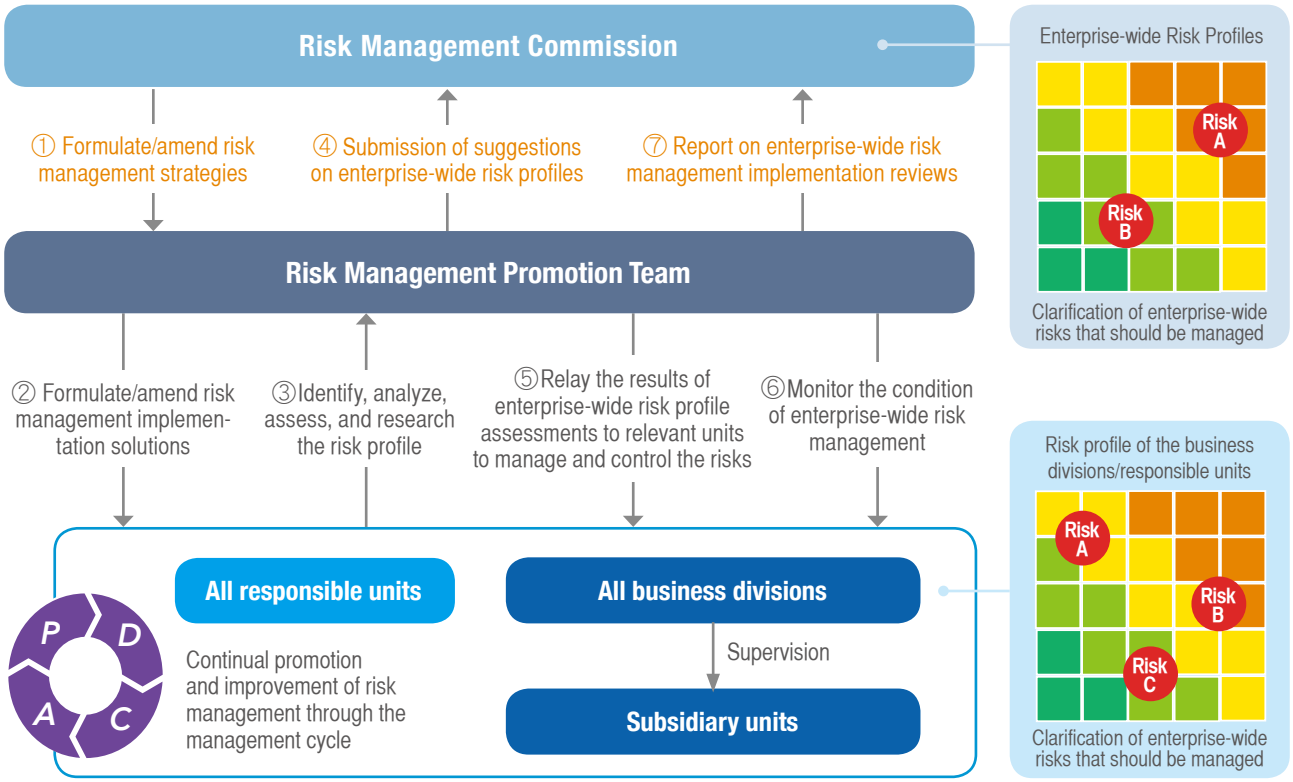
Taipower's Risk Management Organization Structure



Risk Management Process

Taipower's risk management process begins with strategies established by the Risk Management Commission. Subsequently, the Risk Management Promotion Teams formulate 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 Promotion Team into a company-wide risk profile to be submitted to the Risk Management Commission for reviewing. After the review, the Risk Management Promotion Team will relay the results of the review back to all supervisory units for risk control.

The Risk Management Promotion Team is also responsible for monitoring enterprise-wide risk management status and reporting periodically to the Risk Management Commission. Each year, the Risk Management Promotion Team reports on risk handling and control results. These reports are reviewed by the Risk Management Commission. Depending on changes in the internal and external environments, risk management policies can be subjected to review and revision.



1.6.2 Risk Assessment - Considerations for Risk Identification

During the process of risk identification and profile analysis, Taipower will take the following factors into consideration:

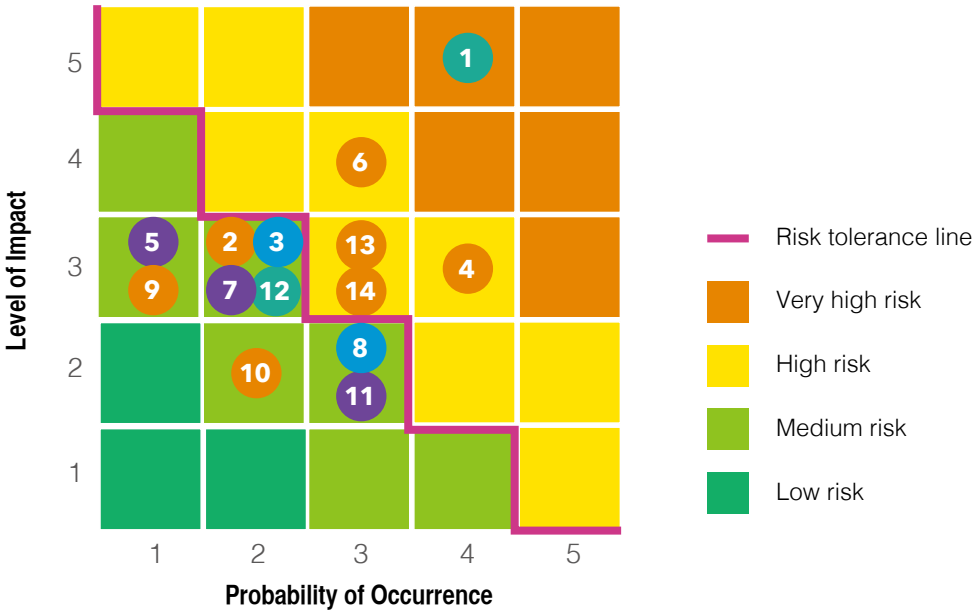
- Issues that pertain to Taipower's stakeholders
- Critical issues that affect the Company's operations or safety
- New policies or changes due to major incidents
- Incidents tracked by the supervising agency or affairs that have warranted specific attention from competent authorities

Risk Profiles and Counter Measures

Taipower uses risk profiles to monitor potential risks. When an incident is classified as an extremely high risk, it will be given top priority for rectification; high-risk incidents are the second ones to be fixed, and may require specific plans to be drafted and resources to be in place before they are handled. Risks at the medium level are only monitored continually by the relevant departments. Low-level risk indicators are handled in accordance with the Company's general procedures.

The risk profile for Taipower's sustainable management in 2019 is shown below. Among the risks identified are increasing accrual of losses, power supply shortages, workplace accidents, power line projects and renewables which have been postponed and identified as high-risk items that Taipower has to handle with prudent planning. After identifying extremely-high and high-risk incidents, Taipower predetermines risk scenarios for the respective risks and manages them with adequate control measures to increase the effectiveness of prevention and response. Through this systematic assessment method and the analysis of risk and sustainability issues, Taipower is able to enhance its capacity to reduce risks and capitalize on opportunities so as to achieve its vision of sustainable management.

Risk Distribution



Risk Category	Risk Identified
Strategic and Financial Risks	1. Accrual of losses resulting in greater impacts on the Company's operations 12. Power plans which were postponed, affecting the Company's power supply capabilities
Operational Risks	2. An aging workforce structure impeding the passing on of techniques 4. Power supply shortages affecting system stability and safety 6. Incidents of EHS resulting in asset loss and damaged reputation of the Company 9. Hacking of the Company's information systems 10. Outbreaks of labor-management disputes and employee protests 13. Progress of renewable energy construction falling behind, affecting the reputation of the Company 14. Progress of grid construction falling behind, affecting grid power supply
Legal Compliance Risks	3. Incidents of employee corruption 8. Negative publicity having an adverse impact on the image of the Company
Environment and Climate Change Risks	5. Natural disasters leading to accidents at nuclear power plants 7. Environmental issues having adverse impacts on the image of the Company 11. Natural disasters causing damage to power facilities

1.6.3 Opportunity Management and Responses

Risks and opportunities are two sides of the same coin. Through the comprehensive risk management system described in previous section, Taipower is able to better understand and follow trends in order to seek out potential opportunities for the Company. Taipower refers to the World Energy Issues Monitor published annually by the World Energy Council (WEC) to learn about important issues in the energy industry and how they correspond with the critical issues identified in the Taipower Sustainability Report every year. The Company also organizes SDG workshops, and responds to the potential development directions of the sustainable development goals. The aim is to look for possible development opportunities in the face of operational environment changes in Taiwan's electricity industry and among global sustainable business trends.

In order to effectively leverage the opportunities identified and create possibilities for development in ventures outside its main business, Taipower has amended Guidelines Governing New Venture Proposal Review and Promotion. A dedicated task force (the Long-term Finance and Investment Planning Task Force) reviews the Company's new venture ideas to speed up the review process and ensure that the contents of proposals are in line with the Company's business philosophy and strategy. Meanwhile, the task force also expands the scope of new business proposals and the eligibility of receiving rewards that promote innovative business opportunities within the Company. Following initial identification, the opportunities that have been identified through the preliminary process are described below:

Issues and Potential Driving Factors	Measures	Responding to SDGs and Potential Directions
• Domestic and foreign enterprises hoping to increase the utilization of green energy to reduce global carbon emissions • Initiation of domestic offshore wind power development programs • Attention to domestic air pollution • The Renewable Energy Development Act	• Investing in renewable energy and its related technology • Establishing a Taiwan International Wind Power Training Corporation Ltd. to create new value for Taipower • Researching the feasibility of promoting ESCO energy services and aiming to become a comprehensive energy service provider • Planning circular business models	 **SDG7 Affordable and Clean Energy** • Developing innovative energy services • Continuing to promote renewable energy plans • Developing energy storage technologies • Maintaining the usability of core nuclear technology and power plants • Investing in energy devices and technology to improve air pollution caused by thermal power generation • Increasing the efficiency of power generating units • Promoting a circular economy
• Amending the Electricity Act • Technological development in big data, AI, smart IoT, etc. • Infrastructure weakness caused by climate change	• Implementing the "Rules of Power Transmission and Distribution for Wheeling and Contract Signing," conducting outsourcing research on contracts and rules of power transfer in the electricity industry, power dispatching regulations, and power dispatching fees • Engaging in technical research on renewable energy grid-connected services • Continuing to promote the smart grid and to popularize smart meters then combining them with commercial applications	 **SDG9 Industry, Innovation, and Infrastructure** • Constructing smart grids, popularizing electricity meters, and combining business applications • Developing low-carbon emission techniques • Developing techniques for recycling solar panels • Independently developing nuclear energy decommissioning technologies and retaining the core technical manpower and capabilities for nuclear energy in response for future changes in policies and international trends • Investing in more R&D manpower and expenses • Building up cross-departmental partnerships to invest in energy and other infrastructure that can assist in the R&D of innovative technology • Expanding participation in demand-side management
• Domestic and international enterprises hoping to increase the utilization of green energy to reduce global carbon emissions • Initiation of a Renewable Energy Certificate mechanism in Taiwan	• Putting efforts into reducing carbon emission coefficients to provide low-carbon electricity • Investing in renewable energy and its related technology • Investing in power conservation facilities and their applicable services • Increasing customers participation in demand response	 **SDG13 Climate Action** • Establishing specific goals and trajectories for reduction of emissions • Increasing the efficiency of power plants to reduce both carbon emission and warm effluents • Continuing to develop renewable energy • Ensuring the usability of nuclear technology and power plants • Urging customers to invest in demand side management • Increasing investment in research on reuse and recycling of carbon dioxide • Strengthening the resilience of all types of infrastructure in value chains • Continuing to be aware of and to master domestic and international development dynamics

1.7 Operational Performance

1.7.1 Improving Financial Management

Strategy for Sustainable Financial Operations

Despite facing increases in international fuel purchase costs, and external electricity tariffs along with costs associated with the suspension of construction at the Shenao Power Plant, Taipower was unable to win an increase in electricity tariffs from the Electricity Tariff Examination Council in 2018. In consequence, the company has been unable to shift the price of electricity to reflect operating costs and maintain reasonable profits. Instead, the Electricity Tariff Examination Council has decided that insufficient profits will be supplemented through the electricity tariff stability reserve and expense controls will be used on operations and maintenance to improve Taipower's financial sustainability. Under the conditions imposed by green energy, carbon reduction, energy conservation, and the need for a stable power supply, Taipower will maintain its electricity rates and operate in a diversified manner as it undergoes changes in the structure of power generation and sales, fuel price volatility, and uncertainty in electricity rates adjustments. It is hoped that multiple goals such as a reliable power supply, reduced carbon emissions, and ensuring financial stability will be achieved.

2018 Taipower Financial Performance Targets and Results

Aspect	Key performance index	2018		2019 Target
		Target	Performance	
Finance	**Pre-tax income** (NT$100 million)	≧ −111	283	≧ 24
	Control of operations and maintenance expenses (cent/kWh)	≦ 38.28	38.38	≦ 39.41

2016-2018 Taipower Financial Performance Targets and Results

Unit: NT$ million

Year	Total assets	Operating revenue	Equity	Losses before tax
2016	2,002,700	569,290	293,993	38,778
2017	1,990,547	566,621	258,189	22,275
2018	2,028,178	587,560	286,884	28,302

Note: Taipower is a state-owned enterprise, and its final accounts are subject to the review and certification by the National Audit Office according to law. At the time of publication, the actual performance for 2018 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. The numbers for 2017 are those of reviewed and certified final accounts, and are slightly different from those in the 2018 Sustainability Report.

The Reasonableness of Electricity Rates

Since Taipower must maintain a stable power supply that meets the consumptive needs of the public, the issue of reasonable electricity rate adjustment is important to the Company. The competent authority, in accordance with Article 49 of the amended Electricity Act, lays out a calculation formula for the electricity tariff used for public electricity sales. The same authority lays out the adjustment mechanism 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 then adjust the tariff after obtaining the approval from the Electricity Tariff Examination Council. This allows electricity prices to immediately reflect international fuel price volatility and Taipower's operational performance. This result is that consumer pricing reasonably reflects operating costs thus creating a rationalization for the electricity tariff.

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

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

As noted above, the electricity tariff is reviewed and adjusted twice a year (generally, in April and October). The adjustments, whether increases or decreases, do not exceed 3 percent each time. However, when the cost of electricity supply continues to rise or fall sharply, the Electricity Tariff Examination Council can adjust the electricity rate depending on the status of the electricity tariff stability reserve.

During to the Electricity Tariff Examination Council meeting held on Marh 16, 2018, a tariff adjustment of +10.24% was proposed in order to reflect operating cost and ensure reasonable profits. Since the adjustment is limited by the tariff formula, it was resolved that the adjustment rate would be +3%. During a second meeting, held on September 13, a tariff adjustment of +8.21% was proposed. However, the Council again considered the impact of the rapid increase in cost along with commodity prices and determined that the electricity tariff would not be adjusted. Both tariff adjustments failed to reach a level that reflects operating costs and reasonable profits. Consequently, the first Electricity Tariff Examination Council meeting in 2019, led to a decision to use the electricity tariff stability reserve to make up the loss.

Diversified Management and Strategies

Taipower's diversification strategy is based on the four aspects of government policy, strategic consideration, financial infusion, and corporate responsibility. This allows the Company to realize its vision as a business groups by creating possible new business developments for the Company. Currently, Taipower is actively creating a variety of new businesses. These include real estate revitalization, a fiber optic circuit bandwidth rental business, contracting wind turbine blade repair, and cultural and creative businesses. In 2018, these new ventures have brought in more than NT$2 billion in revenue for Taipower.

Promoting Real Estate Revitalization

With the changes in power automation, transportation and the economy, some of Taipower's properties are not used anymore. Therefore, Taipower has established a cross-departmental "Land Revitalization Task Force" to promote asset activation.

Real Estate Rental Business

Taipower used the original, nostalgia-evoking elements when revitalizing an old house located on Chaozhou Street in Taipei. The house was integrated to illustrate design styles commonly seen in Taiwan during the 1950s and 1960s. In January 2019, the "new" old house was reborn and now contains a light-food restaurant, office and other composite spaces. A series of cultural lectures were held to renew the community's common memories of the era.

Promotion of Educational and Recreational Affairs

Taipower's Hotels had an occupancy rate of 32.9% in 2018. This number excluded the training center hotels which had an occupancy rate of 39.2%. The hotels yielded NT$ 23.87 million in annual revenue, excluding the additional NT$ 20.26 million generated by the training center hotels.

Promotion of Cultural and Creative Businesses

Taipower's cultural and creative businesses place circular economies at their cores by integrating elements of power industry culture with special products bearing Taipower's logos, images, and symbols and then selling the products via online platforms. By interacting with consumers through product marketing, we will be able to present Taipower's corporate values and philosophy of cultural and creative development by establishing closer ties between the public and Taipower in day-to-day life.

Meanwhile, based on the concept of reusing and recycling, Taipower cooperated with young creative design teams and studios to create the products which bears Taipower's images from coal ash along with waste cap and pin insulators.

Reinvestment Enterprises

As of the end of 2018, Taipower had five reinvestment ventures. These included the Taiwan Stock Exchange Corporation Ltd., Taiwan Cogeneration Corporation Ltd., the Bengalla Mining Company Pty. Ltd., and the Bengalla Coal Sales Company in conjunction with the Bengalla mine development project in Australia. The fifth reinvested venture is the newly established Taiwan International Windpower Training Corporation Ltd. Taipower has invested a total of NT$ 1.295 billion and generated a total of NT$ 343 million in profits in 2018, with a rate of return of 26.94%.

In the future, Taipower will continue to expand its various new businesses in hopes of strengthening the Company's foundation for sustainable operations. Potential investment opportunities for Taipower include coal ash resource utilization, asset revitalization, offshore energy minerals and offshore wind power, participation in international power utility maintenance, construction of foreign power plants, and operation of real estate businesses.

Taipower Establishes Its Fifth Investment After Two-decades of Waiting

Taiwan International Windpower Training Corporation Ltd. (TIWTC), the fifth investment venture of Taipower, was formally established on May 17, 2018 and was the first institution in the country to obtain certification from the Global Wind Organization (GWO).

In response to the government's active promotion of renewable energy development, and given the infancy of the offshore wind power industry, maritime engineering can be both highly risky and technical. Moreover, there are not enough experienced offshore wind power experts in Taiwan. In order to meet the demands of domestic offshore wind turbine safety training, and to ensure the safety of operations, Taipower cooperated with domestic and foreign companies to established the Taiwan International Windpower Training Corporation within less than one year.

The company introduces basic safety training standards developed by the Global Wind Organization (GWO), and provides offshore wind power-related safety training courses that provide the most complete course training for domestic workers engaged in offshore wind power. Five basic safety training courses were initially rolled out. These included first aid, manual operation, fire prevention, aerial work, and survival in the sea. The company will gradually expand the scope of its training business to provide more complete training services domestically.

1.7.2 Strengthening Operation Performance

In recent years, Taipower has actively strengthened its operations through implementing goals and performance management, assessing its operational efficiency through balanced scorecards, and focusing on the four major dimensions of finance, customers, internal processes, and learning and growth. These indicators are reviewed annually to ensure the general objectives of operation are met.

Taipower's Management Objectives and Performance Evaluations – Balanced Scorecard

Dimension	Objectives	Key performance indicators of 2018
Finance	• Improving financial efficiency • Strengthening reasonable cost	① Pre-tax income ② Developing diversified businesses ③ Fuels and materials procurement performance ④ Operations and maintenance fee control
Customers	• Optimizing the Company's image as a corporate citizen • Improving the quality, service, and customer satisfaction	⑤ Social communication and promotion ⑥ Customer satisfaction ⑦ Power supply reliability
Internal Processes	• Improving overall productivity • Proactively implementing energy transition • Ensuring power supply stability • Promoting corporate transformation • Creating a zero occupational hazard environment • Dedication to environmental protection	⑧ Operational performance with electric energy ⑨ Renewable energy generation ⑩ Improving the operational performance of units ⑪ Major construction control ⑫ Planning the transformation into a holding company with subsidiaries ⑬ Occupational safety performance ⑭ Implementing the Nuclear-free Homeland policy ⑮ Greenhouse gas control performance ⑯ Air pollution control performance ⑰ Demand side management performance
Learning and Growth	• Developing human resources • Benefits from R&D results	⑱ Strengthening human resources ⑲ Significant R&D results ⑳ Learning and growth performance

Results of Balanced Scorecards

Dimension	Key Performance Indicators	2018 Target	2018 Actual Performance	Target Achieved	2019 Target
Finance	① **Pre-tax income** (NT$ 100 million)	≧ −111	266	✓	≧ 24
	② **Business diversification** Net profit from new businesses and reinvestments (NT$ 100 million)	≧ 12.20	20.32	✓	≧ 16
	Income from fiber circuit rentals (NT$ 100 million)**	≧ 0.52	0.627	✓	≧ 0.52
	Capital expenditure execution rate* Fixed asset investment plan of the year (%)	*	*	*	≧ 95
	General buildings and facilities plan (%)	*	*	*	≧ 95
	③ **Fuel procurement performance** Coal procurement performance (%)	≦ −5.03	−7.44	✓	≦ −4.96
	Maintain sufficient coal inventory (no. of days)	30~33.5	32	✓	30~35
	Ratio of collective asset procurement (%)	≧ 17	30.88	✓	≧ 20
	Ratio of asset procurement cost reduction (%)	≧ 11.60	16.56	✓	≧ 15
	Maintain sufficient materials inventory (NT$ 100 million)**	≦ 177.83	171.40	✓	**
	④ **Operations and maintenance fees** (cent/kWh)	≦ 38,28	38.28	✓	≦ 39.41

Dimension	Key Performance Indicators	2018 Target	2018 Actual Performance	Target Achieved	2019 Target
Customers	⑤ **Social communications and promotions**** Decommissioning and site selection issues** Decommissioning and Site Selection Issues Forums**	2	2	✓	**
	Public communications activities**	≧ 200	233	✓	**
	Power issues advocacy** Campus issues advocacy**	≧ 110	122	✓	**
	Online Issues advocacy	≧ 24	29	✓	**
	Media communications Positive news coverage**	≧ 85	90	✓	**
	Media conferences **	≧ 5	7	✓	**
	Open information sessions**	≧ 2	3	✓	**
	Mobile payment services (10 thousand customers)	≧ 6	12.8	✓	≧ 13
	⑥ **Customer satisfaction** (score)	≧ 86.5	95.5	✓	≧ 86.5
	⑦ **Power supply reliability – period of forced outages** (min/customer · year)	≦ 17.23	16.1874	✓	≦ 17.10
	Length of underground transmission line deployment for disaster prevention (km)**	≧ 153.81	164.25	✓	**
	⑧ **Energy operations performance** Line loss rate (%)	≦ 4.48	3.94	✓	≦ 4.35
	Dispatching performance - system control performance standard (CPS)	100 ≦ Target ≦ 120	110.13	✓	100 ≦ Target ≦ 120
Internal business processes	⑨ **Renewable energy generation** Hydro unit availability (base load/peak load) (%)	Base load ≧ 96.83 Peak load ≧ 95.25	Base load ≧ 98.26 Peak load ≧ 97.69	✓	Base load ≧ 96.61 Peak load ≧ 94.43
	Wind unit annual availability (%)	≧ 93	93.83	✓	≧ 93
	Solar power generation (100 million kWh)	≧ 0.25	0.317	✓	≧ 1.25
	New additions to renewable energy installed capacity achievement rate (%)	≧ 95	100.84	✓	≧ 95
	⑩ **Improved unit operating performance** Reduce heat consumption for coal-fired units (kcal./kWh)	≦ 2,161	2,143	✓	≦ 2,158
	Improve nuclear power generation performance (excluding overhaul capacity factor) (%)**	≧ 98.88	101.79	✓	**
	Availability of coal-fired units (%)	≧ 97.59	97.70	✓	≧ 97.60
	Number of maintenance overruns for generating units (excluding nuclear power) (time/year)	≦ 4	1	✓	≦ 3
	⑫ **Planning of the transformation into a holding company with subsidiaries*** Implementation of internal communications on transformation *	*	*	*	≧ 10
	⑬ **Occupational safety performance** Occupational injury incidence rate	≦ 0.26	0.41		≦ 0.26
	Occupational safety accident	= 0	32		= 0
	Increasing the employees' abilities to predict dangers*	*	*	*	4 classes
	Promotion of Accredited Healthy Workplace* Assistance and consultation of participants in the Accredited Healthy Workplace*	*	*	*	5 units
	Successfully obtained Badges for Accredited Healthy Workplaces*	*	*	*	3 units
	⑭ **Implement nuclear-free homeland** Nuclear safety performance - indicator signals	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

Dimension	Key Performance Indicators	2018 Target	2018 Actual Performance	Target Achieved	2019 Target
Internal business processes	Ensuring the safety and stable operation of nuclear power* Reliability of facilities* Nuclear reactor trips (events)*	*	*	*	≦ 1 (Total of all plants)
	Abnormal incidents caused by operational negligence (events)*	*	*	*	≦ 3 (Total of all plants)
	⑮ **Greenhouse gas control performance** Total generation emission intensity from Taipower (g/kWh) (Note: Power generated from nuclear power plants not included)	≦ 670	606	✓	≦ 672
	⑯ **Air pollution improvement and control performance** SOx emission per GWh of power generated (kg/GWh)**	≦ 255	183	✓	**
	NOx emission per GWh of power generated (kg/GWh)**	≦ 254	213	✓	**
	Particulate matter (PM) emission per GWh of power generated (kg/GWh)**	≦ 22	21	✓	**
	⑰ **Demand side management performance** Peak load capacity for demand-based bidding (10 MW)	≧ 65	138	✓	**
	Accelerating AMI deployment (units)	≧ 200,000	230,000	✓	≧ 400,000
	Electricity saving plan achievement rate (%)	*	*	✓	≧ 95
	Reducing peak hour electricity demand (10 MW)*	*	*	*	≧ 70
	Completion rate of green energy grid-connections (%)*	*	*	*	≧ 90
	Introduction and establishment of the IEC 61850 standard in substations (no. of substations)*	*	*	*	11 substations
Learning and Growth	⑲ **Significant R&D results** Amount contributed to research and development (NT$1 million)	≧ 5,501	6,535	✓	≧ 5,601
	Contributions made to energy saving, carbon reduction and green power industry development Research reports**	≧ 30	42	✓	**
	Thesis publications (number of articles)**	≧ 20	25	✓	**
	Number of international power industry forums hosted**	≧ 1	1	✓	**
	Number of articles published at international forums and symposiums	≧ 10	24	✓	≧ 10
	Investment in energy saving, carbon reduction and green power industry research (NT$ millions)*	*	*	*	≧ 3.140
	⑳ **Learning and growth performance** Employee proposals**	≧ 825	1,386	✓	**
	Proposal implementation rate (grade 6 and over) (%)**	≧ 80	92	✓	**
	Average number of digital learning hours completed by employees (hours/person)**	≧ 6	11.5	✓	
	Average number of internal and external learning hours for employees (hours/person)	≧ 45	54.41	✓	≧ 45

Note: 1.*Denotes new items added in 2019 (13 items in total), **Denotes items deleted in 2019 (22 items in total). The addition/deletion of relevant KPI items were made to reflect the Company's operational focus for the year.

2. ⑪ Major construction controls, ⑫ Planning on the transformation into a holding company with subsidiaries, and ⑱ Strengthening human resources all fell under qualitative indicators and as such were excluded from this table. For relevant contents, please refer to Chapter 2.1 Planning for New Sources of Energy, Chapter 1.4 Corporate Transformation, and Chapter 4.1 Human Resource Management Strategies.

2 Stable Power Supply

Capital Equipment Implications for Taipower

Generating units, the power grid, power transmission and substation facilities are all vital assets that contribute to the stable power supply for Taiwan. Investment planning for equipment capital management is crucial for Taipower as it faces external trends such as the push for energy transition and the growing levels of environmental awareness in society, as well as the decommissioning and renewal requirements of existing thermal and nuclear power plants. As a result, Taipower has prioritized the development of renewable energy, the promotion of low-carbon gas, and the renewal of coal-fired power units to ultra-supercritical (USC) generation units as the three major directions of transition. We hope that these measures will stabilize the hardware capital of the electric power system and provide a stable electricity source for the development of Taiwan's diverse society.

Principal Investments

- Taipower plans to invest more than NT$418 billion in renewable energy between 2015 and 2030
- Increase the resilience of the power grid by adopting a clustering design for important power plants, reducing equipment overload through grid improvement projects, and strengthening existing tower foundations, etc.
- Strengthen the transmission and substation system; the total investment of the 7th Transmission and Substation Revision Project is expected to be about NT$236.9 billion. The accumulated investment for the project as of 2018 is approximately NT$178.295 billion
- Develop distribution feeder automation. A total of 963 automatic switches were installed on distribution feeders in 2018. This brings the accumulated number of monitorable on-site automated switches to 24,050 and the number of automated feeders to 7,354. Through this development, the probability of successful malfunction detection can be increased, thus minimizing the scope of power failures due to outages

SDGs	Connections between SDGs and Taipower	Associated sections and issues
	Plan various renewable energy projects; improve operational and energy efficiency and continue to increase the availability and popularity of electricity.	– Development of Renewable Energy
	Achieve full, productive employment and decent work for all, including younger generations and those who are physically/mentally challenged. Follow the principle of equal pay for equal work. Promote occupational safety and the protection of labor rights.	– Stable Power Supply and Generation System
	Improve the energy efficiency and resilience of power infrastructure. Promote the innovative development of eco-friendly technologies.	– Planning for New Sources of Energy – Development of Renewable Energy – Providing Quality Electricity Services – Demand Side Management
	Reduce urban impact on the environment and focus on reducing air pollution and waste.	– Planning for New Sources of Energy – Development of Renewable Energy – Demand Side Management
	Actively participate in adaptation projects and mitigation actions to improve energy efficiency, develop renewable energy and improve climate resilience in power generation systems.	– Planning for New Sources of Energy – Development of Renewable Energy – Providing Quality Electricity Services – Demand Side Management

Performance Highlights

- In 2018, System Average Interruption Frequency Index was ***0.227*** times/household, and System Average Interruption Duration Index was ***16.187*** minutes/household
- In 2018, there were ***18,625*** renewable energy grid-connections
- The Taipower Wind Power Plant in Penghu and the Demonstration Optical Site in Taichung were acquired. Taipower also obtained ***17,113*** renewable energy certificates (more than ***50%*** of all certificates in the country)
- The gross thermal efficiency of full thermal power plants increased from 43.96% (LHV, gross) in 2017 to ***44.83%*** in 2018
- The progress of thermal generation unit renewal projects is as follows: Linkou (92.44%), Dalin (98%), Tongxiao (97.4%), Datan (0.62%), Taichung (0.85%), Xingda (0.16%), and Xiehe (0.18%)

Future Plans

Climate change and economic development mean there will be many changes for the electricity industry in the future. In addition to the active supply-side development of renewable energy and low-carbon gas, along with the continuous renewal of thermal power generation units, Taipower also actively promotes demand-side management including demand bidding, time-of-use (TOU) rates, power-saving service groups, and community energy conservation campaign projects, etc. Meanwhile, by maintaining a stable transmission system that provides the power demanded during the energy transition process, and through the development of multiple energy sources, Taipower will continue to enhance its operational capabilities and market competitiveness.

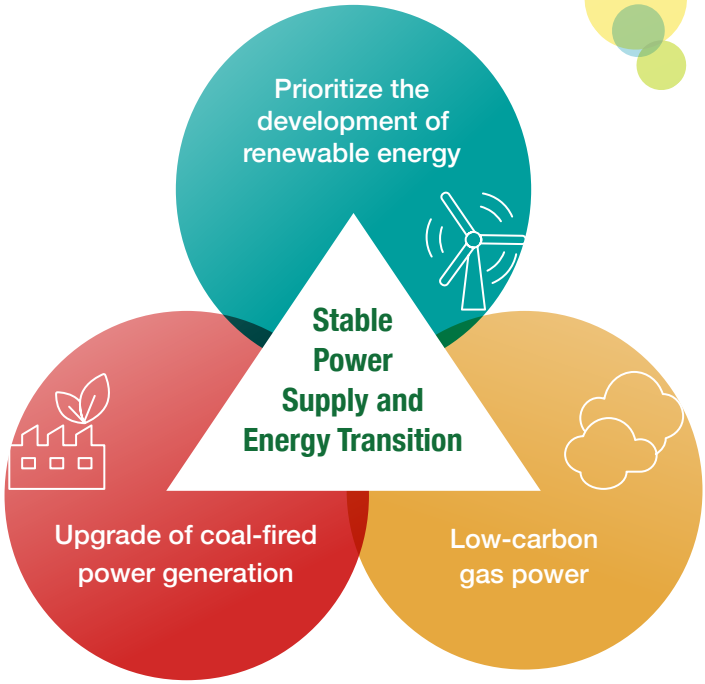
2.1 Planning for New Sources of Energy

2.1.1 Transition to a New Generation of Energy Sources

Direction of Transition for Power Plants

Taiwan's energy transition policy is centered on reducing coal use, increasing gas use and nuclear-free, green energy. The policy aims to use renewable energy and gas power generation as the main sources of power in the future. Assuming that various development projects for solar, wind and gas-fired power along with natural gas receiving terminals are completed on time and at the expected level of quality, a reserve capacity of 15% and an operating reserve of 10% can be achieved to ensure a stable power supply.

In response to the energy transition, Taipower will prioritize the development of renewable energy, promote low-carbon gas power generation, partially upgrade its coal-fired units into ultra-supercritical units, and adjust the proportion of various types of power supply, so as to gradually achieve the goals of a stable power supply and energy transition.



Prioritize the development of renewable energy

Renewable energy is derived through distributed generation. In addition to the efforts of Taipower, private enterprises must participate in the development of renewable energy to ensure its maximization. Therefore, Taipower actively promotes the establishment of renewable energies such as off and onshore wind power, solar power, geothermal power and micro-hydropower. Taipower also continues to strengthen power grid construction in order to create a friendly grid-connected environment, and fully promotes renewable energy development.

Actively promote low-carbon gas power generation projects

Since renewable energy typically results in intermittent power generation, a stable power supply must be derived in conjunction with conventional thermal power generation. In order to meet the need for spare thermal units, Taipower will expand its low-carbon and high-efficiency gas plants through projects such as the renewal and expansion of Tongxiao and Xiehe Power Plants, the expansion of the Datan Power Plant, the renewal of the Xingda Power Plant, and the extension of generating unit of Taichung Power Plant.

Meanwhile, in order to ensure national energy security and the stability of the natural gas supply to the power plants, Taipower is pursuing low-carbon gas power generation projects and liquefied natural gas (LNG) station receiving terminals in Taichung Port and at Xiehe. CPC Corporation is constructing a third LNG station receiving terminal to jointly strengthen Taiwan's energy supply security and overall economic development.

Coal-fired units are partially updated to ultra-supercritical units

International trends in energy policy and the facts that Taiwan's power grid is both independent and overwhelmingly (98%) reliant on imported fuels, a certain amount of coal-fired power generation will remain necessary throughout the process of transition. This will ensure a stable power supply, energy security and energy diversity. While coal remains a necessity, Taipower plans to renew its coal-fired power generating units to highly efficient ultra-supercritical units with advanced environmental protection equipment. Moreover, coal-fired power generation will be reduced to minimize environmental impact and will only be used under the premise of ensuring no impediment to the power supply arises. This will allow both the energy mix goals set by the government and energy supply security to be achieved.

Short-Term Responsive Actions

Since Taiwan is small and densely populated, land for power plants and power lines are difficult to obtain. Generally, there are great obstacles to constructing power plants and power lines due to the Not-in-my-backyard (NIMBY) effect and the intense attention greenhouse gas emissions have drawn from the general public in recent years. Since the construction of power plants takes a long time and existing nuclear and thermal plants that are near mandatory decommission dates, it is impossible to make plans to acquire new traditional thermal power sources to replace those facing impending decommissioning. To lower the risk of power shortages, Taipower has planned the following responsive actions:

- Enhance various load management measures to slow down the growth of electricity consumption, such as simplifying measures for reducing electricity consumption, implementing measures for demand-based bidding, and piloting an air-conditioning automatic demand response scheme.
- Continue to strengthen the maintenance of generating units, and ensuring unit maintenance schedules are properly arranged to improve unit availability.
- Request renewal and expansion projects for Linkou, Dalin, and Tongxiao Power Plants.
- Assess units that are near to mandatory decommissioning for use as emergency backup units

Responsive Measures for the Medium to Long-Term

In terms of supply-side management, Taipower will continue to promote the replacement of traditional thermal power plants, introduce high-efficiency units with advanced pollution prevention technologies to reduce pollution emissions, expand renewable energy development, and promote the self-built Port of Taichung and Xiehe LNG Receiving Terminal projects. The Company will also increase the power supply's capacity and reduce carbon emission intensity. In terms of demand-side management, Taipower will expand the installation of smart meters (AMI) to promote more efficient time-of-using pricing and electricity-saving measures that will reduce electricity demand in the future.

Power Plant Renewal and Expansion Projects

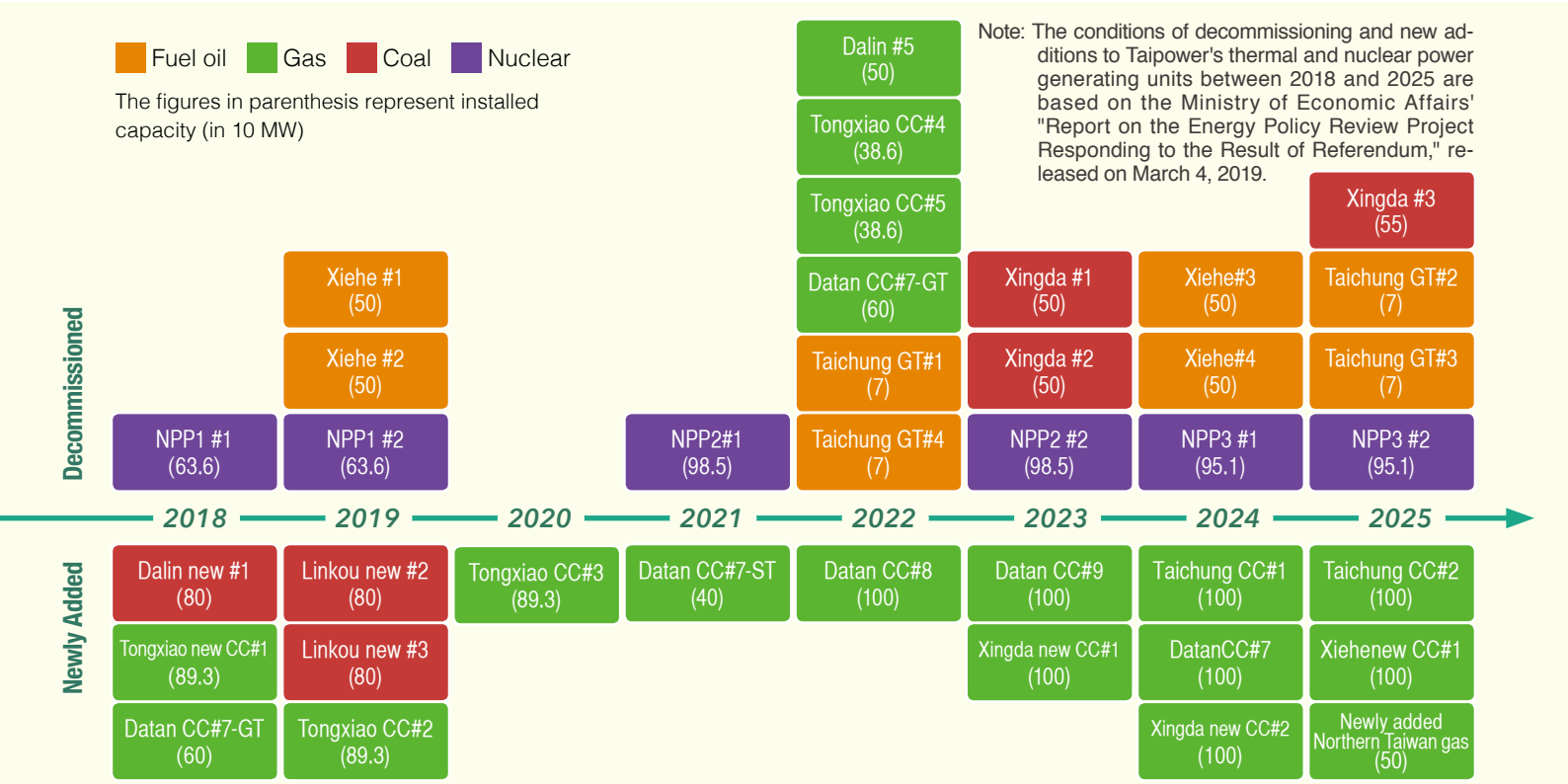
Type	Name of Project	Project Capacity	Progress	Expected Benefits
Thermal power plant	Renewal and Expansion of Linkou Power Plant	Renewal and expansion of three ultra-supercritical pressure coal-fired units, each of which has a capacity of 800 MW at the current plant site	Percentage of completion was 92.44% as of the end of 2018	Supply power for northern Taiwan region and increase quality of power supply
	Renewal and Expansion of Dalin Power Plant	Installation of two ultra-supercritical pressure coal-fired units, each of which has a capacity of 800 MW	Percentage of completion was 98% as of the end of 2018	Strengthen power supply capability
	Renewal and Expansion of Tongxiao Power Plant	Construction of three gas combined cycle units, each of which has a capacity of 892.6 MW	Percentage of completion was 97.40% as of the end of 2018	Execute the government policy of prioritizing the utilization of natural gas and strengthening the efficiency of thermal generating units as a whole
	Expansion of Datan Power Plant	Planning to add three gas combined cycle units, each of which has a capacity of 1 GW at the current plant site, bringing the total capacity to 2.88-3.168GW	Percentage of completion was 0.62% as of the end of December 2018	Respond to the growth of domestic power consumption and the government's Nuclear-free Homeland policy; new generation units were acquired to ensure stable power supply
	Newly Constructed Gas Generation Units of Taichung Power Plant	Installation of two gas combined cycle units, each of which has a capacity of 1-1.3 GW at the current plant site, bringing the total capacity to 2-2.6 GW. Construction of LNG receiving terminals, with five above-ground 160,000kL LNG storage tanks planned in the initial stage	Percentage of completion was 0.85% as of the end of December 2018	Execute the government policy of prioritizing the utilization of natural gas and strengthening the efficiency of thermal generating units as a whole
	Renewal and Expansion of Gas Generating Units of Xingda Power Plant	Renewal and construction of gas combined cycle units with the total capacity of 3-3.9 GW at the current plant site	Percentage of completion was 0.16% as of the end of December 2018	Executing the government policy of prioritizing the utilization of natural gas and strengthening the efficiency of thermal generating units as a whole

Type	Name of Project	Project Capacity	Progress	Expected Benefits
Thermal power plant	Renewal and Expansion of Xiehe Power Plant	Installation of two gas combined cycle units, each of which has a capacity of 1-1.3 GW	Percentage of completion was 0.18% as of the end of December 2018	Cooperate with power plant decommissioning and supply power for customers in northern Taiwan. Plan to upgrade and transform facility into a gas power plant
Offshore wind power	Phase I of the Offshore Wind Power Project	Installation of a wind field whose total capacity is 109.2 MW. The site will be able to generate over 360 GW of power annually	Actual percentage of completion was 37.32% as of March 2019	Developing Taiwan's R&D capabilities for offshore wind power and expand green energy devices
Hydropower plant	Liyutan Reservoir Jingshan Hydropower Project	Installation of one hydraulic generation unit of vertical Francis turbine with a capacity of 4,000 kW at Liyutan Reservoir, Miaoli. The annual amount of power generation will be 13.886 GWh	The hydraulic generation unit is set to complete installation by December 31, 2019	Make use of the potential of hydropower and expand the application of renewable energy
	Phase 1 of the Island-wide Small Hydro Project	Installation of one hydraulic generation unit of vertical Francis turbine at the crossover pipe of stone waterway; installation of 12 bulb hydro turbine generating units at six sites including access road along the south bank of Jiji Weir. A total of 13 generating units with a total capacity of 16.24 MW and an annual amount of power generation of 74.6 GWh	The process of calling for tenders is under way	Make use of the potential of hydropower and expand the application of renewable energy, as well as develop a distributed grid
	Phase 2 of the Island-wide Small Hydro Project	Installation of a total of five hydraulic generation units at four sites: Shilin Weir, Tianlun Dam, Maan Houchi, Qilai Outlet. The total capacity will be 2.09 MW and the annual power generation will be 10.74 GWh	The process of calling for tenders is under way	

Long-term Power Development

As the demand for electricity continues to grow, thermal and nuclear power plants are nearing mandatory decommissioning. Taipower must execute the government's policies and consider internal and external environmental conditions when planning long-term power development projects to 2025 as follows:

Taipower Power Resource Planning in 2018

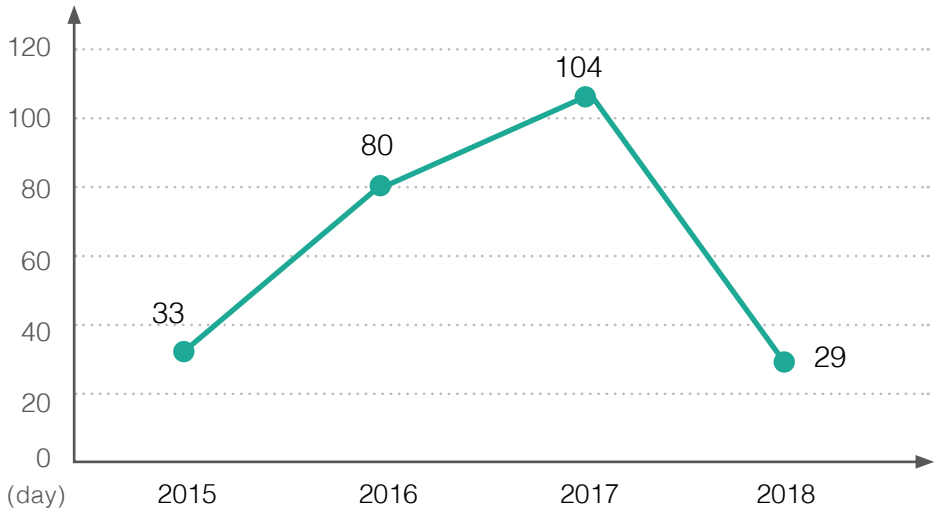


2.1.2 A Stable Power Supply and Generation System

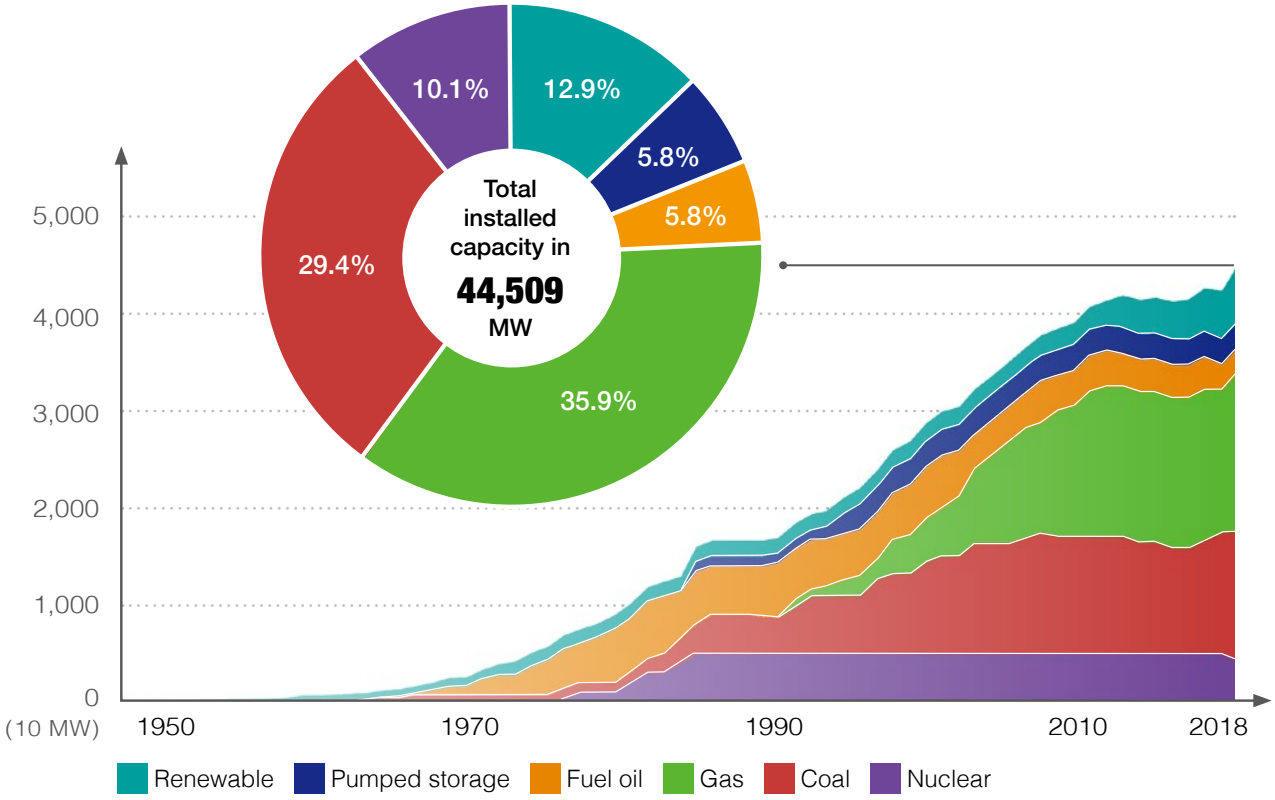
Stable Power Supply and Installed Capacity

In recent years, sustained economic growth and extreme weather has led to repeated record highs in Taiwan's electricity consumption. To ensure the stability of the power supply. Taipower continuously strengthens management, promotes power development plans, and brings new generating units online every year. In 2018, the number of days that Taipower's reserve capacity was less than 6% was the lowest in the past four years at only 29 days. This is a significant drop from 104 days in 2017.

The number of days that Taipower's reserve capacity was less than 6%



Taipower System Installed Capacity from 1950 to 2018



Note: The sum of the percentages of respective energy sources in the pie chart as of 2018 may not be 100% due to the fact that the numbers are rounded off to the first decimal place after calculation.

Total Amount and Composition of Power Generation from 2016 to 2018

	2016		2017		2018	
	100 GWh	Percentage	100 GWh	Percentage	100 GWh	Percentage
Net amount of power generation and purchase	**2,258**	**100.0%**	**2,311**	**100.0%**	**2,333**	**100.0%**
Amount of power generated	**1,740**	**77.1%**	**1,805**	**78.1%**	**1,827**	**78.3%**
Pumped storage hydro	33	1.5%	33	1.4%	34	1.4%
Thermal	1,340	59.4%	1,503	65.1%	1,483	63.6%
Nuclear	305	13.5%	216	9.3%	267	11.4%
Renewable energy	62	2.7%	53	2.3%	43	1.9%
Amount of purchased power	**518**	**22.9%**	**506**	**21.9%**	**506**	**21.7%**
Privately-owned thermal	405	17.9%	405	17.5%	389	16.7%
Renewable energy	54	2.4%	60	2.6%	71	3.0%
Cogeneration	59	2.6%	41	1.8%	46	2.0%

In order to effectively manage the operation of thermal units, Taipower not only strengthened various operation maintenance strategies, but also established a licensing system and a training mechanism for operating personnel to ensure the stability of daily operations. Meanwhile, Taipower's main management measures for nuclear units include supervising the plants, pointing out operational weaknesses, and strengthening equipment improvement and renewal during overhauls, as well as reviewing the unplanned events in the current year.

Average Availability Rates for Power Plants from 2016 to 2018

Unit: %

Unit		Energy Type	2016	2017	2018
Thermal	**Steam**	Coal	91.25	90.74	86.55
		Oil	89.08	89.43	89.01
		LNG	73.52	90.38	90.21
	Combined Cycle	LNG	90.26	90.81	87.62
Hydro		Hydro	93.85	96.61	95.58

Note: 1. Thermal Unit Availability = 1 - Period Unit Impact on Power Supply/No. of Hours/Unit Max Net Output
Thermal Plant Average Availability = Σ (Unit Availability × Unit Max Net Output)/Σ Unit Max Net Output

2. Hydro Unit Availability = (Operational Period + Number of Standby Hours)/Annual Number of Hours
Hydro Plant Annual Availability = Arithmetic Mean of Unit Annual Availability

Average Availability Rates for Taipower's Nuclear Power Plants from 2016 to 2018 Unit: %

Year	NPP1			NPP2			NPP3			Average
	Reactor 1	Reactor 2	Average	Reactor 1	Reactor 2	Average	Reactor 1	Reactor 2	Average	
2016	0	96.58	48.29	90.85	27.88	59.37	88.80	96.46	92.63	66.76
2017	0	41.76	20.88	56.12	0	28.06	99.12	80.17	89.64	46.19
2018	0	0	0	85.46	56.62	71.04	87.70	92.07	89.88	53.64
Accumulated availability rate during commercial operation	76.36	82.81	79.59	84.38	81.94	83.16	83.06	86.74	84.90	82.55

Note: 1. Utilization rates of nuclear power plants = Number of hours of power generation per year/Number of total hours in that year.

2. Although the damage on the connecting hardware for the water channel on Atrium-10 fuel at the First Nuclear Power Plant's reactor 1 in 2015 had been repaired by February 2015, the Legislative Yuan's Education and Culture Committee resolved in mid-March 2015 that the Atomic Energy Council must complete its report on the incident before Taipower is permitted to apply for the First Nuclear Power Plant to resume operations. Despite the fact that the Atomic Energy Council has made numerous applications to the Education and Culture Committee to present the report to the legislators, the Committee did not put the application in its agenda. Consequently, the First Nuclear Power Plant has remained non-operational since the incident, and the operating license of the reactor expired on December 5, 2018. The reactor is currently in the decommissioning process.
3. Due to the torrential rain on June 2, 2017 (with accumulated precipitation exceeding 600mm for the day), one of the three transmission towers connecting the main transformer collapsed and caused a generator to trip and reactor Number 2 of the First Nuclear Power Plant to scram. The reactor remained in safe shutdown until June 11 and the EOC-28 major overhaul for the reactor began on June 12. Due to the fact that the fuel pool was full and the fuel rods were unable to be extracted, the reactor remained non-operational as of the end of 2018.
4. Reactor No. 2 of the Seond Nuclear Power Plant has been in a safe shutdown mode since May 16, 2016. On March 27, 2018, the Atomic Energy Council agreed to its overhaul, and Taipower applied for interconnection, and the first ever interconnection was completed at noon of the same day. The next day, according to the Steam Bypass & Pressure Regulations (SB & PR) the system failed to reach optimization, the reactor went through an emergency shutdown due to safety concerns. The investigation into the cause of this incident was completed on April 9. The emergency review report was sent to the Atomic Energy Council for review. After the review was completed, the Atomic Energy Council agreed to restart the reactor on June 5, and the unit was interconnected again on June 8. However, on June 12, the temperature from the main transformer to the connection wire's A clamp at the switchyard entrance was quite high; to ensure the safe operation of the transmission lines at the highest standard, the de-interconnection procedure was applied and the lines were adjusted. On the next day, June 13, the interconnection was done again and power generation was reinitiated, and the reactor reached fully loaded operation on June 17. Currently, the unit is in stable operation.

Power Supply Load Management

Taipower has complete measures concerning power dispatch, and is able to implement load limits when the power system is on the verge of breaking down due to outages, insufficient power supply caused by fuel shortages, facility overloads, or severely low voltages.

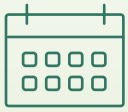
Load limits are categorized as either emergency load limits or planned load limits. The respective timing of these two types of load limit are:

- **Emergency load limits:**

  When the system has a power shortage due to sudden outage, equipment overload or the severely low voltage, etc, a load limit needs to be implemented immediately. An emergency load limit may be executed in the following ways: (1) automatic unloading of under-frequency relays; (2) Level 1 load limits; (3) emergency rolling blackouts.

- **Planned load limits:**

  When it is predicted that there is going to be power shortage in the system on the next day, a planned load limit is announced on the day before the power rationing is implemented. The planned load limit may be executed in the following ways: (1) industrial user power rationing; (2) planned rolling blackouts.



The Unsung Heroes of Taipower's Central Dispatching Centers

Taipower's Central Dispatching Centers operate on the world's first dual-control synchronous dispatch model. The two Central Dispatching Centers were set up in Taipei and Kaohsiung, respectively. Three employees rotate for each turn in Central Dispatching Centers. They consist of one duty manager and two duty supervisors. The centers operate 24/7 with four shifts on three rotations. Supporting shifts are set up to support rotations, education/training, and administrative operations. A total of 30 people shoulder the responsibility for daily power dispatching.

Daily power dispatching is the result of the teamwork of several related departments. Preparation begins with the Dispatching Group, also known as the logistics department of the Central Dispatching Centers. This group collects data such as temperature, power consumption information, weather forecasts, power consumption for the season, economic details, and festival activities. The group also completes a load forecast for the next day and delivers it to the Central Dispatching Centers.

The information is used to plan power facility maintenance, economic dispatching, fuel restrictions, IPP purchase contracts, reservoir water coordination and power system safety analysis. Power quality and compliance with environmental regulations must also be maintained.

Power dispatching for the day is carried out by the personnel on duty, and they mainly deal with peak power consumption, real-time control of normal voltage and frequency, and emergency accidents that must be handled immediately.

At present, the dual-control synchronous dispatch model implemented in the Central Dispatch Centers has been in operation for more than 10 years. The strategic guidelines and principles for responding to daily peak power consumption and dispatching have matured, and all of the personnel working there continue to do their best to provide safe and stable power.

2.2 Development of Renewable Energy

Target of Promoting Renewable Energy

Taipower promotes renewable energy through all-round action. In addition to actively developing renewable energy devices, the Company also strives to create an environment that is friendly to grid-connection in order to lay the foundation for energy transition policies that will respond to the demand for grid-connections when green power is mass produced in the future.

Goals include: Continuing to promote Phases 2 to 5 of the Photovoltaic Project, Phase 5 of the Wind Power Project, the low-carbon Island Wind Power Project in Penghu, Phases 1 and 2 of the Offshore Wind Power Project, the Green Island Geothermal Generating Unit Pilot Project, Phase 1 of the Geothermal Energy plan at Renze and Tuchang in Yilan County, and the Small Hydropower Project. These projects make full use of natural resources to reduce dependence on fossil fuels.

Time	Government's target				Taipower's target			
	2020		2025		2020		2025	
Item of promotion	Capacity (MW)	Power generated (100 GWh)	Capacity (MW)	Power generated (100 GWh)	Capacity (MW)	Power generated (100 GWh)	Capacity (MW)	Power generated (100 GWh)
Hydropower	2,100	64	2,150	66	1,800.6	44.0	1,813.0	44.5
Onshore wind power	814	19	1,200	28	345.4	8.5	372.8	9.1
Offshore wind power	976	35	5,738	207	0	0	409.2	13.3
Solar power	6,500	81	20,000	256	130.2	1.7	451.3	5.5
Geothermal power generation	150	10	200	13	0	0	8.0	0.4
Fuel cells	22	2	60	5	-	-	-	-
Biomass energy	768	38	813	43	-	-	-	-
Total	**11,331**	**249**	**30,161**	**617**	**2,276**	**54**	**3,054**	**73**

At present, Taipower intends to invest more than NT$418 billion between 2015 and 2030. The Company expects to increase its offshore wind power generation by 1.8 GW, solar power generation by 1 GW, onshore wind and geothermal power generation by 0.7GW, totaling 3.5 GW. If hydropower generation of 1.9 GW is included, the total capacity of renewable energy for Taipower will reach 5.4 GW in 2030.

Current Status

Taipower continues to play a leading role. In addition to hydropower generation, which has a century of history, the Company has also devised a complete development plan in recent years for wind power and solar power generation. It has also invested in research and development in emerging fields such as geothermal and biomass energy.

Current Status of Renewable Energy

Hydro Power

Taipower started the development of hydropower nearly a century ago. By the end of 2018, the installed capacity had reached 2.09 GW (including IPP), and accounting for about half of the total capacity of renewable energy.

Wind Power

Since 2000, Taipower has been committed to wind power development. By the end of 2018, the Company had completed the Zhongtun Wind Power Demonstration Project, Phases 1 to 4 of the Wind Power Generation Project, the Huxi Wind Power Project in Penghu, and the Jinsha Wind Power Project in Kinmen. Currently, there are 16 wind farms and 173 turbines, with a total installed capacity of approximately 290,000 kW.

Solar Power

Since 2008, Phase 1 of the Solar Power Project has been implemented, and a large number of solar power systems have been built. By the end of 2018, a total of 23 solar farms had been completed, with a total installed capacity of more than 18,000 kW.

Status of Taipower's Renewable Energy Development (as of the end of 2018)

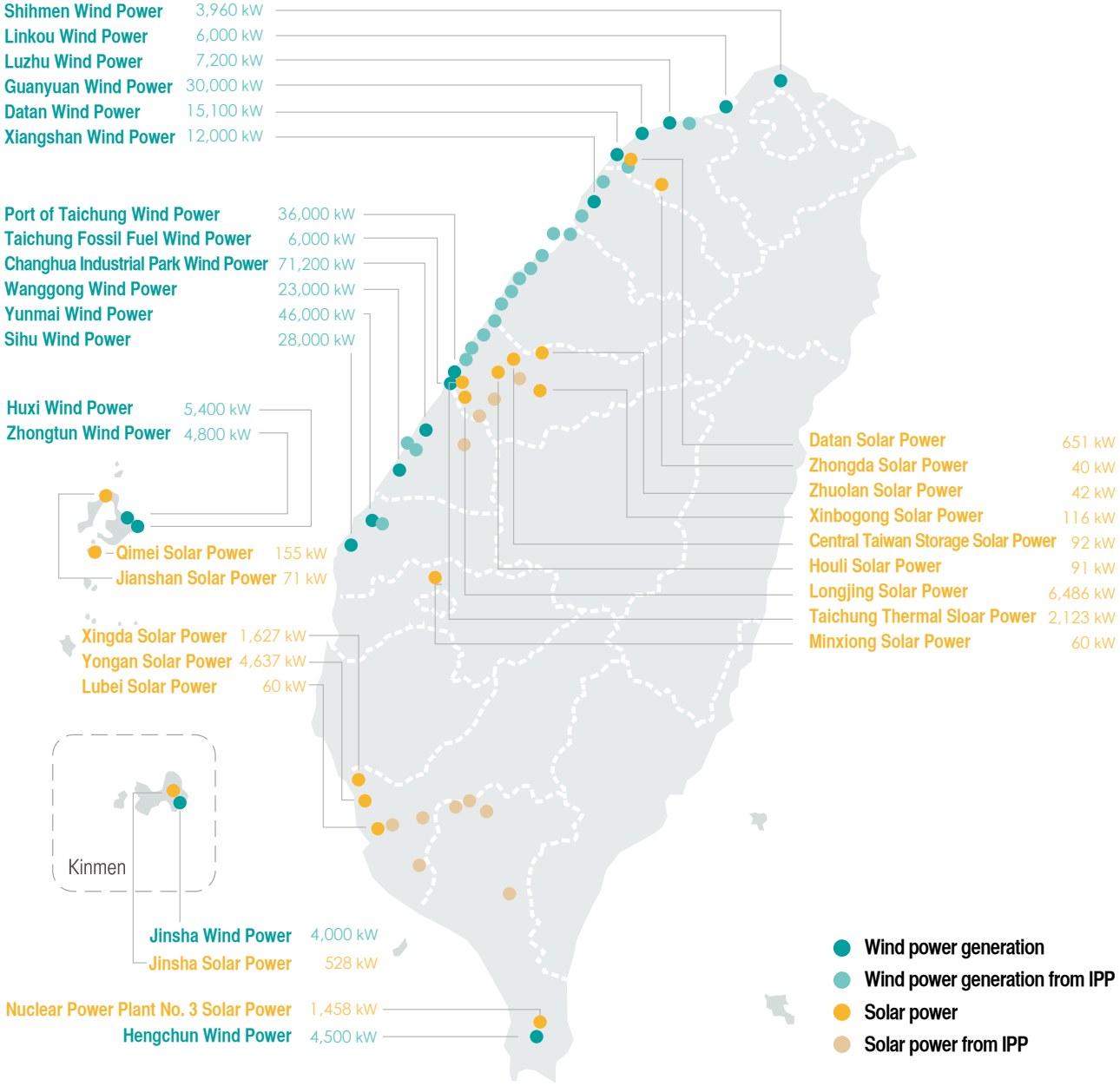
	Deployments	Installed capacity (MW)	Generation in 2018 (GWh)	Number of households accommodated
Wind Power	173 units across 16 sites	290.00	731.8	203,264
IPP Wind Power	-	-	913.0	253,601
Solar Power	25 sites	23.57	26.7	7,417
IPP Solar Power	-	2,323.97	2,630.7	730,737

Note: 1. The calculation is based on Taipower's open data statistics, derived from average monthly power consumption for a typical residential customer at 300 kWh per month and 3,600 kWh per year.

2. Six collapsed wind turbines at the Port of Taichung and two at Shihmen have been deducted from the calculation of installed capacity.

3. Some of the solar power sites have been connected and started power generation, but they will only be licensed by the end of 2019 and have not yet been included in the chart.

Distribution of Taipower's Renewable Energy



The Green Island Geothermal Generating Unit Pilot Project

Taipower's Green Island Geothermal Generating Unit Pilot Project completed test well Number 1 (1,005 meters) in 2018. The result shows that the reservoir has sufficient water, but the temperature at the bottom of the well is quite low at only about 80℃. Therefore, the well is not cost-effective, and is now intended for use as an injection well. Apart from this, test well Number 2 will be completed by the second half of 2019. Currently, the temperature of slurry generated from drilling (at a depth of around 630 meters in February 2019) is rising, meaning that the location is near the heat source. After the production capacity of test well Number 2 is measured thoroughly, the scale, design and construction of the generating unit will be determined.

In order to develop national geothermal power generation, the Ministry of Economic Affairs issued an official letter on January 30, 2018 mandating the set up of a team. Team members were to include representatives from industry, government, research and other units. The CPC Corporation and Taipower are charged with execution of the drilling of geothermal wells and the construction of power plants, respectively. The two companies signed a letter of intent for cooperation on March 28, 2018. Starting with Yilan Renze and the Tuchang, Taipower expects to complete the policy goal of 8MW of geothermal power generation in three stages. CPC Corporation plans to complete the drilling of Renze wells #3 and #4 in June 2019, and will provide data to Taipower so that the Company is able to plan the design of the geothermal power plant (currently estimated at 2,000 kW in capacity). Taipower has initiated a feasibility study for the project, which is expected to be budgeted and implemented in 2020.

Current Status of Renewable Energy Grid-Connection

Taipower has an open attitude to the development of renewable energy. Under the premise of ensuring the safe operation of the power grid, Taipower refers to international technology and development trends, considers financial status, and adjusts its grid connection strategy to meet demand for renewable energy. The number and various types of solar power projects along with their cumulative capacities are shown in the following table (as of February 12, 2019):

Case status		Cases (number)	Capacity (MW)
Accepted cases	Under review and without approval (A)	2,701	3,871.3
	Approved but haven't signed a contract (B)	4,503	3,795.2
	Have signed a contract but haven't connected to the grid (C)	25,903	3,433.9
	Subtotal (=A+B+C)	**33,107**	**11,100.4**
Cases that have already connected to the grid		**24,422**	**2,797.57**

Promotion Performance of Taipower's Cooperation with the National System of Renewable Energy Certificate

At the direction of to the Bureau of Standards, Metrology and Inspection, Taipower developed a renewable energy certificate system. In 2018, Taipower built the Penghu Zhongtun Wind Power Station and the Taichung Demonstration Solar Power Field. At present, Taipower has obtained a total of ***17,113*** renewable energy certificates, accounting for more than half of the 30,508 total of issued certificates.

Strategies for Grid Connection

Taipower set short, medium and long-term policies for activating the renewable energy grid-connection improvement project. In the short-term, the Company plans to expand eight substations, replace two lines, and build one new switching station. A step-up transformer will also be installed in the electrical room at one of Taipower's wind farms. A total of 12 ongoing projects are currently being implemented. For the medium and long-term, Taipower is continuing to conduct a rolling review based on land development scenarios. These are inventoried by the Bureau of Energy to track improvement progress, so as to alleviate bottlenecks in the grid connection of small-capacity renewable energy.

Short-term (within 1 year)

Adjustment of existing distribution lines, reinforcement or addition of lines to the main transformer

Mid-term (1-3 years)

Expansion of the main transformer in the substation and construction of new distribution lines

Long-term (more than 3 years)

Construction of the new booster station, providing operators with options of 69 kV or 161kV connections

To ensure the transparent disclosure of information, Taipower established a "Renewable Energy Application Case Progress Inquiry System." The system allows the general public to make inquiries. The Company also developed a "Visualization Query System for Grid-Connected Feeder Capacity" to guide developers to establishe power plants in areas where the grid-connected capacity is still abundant.

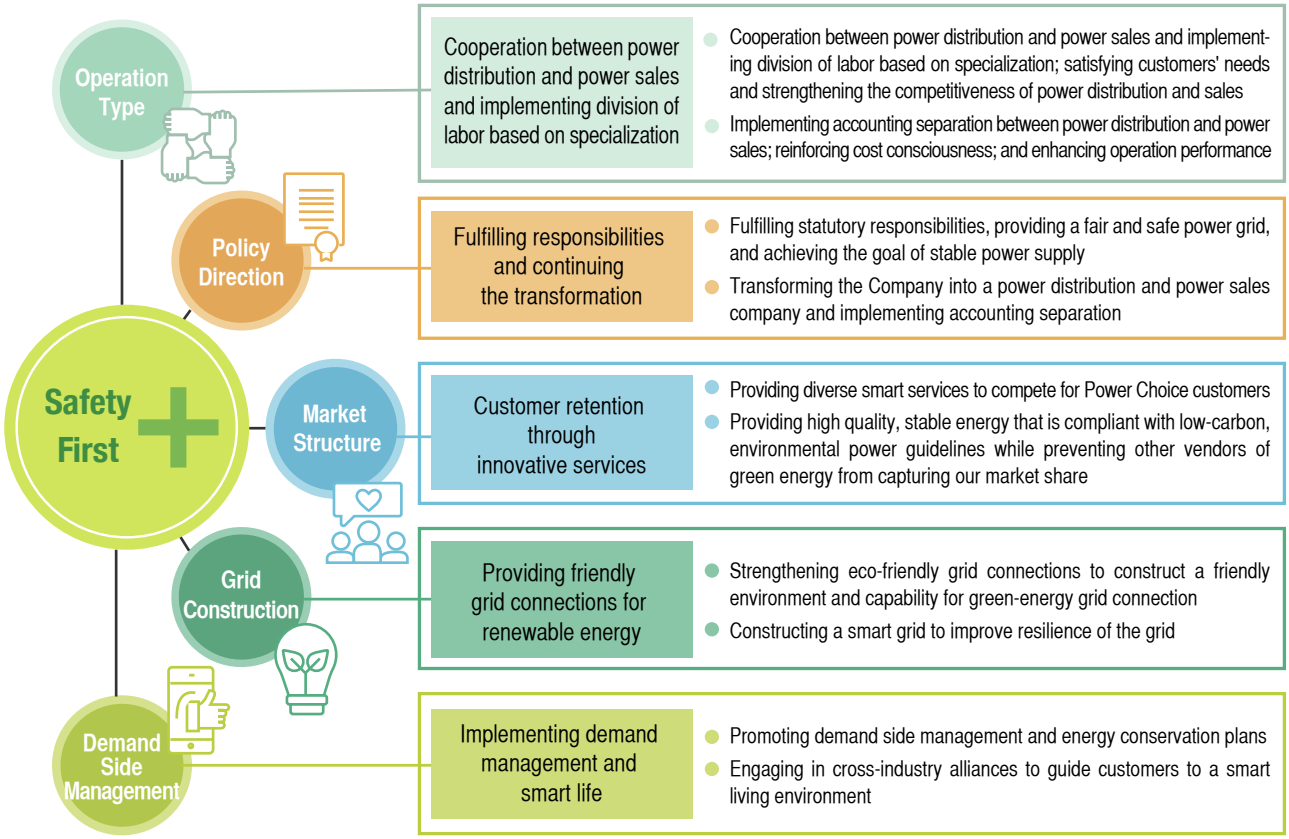
Public Communication on the Construction of New Solar Power Project

During the implementation of the new Salt Field Solar Power Project in Tainan, some people suggested that setting up solar power devices might affect the area's original flood prevention function. Taipower took these concerns seriously and increased the function of the facility's sedimentation tank, calculated the safe displacement, and established standard operating procedures for drainage, so that the original flood prevention capacity has not been reduced, but rather doubled. Taipower also invited local people to visit its wind power stations and solar power fields to strengthen bilateral communication with residents and to help the public learn more about renewable energy generation.

2.3 Providing Quality Electricity Service

A Robust Transmission and Substation System

To ensure the stability of household and industrial electricity, Taipower has comprehensive planning and management of the power grid, transmission, substations, and distribution systems. Looking to the future, we will use five aspects in developing the next generation of stable power supply and distribution. The five aspects include: Cooperation between power distribution and power sales and implementing division of labor based on specialization,Fulfilling responsibilities and continuing the transformation, Customer retention through innovative services, Providing friendly grid connections for renewable energy, and implementing demand management and smart life.



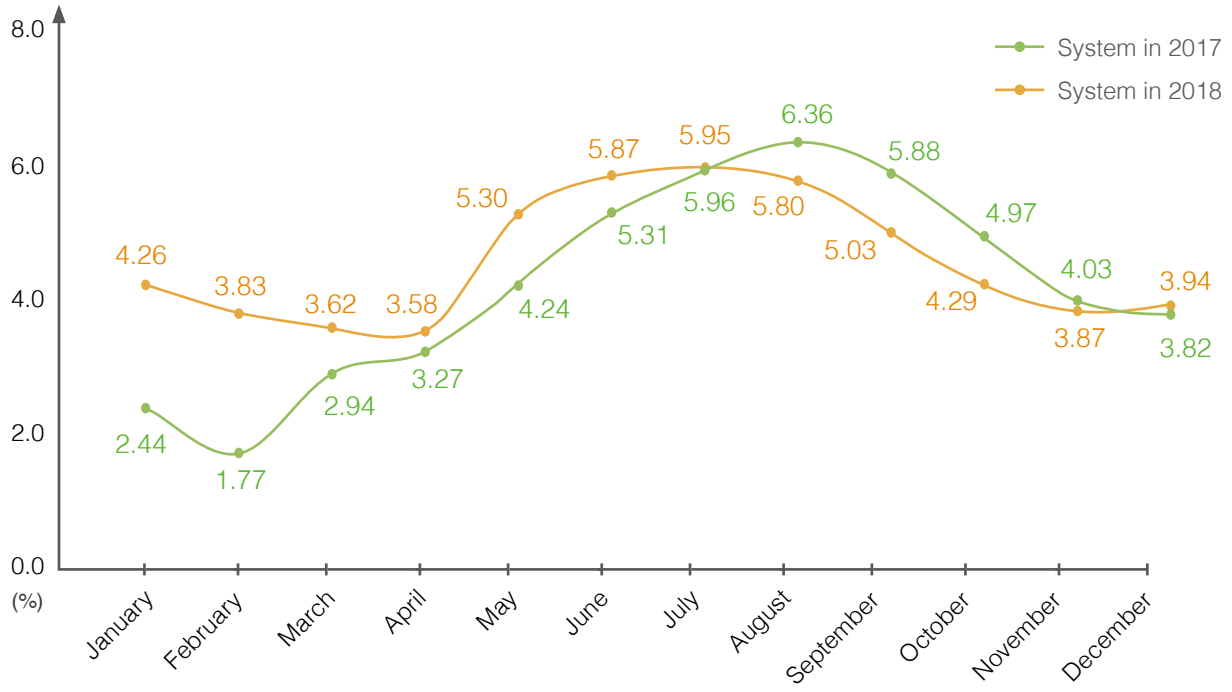
Strengthening the Infrastructure of the Power Grid

The grid is a connective hub between the power generator and the customer. A sound power grid can effectively reduce the probability of power outages and maintain the quality of power supply. Over the years, Taipower has built a dense network around the country to ensure that people have the ability to use electricity conveniently. Regular maintenance of related facilities is also an important part of stable power supply. Taipower will continue to promote plans that increase the power grid's resilience, replace old facilities and lines. The Company will also promote grid projects in a timely manner to maintain a high-quality supply of electricity.

As Taiwan moves towards the integration of intermittently generating renewable energy sources into the grid, the stability of the system and the power supply of the whole country could potentially be affected. Taipower is committed to researching grid-connected dispatching systems and strategies, and to building related systems such as an integration platform that supplies power generation information.

Overall Taiwan has a very stabile power supply. The average number of power outages in 2018 was only 0.227 per household, and the average duration of power outages was 16.187 minutes per household. Over the past decade Taipower has steadily decreased the duration and number of power outages and greatly improved of quality of power supply, customer service, and its own corporate image.

Line Loss Rate in 2017 and 2018 (% accumulated in a month)



Note: 1. The line loss rate in December 2018 was +4.72%. This represents and increase of 3.39% over the same period the year before (when the rate was +1.33%). The increase was caused by the growth in the generation and purchase (from IPPs) of electricity of +1.05% (+187 GWh), and an increase in the power sold of -2.66% (-460 GWh). The increase of generation and purchase of electricity is due to increased demand for electricity in heavy industry and electronics industry; the electricity sales in December 2018 also included power consumed in October and November 2018 by part of the customers. The weather in October 2018 is colder than that of the same period in the previous year, resulting in a decrease in power sold. 2. The cumulative line loss rate from January to December 2018 is 3.94%, an increase of 0.12% from 3.82% of the previous year, due to the increase in inter-zonal flow and load growth.

2. The accumulated line loss rate from January to December, 2018 was 3.94%, a 0.12% increase on the last year's 3.82%. The difference was due to flow increase in the region and load growth.

3. The meter reading factor is caused by inconsistencies between the period of power generation or purchase and the period of power sale. For customers that require high-voltages, AMIs have been fully deployed, with the result that the power consumption period is consistent with the statistical period. However, for the low-voltage users, Taipower currently designates 16 meter reading days per month. Moreover, meter reading is executed region by region on rotation and for meter-rated lighting customers, meter readings are performed every other month. In consequence, the meter reading factor is essentially a lagging indicator of power sold. Despite this, historical data suggests that the statistical estimates of line loss rate as presented annually are typically accurate.

Power Supply Reliability Results for 2014-2018

	2014	2015	2016	2017	2018
System Average Interruption Frequency Index (SAIFI) (times/household • year)	0.264	0.220	0.208	0.212 (Note1)	0.227
System Average Interruption Duration Index (SAIDI) (minutes/household • year)	17.496	16.268	16.274	16.898 (Note 2)	16.187

Note: 1. Results exclude the impact of the large-scale blackout on August 15, 2017. The blackout was mainly due to the interruption of the gas supply from the CPC Corporation. As a result, Taipower was not held responsible. The actual average number of outages per household (including the 8/15 blackout) was 0.553 (times/household • year).

2. Results exclude the impact of the large-scale blackout on August 15, 2017. The blackout was mainly due to the interruption of the gas supply from the CPC Corporation. As a result, Taipower was not held responsible. The actual average duration of power outages per household (including the 8/15 blackout) was 32.572 (minutes/household • year).

Strengthening Power Transmission and Substation System

In response to economic growth, Taipower continued 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 also sought to complete its construction projects as scheduled. Important construction projects are listed in the table below:

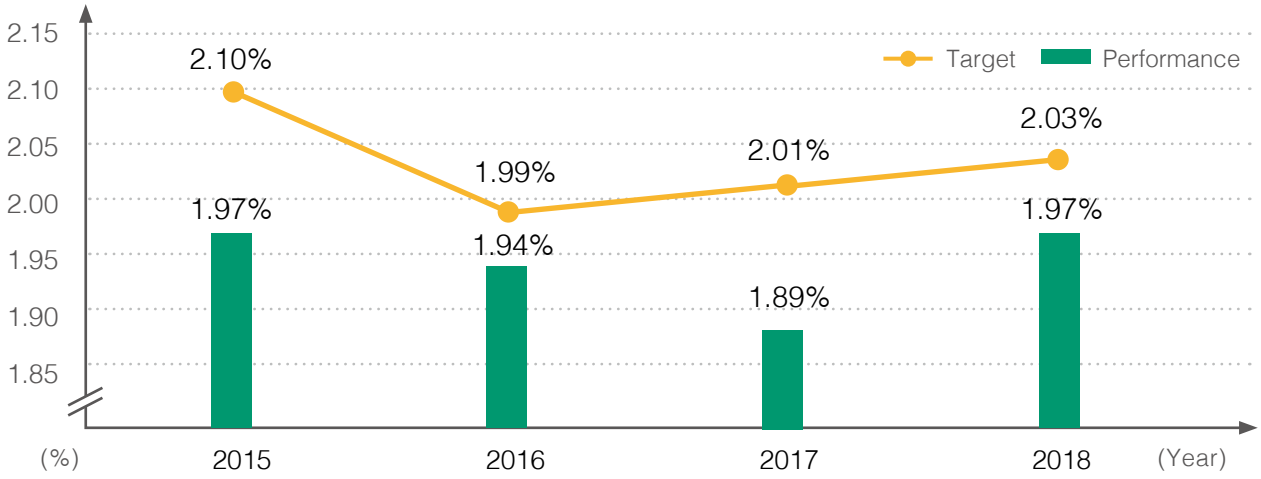
Important Power Transmission and Substation Construction Projects

- Promote the **Seventh Power Transmission and Substation Revision Plan** (2010.1-2021.12) to meet the demands of the load growth, provide grid connections for newly added power sources, and ensure the grid is safe and reliable while reducing the loss rate for the transmission system.
- Promote the **Banqiao Primary Substation Renovation Plan** (2014.1-2020.12) to increase the power supply capacity of the region, improve the quality of supply, promote local prosperity and economic growth, balance regional development, and promote the overall prosperity of the country.
- Promote the **Northern Region's Phase 1 Power Grid Project** (2016.1-2026.12) to meet the regional development load demands of New Taipei and Taoyuan Cities, improve the stable operation of the power system in Yilan in order to meet the load requirements of Hualien and ultra-high voltage customers such as the Asia Cement Corporation.
- Promote the **Northern Region's Phase 2 Power Transmission and Substation Project** (2019.1-2028.12) to meet the development demands of the northern region. The construction of multi-objective substations (Huajiang, Bancui and Yucheng Substations) will also revitalize the surrounding area.
- Promote the **Central Region's Phase 1 Power Transmission and Substation Project** (2019.1-2026.12) to meet load demands and improve the stability and reliability of the power supply in central Taiwan. The project also plans to increase the number of transmission-grade terminal facilities and distribution feeders to facilitate the future connection of renewable energy into the grid.
- Promote the **Complete Renovation of Substation's Phase 1 Project** (2019.1-2034.12) to rectify maintenance difficulties at older, existing substations (that have resulted from wildlife, salt, and fog) and maintain a stable and reliable power supply. This project is a response to government policies promoting renewable energy, smart grid construction and multi-objective substations. During the renovation, space for additionall bays will be reserved for future expansion.
- Promote **grid strengthening for Offshore Wind Power's Phase 1 Project** (2018.1-2025.12) to meet offshore wind power grid connection requirements and government policy goals.
- Promote the **Southern Taiwan Science Park Ultra High Voltage Substation Expansion Plan** (2019.1-2025.12) to strengthen the power supply capacity of the Tainan and Southern Taiwan Science Parks, provide abundant, high-quality, safe, stable and reliable power for the high-tech industry within the parks, promote competitiveness and economic prosperity, improve national income and living standards, and enhance the public's satisfaction with the government's performance.
- In response to the demand for renewable energy grid connections, the Company reported the need for new expansions of substation and line replacement projects.

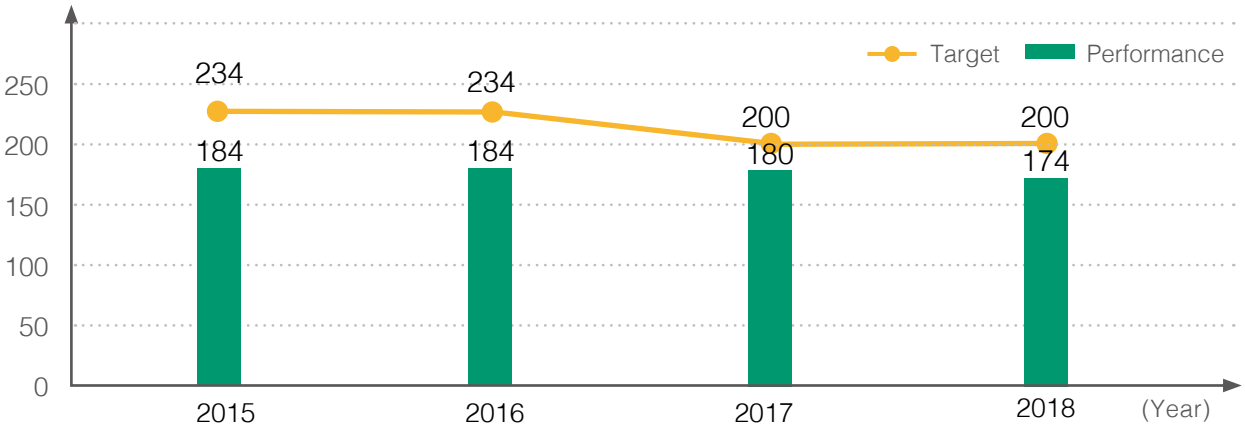
Increasing the Reliability of Power Distribution

To ensure a smooth supply of power, Taipower established a line loss rate target for transmission lines as an indicator for monitoring power supply reliability. In consideration of the transmission system's adaptability and wheeling capabilities in the event of emergencies, Taipower has also drafted distribution system planning guidelines and established a management target of "reducing feeder lines with currents exceeding 300A" as a basis for distribution line performance evaluation.

Line Loss Rates from 2015 to 2018



Implementation Performance for the Reduction of Feeder Lines with Currents Exceeding 300A from 2015 to 2018



In order to avoid regional power outages as a result of typhoons, Taipower proposed a "Power Line Fortification for Disaster Prevention and Resilience Plan" in 2016. The plan called for the removal of existing overhead distribution lines and the establishment of underground pipelines and cables in order to meet the needs of the general public.

Completion of the aforementioned plan was prioritized in high-risk areas including places where typhoons have caused poles to fall, windward areas, and regions where large areas would be affected if a power outage were to take place. The target for 2017 was 154.38 km and 153.81 km for 2018. In 2019 the target is 155.45 km. The goal for 2017 and 2018 were both achieved. In 2019, Taipower is continuing to supervise work on the project according to the predetermined benchmarks. A total of 463.64 km of underground feeders will be completed by the end of the three years.

In response to the energy transition and the move to a new-generation of power supply systems, Taipower has accelerated the automation of distribution feeders. Automated distribution feeders not only help to improve the quality of the power supply, but can also be used for fault detection and the remote control of on-site automatic line switches allowing outages to be quickly isolated thus decreasing the interval and range of power failures. Feeder automation has been applied to industrial areas, vital metropolitan areas and remote areas that are not easy to access for repair. In the future, Taipower will continue to promote distributed feeder automation and raise the target value of feeder construction.

Distribution Feeder Automation Installations from 2016-2018

Performance	2016	2017	2018
Feeder Automation (No.)	7,080 lines	7,316 lines	7,354 lines
Switch Automation (No.)	529 new units	552 new units	963 new units

Enhancing the Reliability of Power Supply on Offshore Islands

Taiwan's offshore islands are not connected to the main island's power grid, making it is challenging to provide outlying areas with a stable power supply. Nonetheless, Taipower has not neglected the rights of residents in offshore areas, and provides electricity services that are equivalent to those available on Taiwan proper. Therefore, Taipower proactively works to improve the electric systems of offshore islands.

In Kinmen, the majority of past power outages and blackouts were caused by the arrangement of the switchyard buses at the Tashan Power Plant. The arrangement made units and lines too concentrated. In the event of accidents, the power plant was likely to experience a complete shutdown. In view of this, Taipower held meetings to discuss methods of segmentation for the switchyard and other facility changes in order to improve the power system in Kinmen. To achieve this goal, Taipower plans to organize generators and substations into different groups in terms of operations. Should a system outage take place in the future, it will not cause a total blackout in the Kinmen area.

At the same time, Taipower is also working on the power grid in the Penghu area so that there is sufficient power and an increase in the availability of electricity. For example, a new primary substation in Penghu has been completed, and after the second line of the Taiwan-Penghu submarine cable is added, some units of the Jianshan Power Plant will be decommissioned and converted into a standby power plant.

The second line of the Taiwan-Penghu submarine cable will integrate the Penghu system into the grid of Taiwan proper. In consequence, the proportion of grid-connected renewable energy in Penghu will be greatly increased, and the surplus electricity will be sent back to Taiwan. Through the integration of these systems, Penghu will be provided with stable and abundant power, which will help increase the electricity penetration rate.

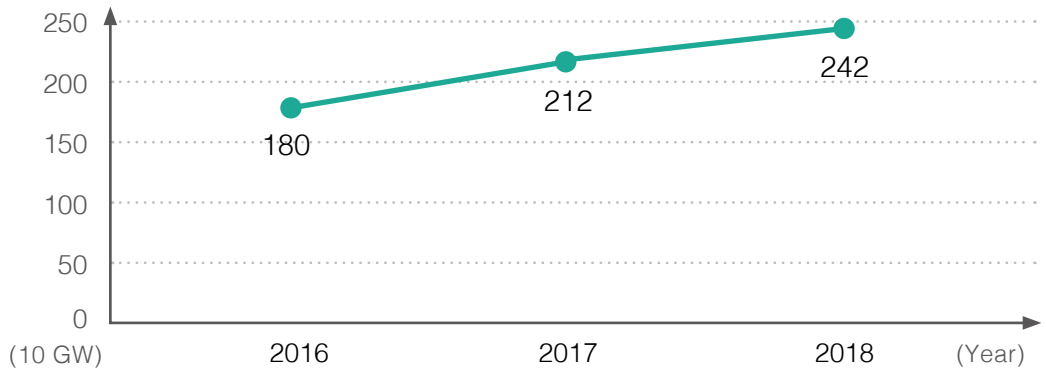
2.4 Demand-Side Management and Power-Saving

In recent years, the demand for electricity in Taiwan has continued to grow, but setting up power generation units has become increasingly difficult. Meanwhile, the frequency of abnormal weather has increased while the power supply has become increasingly tight. Therefore, Taipower is actively promoting power demand management, including the implementation of various demand response load management measures, promoting multiple time-of-use rates, organizing power-saving incentive activities and power-saving awareness campaigns to guide customers in managing their electricity use. It is hoped that these measures will create a beneficial situation for the power utility industry, the general public, and the environment.

Demand-Side Management Measures

Measure		Description	Applicable Customers	Results
Implementing "Time-of-Use Rates" since 1979		Reflect the cost of electricity during different time periods. Encourage off-peak hour electricity use to reduce peak load	Optional for Meter Rate Lighting and low-voltage customers; Applicable to all high-voltage customers	Reduced the daily peak load in 2018 by an estimated accumulation of 3,930 MW
Launched "Residential/ Commercial Customer Simple Time-of-Use Rate" in 2016		In order to provide more diverse rates for residential/commercial customers, Taipower has used pricing indicators as a reminder for customers to reduce power use during peak hours so as to achieve the goal of reducing peak load	Customers in residential housing and proprietors of small stores	
Demand Response Load Management Measures	Implementing "Central Air Conditioner Duty Cycling Load Control Measures" since 1991	Rotation of central air-conditioning systems with 60 minutes on and then 15 minutes off. Rotation of packaged air conditioning system with 22 minutes on and then 8 minutes off to reduce peak load	Non-productive customers (i.e. office buildings, schools, etc.)	
	Implementing "Electricity use reduction measures" since 1987	Provide reduced rates as incentives to encourage customers to reduce electricity use during peak hours and to transfer usage to off-peak hours, so as to reduce system peak load	Either (super) high-voltage customers of more than 100 kW of capacity specified in their contracts or schools (Depending on contract contents, such as factories, educational institutions, etc.)	Daily peak load reduced by 1040 MW on the peak load day of 2018 (August 1)
	Implementing "Demand-Based Bidding Measures" since 2015	Through feed-back pricing decided by the customers, Taipower grants more autonomy to customers to inspire their power-consumption mitigation potential and to improve system loads, thereby mitigating the demand for new power development and reducing the risks of power shortages	(Ultra) high-voltage customers of more than 100 kW of capacity specified in their contracts	
	Implementing a "Joint Solution" as a new demand-based bidding measure in 2017	Encourage customers to apply for demand-based bidding as groups	(Ultra) high-voltage customers of more than 100 kW of capacity specified in their contracts	

Demand Response Load Management Measures Applying for Reduction of Capacity



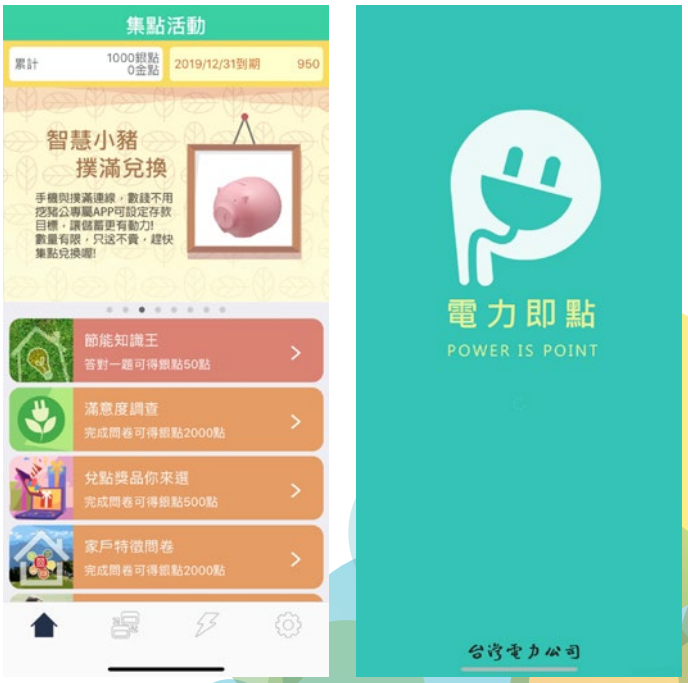
Demand-Based Bidding

Since 2015, Taipower has been promoting a plan to let customers decide the feedback price of electricity if they reduce their electricity consumption and can compete with other customers and Taipower generators. If their electricity consumption is actually reduced after winning the bid, the electricity fee deduction can be obtained according to the quotation. There are three types of plans: reliable, economical, and joint types. By asking customers to self-report feedback prices, they are given more autonomy and are encouraged to actively suppress electricity consumption and peak loads.

Time-of-Use Rates

In order to reasonably reflect the power supply costs of the system during different time periods, and to encourage customers to reduce electricity consumption during peak hours, Taipower has been implementing time-of-use rates since 1979. Ten types of time-of-use rates have been implemented for various types of customers over 40 years. In recent years, rates have been in line with adjustments of electricity prices. The ratio of peak hour rates over off-peak hour rates has been continuously expanded to strengthen incentives for the general public to better manage their power use.

In order to increase interaction with the general public and encourage increased effectiveness and self-reliance in saving electricity, power-saving incentives were introduced into the registration mechanism in 2018. As participants sign up through the official website, customer service hotline, or over the counter, they receive a reward of NT$0.6 per kWh saved in electricity. The "Power is Point" app was launched in the same year to allow people to participate in various energy-saving and educational activities to collect points. Points may be used to redeem prizes and participate in sweepstakes, etc. The goal is to promote the concept of saving electricity within the public and to form a culture that is in the habit of saving electricity.



Power-Saving Service Team

In December 2018., Taipower established Power-saving Service teams in each district that visited 500 high-voltage customers to check for potential electricity savings and to promote demand response measures. External ESCO institutions were introduced to assist employee training programs. In the future, Taipower will continue to innovate and strive for excellence, promote demand-side management measures and power-saving awareness among customers, and to use creative marketing techniques that promote energy saving by the public. The Company will also do its utmost to implement the government's energy-saving and carbon-reduction policies.

Community Energy Saving Campaigns

To motivate individuals and communities to save energy, Taipower pulls out all the stops when holding campaigns, advocating for various energy-saving techniques and promoting knowledge – as in the case of high-efficiency and energy-saving LED lighting. A total of 691 sessions took place in 2018 and were attended by 132,679 participants.

3 Environmental Sustainability

Environmental and Fuel Cost Implications for Taipower

The power utility industry relies on natural resources to generate electricity. With the increase in energy demand and the diversification of power generation sources, Taipower's demand for various natural resources also increases. Therefore, Taipower must control its use of raw materials appropriately, improve the modes of transportation used, and control emissions in order to maximize efficiency, and strike a balance between the needs of the state, society, the general public and the environment.

Principal Investments

- Taipower has established actionable short, medium, and long-term goals and related plans for stationary, mobile, and fugitive pollution sources, respectively
- Actively communicate with stakeholders to explain environmental assessments and processes for projects that may impact local environments and communities
- Develop ecological power plants and promote environmental education with local elementary schools; start a "marine ranching" project at power plants along coastlines to carry out algae cultures and carbon fixation of the fume discharged from power plants
- In 2018, Taipower started to develop a higher-level environmental policy and published an Environment White Paper

SDGs	Connections between SDGs and Taipower	Associated sections and issues
6 CLEAN WATER AND SANITATION	Continual promotion of footprint inventories for power generation and water usage and inspection of the water usage status at various power plants to enhance water usage efficacy; Taipower will also ensure that wastewater discharged (including warm wastewater) is compliant with pertinent regulations to maintain the quality of water resources in the proximity of power plants.	– Effluent Management
7 AFFORDABLE AND CLEAN ENERGY	Formulate plans for various forms of renewable energy and improve operational efficacy while continuing to improve ease of access and availability of power.	– Environmental Policy and Goals
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	Improve energy efficiency and the resilience of power infrastructure. Promote the innovative development of eco-friendly technologies.	– Sustainability and Strategies for Low-Carbon Electricity – Environmental Policy and Goals
11 SUSTAINABLE CITIES AND COMMUNITIES	Mitigate urban impacts on the natural environment while focusing on the improvement of air pollution and reducing waste generation.	– Reduction of Utilization of Energy Resources – Minimizing Environmental Impact – Environmental Policy and Goals
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	Improve overall energy efficiency and resource requirements for generation, transmission, and distribution in order to reduce the environmental footprint of the power supply.	– Reduction of Utilization of Energy Resources – Minimizing Environmental Impact – Environmental Policy and Goals
13 CLIMATE ACTION	Actively participate in adaptation plans and mitigation actions while improving energy efficiency, developing renewable energies, and enhancing the existing power generation system's climate resilience.	– Reduction of Utilization of Energy Resources – Minimizing Environmental Impact – Environmental Policy and Goals
15 LIFE ON LAND	Construct ecological power plants that protect the surrounding ecological systems.	– Minimizing Environmental Impact

Performance Highlights

- The amount of greenhouse gas emission from Taipower in 2018 was ***98.26 million*** tons of CO_2e
- The amount of air pollution released by Taipower between 2016~2018 was declining year by year and lower than the regulatory value
- A total of ***230 thousand*** tons of rainwater was recovered in 2018 and recycled for utilization in the plant
- In 2018, the output of coal ash was 2.46 million tons and the amount of recycled utilization was 2.04 million tons, for a re-utilization rate of ***82.9%***
- Taipower initiated the reuse of coal ash from power plants and won the 1st ***Taiwan Circular Economy Awards***
- In 2018, in order to maintain air quality, Taipower voluntarily reduced loads and emissions. The total energy saved was ***5.83TWh***

Future Plans

According to the plan outlined in the Environment White Paper, Taipower will reduce its impact on the environment, enhance the efficiency of utilization in various resources, while investing in circular economic activities and ecological conservation. The Company will also strengthen international exchanges and cooperation. By adjusting the energy structure, increasing the proportion of natural gas energy, and strengthening pollution prevention and control equipment, in response to the air quality and climate issues of concern to the general public, the greenhouse gas emission intensity from thermal generating units will be reduced by 20% and air pollutant emissions will be reduced by 50% by 2030. In addition, at least five ecological power plants will be constructed to fulfill the Company's eco-friendly commitments.

3.1 Sustainability and Strategies for Low-Carbon Electricity

3.1.1 Toward the Goal of Low-Carbon Power

A commitment to carbon reduction is one of the most basic requirements of the power industry today. In the current era of electrification, providing low-carbon electricity allows the general public to work for the goal of achieving an environmentally sustainable society. At this time, Taipower's main sources of greenhouse gas emissions include thermal power generation, coal yards, oil-consuming equipment such as vehicles and engines, insulation gas used for switch gears, freezers and air-conditioning. The Company conducts an annual inventory and internal audit, as well as an external verification (through third-party institutions) of its thermal greenhouse gases. The scope of the inventory covers greenhouse gas emissions for Taipower and its thermal (coal, oil, and gas-fired) power generating units and is disclosed in this report.

In order to achieve the goal of reducing carbon emissions, large-scale thermal power generating units are being upgraded and rebuilt to improve their power generation efficiency. The Company is also working to develop renewable power generation through plans that include hydropower, on and offshore wind farms, solar power sites, geothermal power plants, and the construction of related energy storage systems. This work similarly includes investment in research on carbon reduction technologies (such as carbon capture and storage technology, and the establishment of carbon reduction technology parks and experimental device demonstration projects) and a lower carbon power service model (that includes continuous promotion of demand response plans for enterprises and customers, the development of ESCO energy technology services and energy-saving diagnostic demonstration service centers). Other actions include the use of management methods such as inventory, assessment, setting of science-based reduction targets, and strengthening buildings' energy efficiency to achieve carbon reduction.

Taipower's Short, Medium and Long-term Carbon Reduction Goals

Short-term Goals (By 2021)

Thermal unit emission intensity will be reduced by *7%* compared to 2016

Medium-term Goals (By 2025)

Thermal unit emission intensity will be reduced by *15%* compared to 2016

Long-term Goals (By 2030)

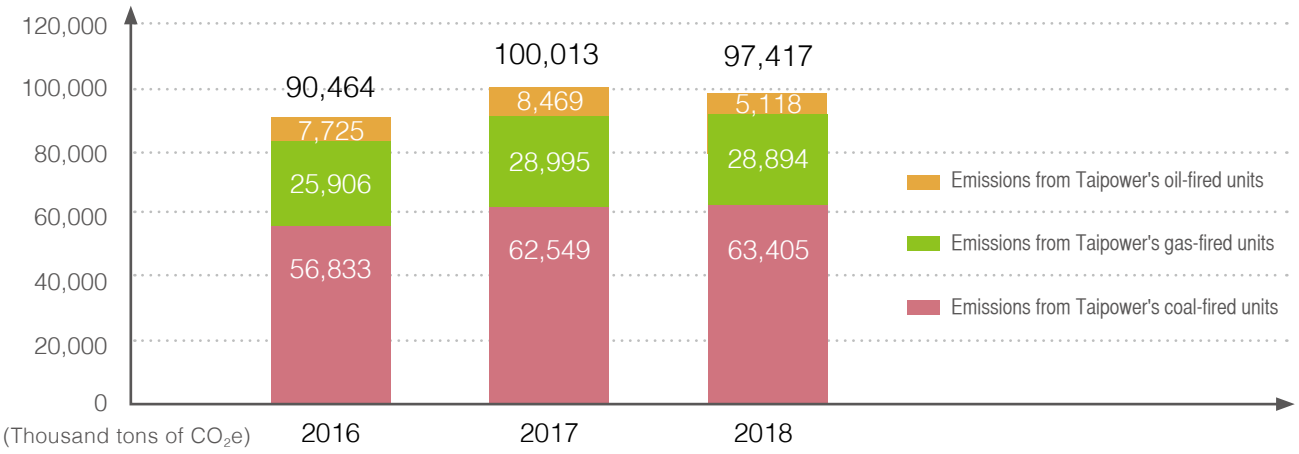
Thermal unit emission intensity will be reduced by *20%* compared to 2016

Greenhouse Gas Emissions by Taipower from 2016-2018

Unit: Thousand tons of CO_2e

Type of Gas	CO_2	CH_4	N_2O	SF_6	HFC	Total
2016	90,447	223	300	78	12	**91,060**
2017	100,042	262	331	75	12	**100,722**
2018	97,531	254	327	133	18	**98,263**

Greenhouse Gas Emissions from Taipower's Thermal Power Generation Units from 2016-2018



3.1.2 Climate Adaptation

Taipower's generation, transmission and supply systems are located in mountains and along shores and river basins. As a result, these facilities face unknown direct challenges from climate change. To mitigate potential impacts, Taipower will engage in proactive "adaptation" in terms of the strength of power plants by reinforcing the protective abilities of hydro and thermal power plants as well as transmission and distribution systems. This is being done to reduce environmental impact and put more effort into achieving sustainability.

Starting in 2010, Taipower began actively participating in the "Climate Change Adaptation Strategies and Counseling for Energy Departments" program organized by the Bureau of Energy. This required the completion of adaptation action plans for the power generation systems at the Xingda, Datan, Mingtan, Jianshan, Dalin and Tongxiao power plants along with climate change impact analysis and vulnerability assessments for the transmission and distribution systems. In addition, a reflective risk assessment of power-generating facilities has been done on the "Climate Change Adaption Platform for Energy" established by the Bureau of Energy.

Then, in 2016, Taipower independently launched a two-year "Taipei Power Supply Branch Climate Change Adaptation Research Project." This led to the devising of adaptive strategies in 2018. Based on the likelihood of disaster occurrence, facilities identified as high-risk were categorized as either "intolerable" or "tolerable." Facilities categorized as "intolerable" were included in a list of prioritized items that require immediate adaptive action; facilities categorized as "tolerable" have corresponding short, medium, and long-term adaptation measures that have been formulated based on their respective costs.

3.2 Reducing Use of Energy and Resources

3.2.1 Utilization of Fuels

In order to be more environmentally friendly, Taipower's fuel selection emphasizes low-ash, low-sulfur and low-nitrogen fuels. Company 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, thus stabilizing power supply requirements and ensuring pollutant emissions in fumes generated by thermal power generation remain lower than legally required levels.

Taipower's Utilization of Fuels from 2016-2018

	2016	2017	2018
Coal (millions of tons)	26.164	28.975	29.009
Gas (millions of cubic meters)	12,609	14,113	14,085
Fuel oil (thousand of kilolitre)	2,427	2,663	1,601
Nuclear fuel (million pounds)	203.30	67.61	164.86

In order to reduce emissions, power plants need to add environmental protection equipment and facilities to bring them in line with the environmental protection requirements. Coal quality must also meet the requirements of being high in calorific value, low in ash and low sulfur content. Since coal from mines in different countries have different properties, power plants usually blend coal from multiple sources to adjust their content ratios. For example, the ash content of Australian coal is about 15% higher than average while the ash content of Indonesian coal is about 5% lower. With proper blending, ash levels can be reduced to meet a power plants coal ash level requirements. Similar blending allows calorific values and sulfur contents to meet requirements. In addition, Taipower has added quality requirements for its coal procurement. For example, the Company has decided to reduce the ash content of Indonesian coal from 11% to 8% and sulfur from 1.1% to 0.9%. Further restrictions of mercury content have been imposed. While Taipower exercises strict control of emissions from power plants in the downstream of its supply chain, the Company works even harder to deliver on its commitments on upstream areas of its supply chain. (Please refer to Chapter 6.3.1 for information on Taipower's management and performance in fuel procurement)

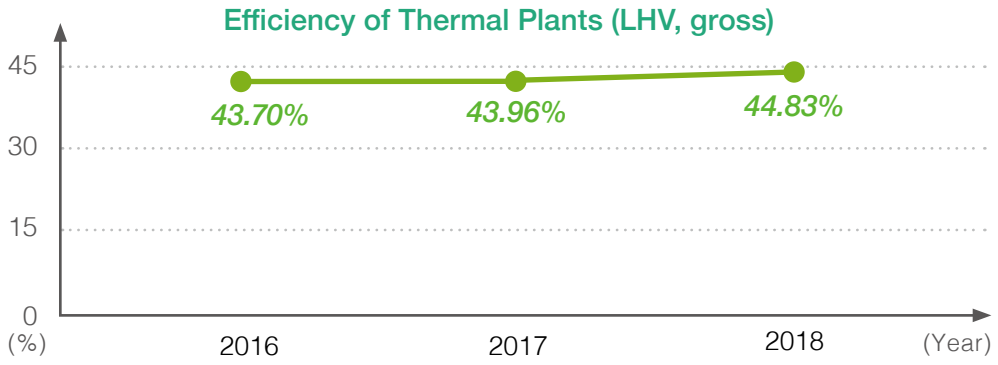
3.2.2 Increasing Energy Efficiency

Management of Productive Resources

Starting in 2015, Taipower implemented the use of an Energy Management System at its different power plants. The system received certification from the British Standards Institution (BSI) in 2015 and again in 2016 at the Datan and the Xingda power plants. For 2017, Taipower continued to expand on its past experiences and constructed Energy Management Systems at the Nanbu, Dajiaxi and Daguan power plants with personnel from its Department of Environmental Protection. Taipower organized training, conducted energy reviews, performed energy-saving diagnostics, formulated action plans and organized discussions. These efforts were recognized with the BSI and SGS certification of power plants in 2017.

Thermal Power Generation

Taipower endeavors to manage power production quantities and to set specific targets for power use. These targets may not exceed the averages of the most recent three years. To achieve this ongoing improvement, Taipower is gradually phasing out its older generation units that are due for decommissioning while introducing high-efficiency units. In recent years, Taipower's thermal plants have also diligently worked to improve efficiency and to strengthen international exchanges and collaborations in order to increase knowledge and introduce new technologies. In addition, operations and maintenance measures have been introduced to enhance the energy efficiency of existing units. As a result, the gross efficiency of lower heating values (LHV) at thermal plants rose from 43.96% in 2017 to 44.83% in 2018.



Production Power Use by Thermal Power Plants from 2016-2018

	2016	2017	2018
Power consumption (Twh)	50.27	55.27	55.62
Power consumption target (%)	≦ 3.60%	≦ 3.60%	≦ 3.58%
Actual average power consumption (%)	3.62%	3.55%	3.62%

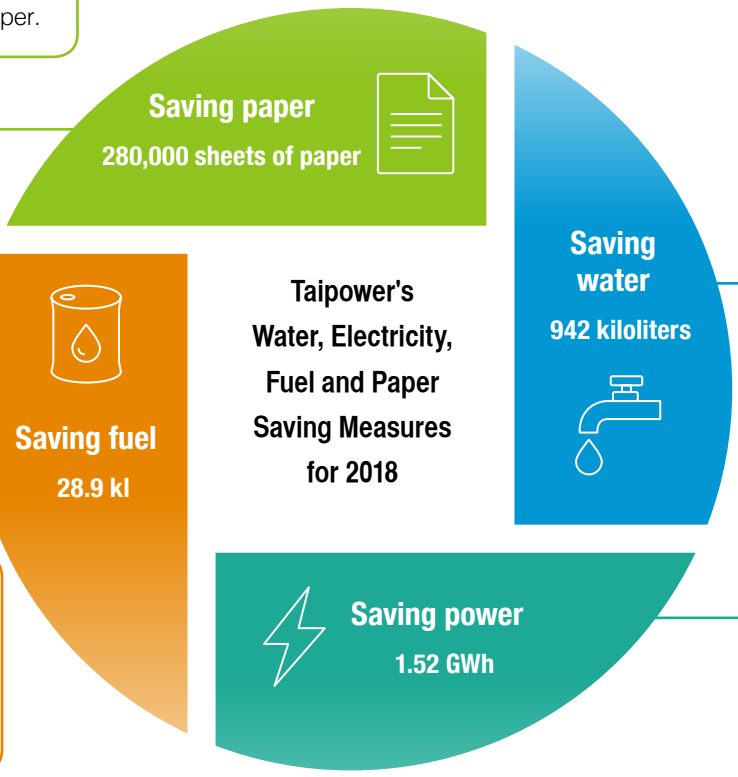
Non-Production Resource Management

In 2018, Taipower continued to promote energy and oil conservation in conjunction with the Executive Yuan's "Government Agencies and Educational Institution Energy Conservation Action Plan." The Company set an annual target for reducing the consumption of power and oil by 1% when compared to the previous year. Taipower has also been promoting water conservation in accordance with the MOEA's "Normalized Action Plan for Water Conservation." The Company has set an annual target for reducing the consumption of water by 1.5% compared to the previous year. Reductions are achieved by encouraging all branches and power plants to save energy and reduce emissions. Taipower also tracks its monthly usage of energy (water, electricity, and oil) and has implemented annual evaluations to identify units with outstanding performances.

Results of Non-Production Resource Management

- Continued to implement paper-reduction measures such as electronic official document exchanges and online approvals, with the performance reaching 70% and 75%, respectively. Encouraged colleagues to print on both sides of the paper.

- Actively used recovery systems for rainwater that is used for watering plants and cleaning floors in the Headquarters building; additional plans are being made to use the collected rainwater to flush toilets.
- All toilets on every floor of the Headquarters building have been renovated by installing dual-flush toilets, urinals with flush sensors and faucets equipped with water-saving nozzles.



- Encouraged carpooling and improved vehicle maintenance to improve fuel mileage.

- Kept indoor temperatures between 26-28℃ and installed circulating fans on the ceilings of each floor to increase occupant comfort while reducing water-chiller load.
- Adopted computerized operations for elevators in the building with energy-saving modes; some elevators do not operate during off-peak periods of office hours, off-hours and holidays.
- Power-consuming equipment in buildings has been incorporated into a central monitoring system so scheduled operations can be integrated with power-saving modes (e.g.., automatically cutting off power to water coolers during off-hours and holidays to save power from equipment on standby). The traditional lighting of the stairs at the Headquarters building has been replaced with LED energy-saving lighting to improve the efficiency of electricity consumption.
- Analyzed the electricity consumption of equipment and the building with the Energy Management System and strengthened the effectiveness of energy conservation management.

3.3 Minimizing Environmental Impact

3.3.1 Response Measures to Air Pollution

In response to the current public emphasis on air quality, Taipower has established an actionable air pollution management strategy for stationary, mobile, and fugitive sources of emission. The Company is also gradually implementing air quality guarantees through short, medium, and long-term goals and planning. Through the transformation of the power generation structure, thermal power generation has mainly been transformed from coal to gas-fired. The coal-fired units are gradually being replaced by ultra-supercritical units with better power generation efficiency. Older combined gas cycle units are also gradually being replaced by new units that have better generation efficiency. These actions along with various other measures have helped achieve the goal of reducing air pollutant emissions. The emissions of major air pollutants by Taipower in 2018 were far below the regulatory requirements, and emissions fell sharply when compared with 2017.

Actual Major Air Pollutant Values and Legal Requirements between 2016-2018

Unit: Kg/GWh

	PM		SO_x		NO_x	
	Actual value	Legal requirement	Actual value	Legal requirement	Actual value	Legal requirement
2016	22	67	306	587	308	416
2017	21	52	296	552	270	416
2018	20	46	182	368	222	329

Management of Stationary Emission Sources

Short-term response - The loads of coal-fired units are reduced during periods of poor air quality and the dispatching of gas-fired units is prioritized

In order to improve air quality, since 2015 the Company has implemented load reduction of coal-fired power plants provided there will be no impact on power supply safety. In addition, since November 2017, Taipower has acted in accordance with the Emergency Response Procedure for Air Quality Deterioration that the EPA amended on June 9, 2017. When the Environmental Protection Agency releases a red warning (AQI>150), the Company undertakes friendly load reductions. Further voluntary load reductions and related measures are implemented if more than one-third of all monitoring stations in the monitored area reach a Level 1 air quality warning, provided there is no risk of negatively impacting power supply stability. By the end of January 2019, load and emission reduction operations had been executed 1,356 times.

Principles of Load Reduction in Response to Air Pollution Grading

Load reduction actions	Criteria	Planning
Friendly load reduction	According to the EPA's Taiwan Air Quality Monitoring Network website, the air quality index (AQI) forecast for the following day will be published at 4:30 PM. Friendly load reductions are initiated if the AQI forecast reaches 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 reduction during off-peak hours at night (i.e., between midnight and 7:00 AM.).
Voluntary load reduction	According to the EPA's Taiwan Air Quality Monitoring Network website, when one-third or more air monitoring stations at various areas have reached red alert early warning, voluntary load reductions are initiated.	Provided there will be no impact on power supply safety, Taipower arranges for coal and oil-fired power plants in the designated areas to implement load reduction.
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 Procedure for Air Quality Deterioration to reduce actual daily emission by 10, 20 or 40%.

Load Reductions due to Air Pollution in 2018

All power plants in Taiwan	Times of load reduction	Amount of load reduction (10 MWh)		
		Annual overhaul (maintenance)	Non-annual overhaul (maintenance)	Total
Friendly load reduction	446	176,610	95,200	271,810
Voluntary load reduction	549	221,432	89,629	311,062
Total	995	398,042	184,830	582,872

Note: Rounded to the nearest whole number

Medium-term action - Adopt end-of-pipe reduction and regard emission standards for gas-fired generating units as the goal

Medium-term actions include conducting a comprehensive inventory of existing control equipment, planning and setting up high-efficiency air pollution control equipment, and making use of overhaul periods to improve the function of control equipment. In addition, the performance of the control equipment will be improved as much as possible through operations, and the introduction of more advanced and efficient air pollution control equipment which is installed at new power plants or during equipment upgrades at existing power plants. In order to ensure information transparency, continuous automatic monitoring of instruments for flue gas emissions is available to the general public. At present, the inventory statistics for air pollution improvement at Taipower's existing generation units is as follows:

Name of the power plant	Content of improvement plan	Amount to be reduced (ton/year)	Budget (NT$100 million)	Schedule (year)
Xiehe Power Plant	Use fuel oil containing less than 0.3% of sulfur	SOx：2,000	55	Procurement and utilization started from 2018
Datan Power Plant	Units Number 1 to 6 went through renewal of low NOx burners (LNB), and Units Number 3 to 6 went through the addition of selective catalytic reduction (SCR) equipment	NOx：2,401	82.5	2018~2022
Taichung Power Plant	Improvements and upgrades of air quality control systems (AQCS) were implemented on Units Number 1 to 4	TSP：61 SOx：503 NOx：2,154	92.69	2017~2019
	During the overhaul of Units Number 5 to 8, performance was improved for electrostatic precipitators (ESP), coal pulverizers, and low NOx burners (LNB).	TSP：78 NOx：2,277	34.5	2018~2022
	A feasibility study of air pollution control equipment (AQCS) improvement for Units Number 5 to 10 was conducted for comprehensive evaluation	TSP：247 SOx：6,615 NOx：5,888 Note: The reduction results from the improvement of Units Number 5 to 8 during the overhaul period are deducted.	145.6	From March 2022 to the end of February 2025
	Built 2 A-frame indoor coal bins.	TSP：12	140	Completed in 2021 and 2024
Xingda Power Plant	The catalyst layer of the selective catalytic reduction (SCR) equipment for Units Number 1 and 2 was increased to three layers from the original two.	NOx：281	1	2017~2018
Nanbu Power Plant	Units Number 1 to 4 went through a renewal of core elements and low NOx burners (LNB).	NOx：360	67	2016~2019
Dalin Power Plant	Unit Number 5 went through combustion adjustment. Unit Number 6 went through a renewal of its low NOx burner (LNB)	NOx：719	4	2018~2019
Taipower's total investment in response to air pollution and its expected results		TSP：398 SOx：9,118 NOx：14,080	622.9	

Long-term action - Management shift of power sources from "mainly coal with supportive gas" to "mainly gas with supportive coal"

In accordance with the national energy policy, the proportion of renewable energy will be increased, but the thermal power generation structure will also be changed. The thermal shift can essentially be described as a move from "mainly coal with supportive gas" to "mainly gas with supportive coal." According to the power development plan, coal-fired units are going to be used in both the Dalin and Linkou Projects, which are still under construction. Gas-fired units are also used in all other projects at the Tongxiao, Data, Xiehe, Xingda and Taichung power plants. This standardization means a stable power supply can be achieved and overall air pollution emissions can be effectively reduced. In all cases, whether at new coal-fired or gas-fired units, efficiency has increased significantly compared to conditions before renewal and renovation.

Management of Mobile Emission Sources

According to the analysis of the Environmental Protection Administration, mobile sources account for about 30% to 37% of the total domestic PM2.5 pollution. If the mobile pollution sources are classified, the largest source is diesel trucks, accounting for 11.2% to 16.8%. Heavy-duty diesel vehicles that are classified as Phases 1 and 2 of the emission standards will be replaced according to the policy of the Executive Yuan's Environmental Protection Administration. It is estimated that each old large diesel vehicle that is eliminated can reduce PM2.5 emissions by about 67 kg per year. Heavy-duty diesel vehicles that are classified as Phase 3 of the emission standards will be equipped with diesel particulate filters to reduce pollution. It is estimated that each Phase 3 diesel vehicle will reduce its PM2.5 emissions by about 10 kg per year.

A total of 25 Taipower vehicles had been equipped with diesel particulate filters in 2017. Filters were installed on another 27 vehicles in 2018. All Taipower's vehicles are expected to have diesel particulate filters at the end of 2019 reducing PM2.5 emissions by approximately 520 kg. In addition, annual budgets have planned to phase out 308 diesel vehicles which are at least 18 years old, and to replace them with new vehicles that meet the environmental standards. New vehicles will completely replace the old ones in 2020, and they will reduce PM2.5 emissions by up to 20,000 kg.

Taipower Built Its Own Coal Carrier and Reduced CO_2 Emissions by More Than 4,000 Tons Per Year

In order to make coal transportation more efficient, six "Taipower Prosperity" coal carriers were built by the Company. With the addition of these ships to Taipower's fleet, the Company is now responsible for the delivery of 25% of imported coal. The ships were intentionally built to feature green, energy-saving, and carbon reduction equipment. The design takes into account the demands of both coal carrying and environmental protection.

By the time construction began, Taipower Prosperity V to VIII were already industry leaders as they were designed to be green vessels and brought nitrogen oxide (NOx) emissions while sailing into compliance with the International Maritime Organization's Tier 2 NOx emission limits that were set to be enforced in 2011. The four Taipower Prosperity vessels have obtained a total of 16 international certificates for the air pollution prevention of their diesel engines.

When the vessels are sailing, the water flow underneath is dispersed through a "wake equalizing duct" that allows water flow to concentrate and pass under the vessel. This increases propulsion efficiency (or fuel savings) by 5%. Statistics indicate that by using this equipment, the four Taipower Prosperity vessels reduce carbon dioxide emissions by more than 4,000 tons a year.

A Sustainable Power Plant Becomes a Marine Ranch

In order to introduce the concepts of circular economy and ecological friendliness, Taipower plans to run "Marine Ranch" projects at power plants located along the coast. The projects cultivate carbon fixing algae using flue gas and warm effluent (including desulfurized seawater generated by the seawater desulfurizing system) discharged from power plants. The algae is then used in an experimental fish hatchery. This program not only creates secondary products and adds value to power generation, but also improves the environmental friendliness of facilities by creating ecological power plants that co-exist and prosper with the environment.

At present, Taipower has started a marine ranch at the Linkou Power Plant and established a working group to gradually develop the hardware and equipment for the project. This includes warm drainage cages and a breeding control field. The Company cooperated with the National Taiwan Ocean University to carry out the first stage of marine ranch cage breeding. By using higher temperatures in a warm drainage channel, the flora and fauna of the ranch are able to survive low winter temperatures while maintaining their growth rates.

The Linkou plant also has a photosynthetic algal culture reactor that allows cultured microalgae to be used in cementing the carbon dioxide from flue gas. This reduces carbon and the algae that have trapped the carbon are subsequently used as fish bait and feed for the fish cultured in the hatchery cages.

Management of Fugitive Emission Sources

According to the survey conducted by the Environmental Protection Agency, construction sites or other sources of pollution (including original and derived PM2.5 pollution) accounted for between 2.5 and 4.5 percent of emissions. Since 2016, Taipower has actively promoted environmental protection throughout its various construction projects. Corresponding actions have effectively reduced dust at construction sites. Taipower has also begun the establishment of a green, environmental, construction site system and assessment plans. Following the Management Regulations for Construction Project Air Pollution Control Facilities, the Company has strengthened the cleaning of routes where trucks travel and recorded the whole process; dust-proof nets were installed on exposed surfaces and two additions (a car wash and an artificial, high-pressure water column) were set up at site entrances and exits in order to achieve the goal of active dust suppression. In terms of management, the Company strengthened its on-site manpower tasked with supervision, verification, and management of environmental protection. Close contact was also maintained with site management personnel and contractors through monitoring systems and instant messaging software. In the planning stage, new construction projects require the quantification of environmental protection costs to the greatest extent possible within the budget and the establishment of sound systems for implementation.

Expected Results of Overall Air Pollution Improvement

Through source management and end-of-pipe reduction, it is estimated that between 2016 and 2025, overall air pollution emissions will be reduced from approximately 100,000 tons to 65,000 tons, a reduction of 35%. This means power generation is no longer inherently a significant source of air pollution emissions. Moreover, the decoupling of generation and air pollution need not inhibit a secure power supply in order to implement environmental protection. As a result, actual air pollution targets will need to be reviewed in due course.

Ecological Power Plants: Energy Saving and Environmental Protection

The Wanda Power Plant: National Excellence Award

In 2018, the Wanda Power Plant won the "National Excellence Award." This is the first National Excellence Award won by a unit of Taipower at the National Environmental Education Awards. The award not only confirms the achievements and efforts of the staff at the Wanda Power Plant in promoting environmental education, but is also of special significance to Taipower as it works to promote environmental education, fulfill its social responsibilities, and creating public welfare value. Moreover, the award also lets the general public see Taipower's efforts in promoting green energy, carbon reduction, energy conservation, ecological conservation, and sustainable development. This helps the public identify with and recognize Taipower's vision of becoming a green enterprise and a sustainable business.

The Dajia River Power Plant: Culture and History coexists with Ecology

By walking into the museum, you can see the entire history of electric power development along th Dajia River. A precious mechanical planning map from the Japanese era is displayed along with a screen that shows real-time power generation information for all branch plants connected to the Dajia River Power Plant. The display also details the evolution of remotely controlled power plant automation with simple patterns. The exhibit includes a wide array of large-scale pictures and detailed models that were built when the plant was first established. The place not only displays cultural and historical relics, but illustrates the efforts of power plants to achieve both green power generation and ecological conservation.

The Linkou Power Plant

Each year, the plant arranges for students from Xingfu Elementary School to visit in order to observe lilies and make records of their observations. The program typically runs for about five weeks and involves about 240 students. The "2017 Smile Taiwan Creative Teaching Plan Campaign," organized by Common Wealth Magazine used Xingfu Elementary School's lily cultivation and energy education program as a demonstration teaching plan for the campaign.

The Jianshan Power Plant

At 10:00 AM, May 2, 2018, an event featuring the release of juvenile fish (fry) was held at Jianshan Beach's Twelve Chinese Zodiac Park in Huxi Township, Penghu. In conjunction with Longmen Elementary School's marine resources conservation education course, the activity enabled students to learn about protecting marine resources through the experience of releasing the fish themselves.

3.3.2 Effluent Management

Wastewater Reuse

While embracing water conservation, Taipower has been actively pursuing a goal of zero wastewater discharge. Rainwater collection (at power plants and dormitories) and wastewater reuse projects have been promoted to reduce the use of tap water inside the power plants through comprehensive planning.

Though the implementation of various water-saving measures, the amount of recovered wastewater in 2018 is as follows (Note that 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 volume).

Thermal Power Plant Wastewater Reuse

Unit: Tons

	2016	2017	2018
Reuse of rainwater	189,722	133,176.1	230,087.3
Reuse of wastewater and effluent from processing and boiler blowdown	1,764,744	2,023,704.5	2,172,782.9

Reuse of Rainwater

Rainwater storage and utilization essentially provides an alternative water source. It is an economical and practical water source model because it does not consume energy and has the characteristics of zero pollution, easy access, and no conflicts over water rights. Stored rainwater can be used as a supplementary water sources for household water supply, alternative water for industrial areas and water storage for fire prevention. The storage of rainwater also reduces the load of peak flow in urban areas.

According to the "Challenge 2008: National Development Plan" approved by the Executive Yuan, rainwater recycling is a key element of water resource planning and utilization. In line with government policies, Taipower has installed rainwater recovery systems in units such as Linkou, Tongxiao, Taichung, and Xingda Power Plants. In 2018, a total of 230,087.3 tons of rainwater were recovered for reuse in the plants.

3.3.3 Waste Management

Waste Management System

In accordance with Taiwan's "Waste Disposal Act," Taipower established a "Coal Ash Resource Reuse Promotion Taskforce" in 2015. The taskforce is charged with the research and promotion of coal ash use. The taskforce was later expanded to become a "By-product Resource Reuse Promotion Taskforce," which is primarily responsible for coordinating cross-unit collaboration to formulate by-product resource reuse optimization strategies and response solutions, including phase-out strategies in the use of coal ash and gypsum. The taskforce reviews existing coal ash sales regulations at power plants, promotion of green label certification for fly ash and gypsum products and planning of relevant incentive schemes to encourage all units to increase their fly ash use.

Reuse of Industrial Waste

Reuse of Coal Ash

Taipower has encouraged its engineering units to reuse fly ash in civil construction projects where it is used to fill trenches. This raises the volume and utilization rate of the fly ash and reduces the environmental burden. In 2018, coal ash production was at 2.46 million tons, of which 2.04 million tons, or 82.9%, was reused.

Reuse of Desulfurized Gypsum

To improve air quality, coal-fired power plants are outfitted with desulfurization installations which 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 ($CaSO4{\cdot}2H2O$) can be reused by local cement and fire retardant board makers. Taipower produced approximately 430 thousand tons of desulfurization gypsum in 2018.

Bidding for Industrial Waste

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

3.3.4 Circular Economy

The concept of circular economies has received significant attention from the government this year and some businesses have already picked up on this innovative concept and initiated reform in energy resource utilization. Taipower has been actively implementing Assessment and Planning for the Circular Economy for Zero Waste Generation. The Company promotes circular economic activity through the use of the Taipower Material Flow Management Information System. The system screens out products/wastes with large outputs, and combines the information with opinions of scholars and related units at Taipower. After analyzing risk mechanisms and referring to domestic and foreign practices, a representative list of key materials for the circular economy is produced. After further screening out of key materials, the Company evaluates business models for the introduction of the key materials into the circular economy.

The current business model for the planning of various key materials includes five action plans: the Regional Resource Recycling and Rebuilding Model for Inorganic Products, the Product as a Service Model, the Circular Resource Supply Model for Biomass Power Generation, the Product Life Extension Model for Usable Property, and the Industrial Symbiosis Model.

Goals and Strategies of the Circular Economy Model

Strategic aspect	**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 materials and trial of feasible development business models	Implementing the "circular resource supply model"	Completion of a circular economy system

Taipower Reuse of Coal Ash Wins the First Circular Economy Award

The reuse of coal ash from Taipower's coal-fired power plant won the "Circular Economy Award"! Ninety-eight percent of Taiwan's energy is imported, and some power is derived from coal-fired power generation. Coal ash, which is a by-product of coal combustion, has historically only been resold for use as a material for concrete production. Now, Taipower has created the first all coal ash engineering backfill material, which reduces the use of cement, sand and gravel. Since 2010, more than a million tons of coal ash has been used in hundreds of trench filling projects.

In order to encourage enterprises to invest in the circular economy, the Chung-Hua Institution for Economic Research held its first Taiwan Circular Economy Awards. Following fierce competition among 80 submissions from 52 enterprises, the reuse of coal ash by Taipower won the Silver Award.

The coal ash produced by coal-fired power generation meets the Chinese National Standards (CNS). In the past, the material was resold to private companies for use in replacing cement in concrete production. But the large number of Taipower's projects has resulted in increasing amounts of coal ash. Moreover, the ash has characteristics that are similar to those of cement. As a result, a project that uses all coal ash backfill was initiated. The material development plan reduces the amount of cement used in backfilling with reused coal ash and replaces natural sand and gravel, thereby reducing natural resource extraction and carbon dioxide emission.

Since the initiation of this project, the material has been used in hundreds of trench backfill projects, and more than one million tons of coal ash has been reused. In the future, the material will find further applications on marine engineering projects. Taipower has also created a cultural and creative brand based on the concept of the circular economy. Last year, the company launched extremely lifelike manhole cover coal ash coasters, lamp holders that look like ceramic cap and pin insulators, and other delicate or creative products. The brand is set to participate in the "Creative Expo Taiwan" for the first time in April. Taipower hopes to use its own resources to build and make the circular economy become a way of life and attitude.

3.4 Strengthening Environmental Management

3.4.1 Environmental Policy and Goals

Announcement of Environmental Policy

As the trend towards environmental responsibility matures, Taipower as a public utility must constantly strive to balance the necessity of maintaining power quality and security with the public demand for eco-friendliness and sustainability. Finding a functional balance between these competing priorities is an essential element of the company's mandate to "provide stable power for the diversified development of society in a friendly environment and at a reasonable cost" and its corporate vision of "becoming a world-class enterprise in the power utility industry that is both superior and trustworthy." As such, the Company plans its long-term development path by considering major environmental issues and development trends in the energy industry, as well as the international outlook for a transition to carbon neutrality by 2050 and the timeline of achieving the United Nations' Sustainable Development Goals (SDGs) by 2030. To provide transparency in these efforts, Taipower maintains its Chariman-signed, Board-approved environmental policies for public review.

Taipower's Development Pathway of Environmental Friendliness

Aspects	Contemporary		Future
Responding to climate change	Constructing response capabilities	A climate-resilient enterprise	Working toward carbon neutrality
Protecting environmental quality	Strengthening the response to air pollution	Pollution control benchmark	Near-zero emission
Focusing on circular innovation	Consolidation of resource management	Resource efficiency multiplication	Materializing circular economy
Refining management systems	Consolidation of business division systems	Implementing integrated management	Becoming an international benchmark
Creating ecological inclusiveness	Perfecting ecological assessments	Creating ecological values	Environmental co-prosperity
Expanding internal and external engagement	Ensuring an unimpeded engagement mechanism	Perfecting partnerships	Expanding environmental dynamics

Announcement of Taipower's White Paper on the Environment

In order to implement the concept of sustainability for Taipower's businesses, the Department of Environmental Protection, in accordance with its mission of being eco-friendly, proceeded to formulate high-level policy for the Company in 2018. This effort included environmental policy, the development of eco-friendly strategies, objectives and action plans, and the implementation of the "Environmental Protection Policy Establishment Promotion and Analysis Program." The goal of this work is to incorporate the spirit of the Company's existing policy into an "Environment White Paper" and to actually implement the content of the white paper in order to fulfill the organization's commitments to the environment. Internally, the white paper provides a green action guideline for future business units at Taipower when implementing environmental protection. It can also be used externally as a blueprint of the Company's vision for strengthening communication and demonstrating Taipower's commitment to being eco-friendly in the future.

In April 2019, Taipower officially released its "Environmental White Paper" to disclose the Company's six strategic aspects for environmental protection. Correspondingly, the paper developed 12 strategic dimensions as the foundation for Taipower's subsequent efforts to promote environmental sustainability. Through ambitious goals and forward-looking action plans, Taipower will integrate its business divisions to achieve engagement (increasing internal and external engagement), creation (creating a smart and ecological future), and reduction (carbon reduction, pollution reduction, and emission reduction). The benefits of these efforts are the creation of eco-friendly power generating facilities through numerous methods, and fully shaped green, eco-friendly, sustainable, and inclusive enterprise systems for power generation, transmission, distribution and sales. Please visit the following web page for the full text of Taipower's Environmental White Paper:

Taipower Environmental Policies

As a power group, Taipower's businesses covers generation, transmission, distribution and sales. To achieve its mission of being eco-friendly and becoming a world-class power utility group, Taipower has formulated this environmental policy based on its mission and vision. This policy was announced after obtaining the approval of the Chairman of the Board and serves as the highest guiding principle for Taipower's environmental sustainability policy.

This environmental policy is applicable to Taipower, including the Headquarters, all business divisions and secondary units, and all activities, products, and services subject to the Company's influence and control, as well as suppliers and contractors under the influence of Taipower and related to the Company's value chain.

The minimum standards for Taipower's environmentally sustainable development are in line with regulatory requirements, and adhere to the direction of policy development, with the goal of achieving the environmental performance standards of a world-class power utility group. In conjunction with the Company's partners, Taipower will create a clean, sustainable, and inclusive environment of generation, transmission, distribution and sales.

In order to achieve the performance level of a world-class power utility group, in addition to the basic pollution prevention and control, the Company has devised environmental commitments in six major aspects to improve our environmental performance and continue to communicate with external stakeholders:

- Responding to climate change: Carry out a low-carbon transition to enhance resilience to climate change and move towards carbon neutrality.
- Protecting environmental quality: Eliminate, reduce, and manage the impact of pollutants on the environment and human health, and achieve the goal of near-zero emissions.
- Focusing on circular innovation: Create efficient and sustainable utilization of energy resources with circular thinking and implement the ideals of circular economy.
- Refining management systems: Create a leading environmental management system based on the principles of intelligence, efficiency, and responsiveness.
- Creating ecological inclusiveness: Create a model of generation, transmission, supply, distribution and sales that is harmonious with the surrounding environment, and create a green enterprise that reaches the goal of ecological inclusiveness.
- Expanding internal and external engagement: Continue communication with internal and external stakeholders, turn what is passive into active, and also spread environmental protection information on power projects and promote energy transition.

Taipower unfolds the focused environmental dimensions under each of these six aspects, and reviews and adjusts the degree of completion for these comprehensive environmental objectives. Each business division and system will develop its required goal and action plans according to its respective responsibilities and ensure that plans are properly enforced.

Following the announcement of this environmental policy, the policy will be subject to reviews and amendments in response to international trends and internal and external operations; the policy will then be updated and announced following approval by the Chairman of the Board.

Chairman of the Board Wei-Fan Yang

Unfolding the White Paper's Six Major Strategies and Twelve Strategy Dimensions

Specific Content of the Strategy Aspect and Dimension

Strategy	Strategy dimension	Specific content of the strategy
Respond to climate change	Promote mitigation procedures	Control and reduce greenhouse gas emissions from Taipower's business operation, including investment in renewable energy, research in carbon reduction technologies, establishment of electricity service models with less carbon emissions, and other management practices such as inventory, assessment, and setting of science-based target (SBT), and strengthening energy efficiency of buildings, etc. Through these methods, the goal of reducing carbon emissions can be achieved.
	Increase adaptive capability	Strengthen the resilience of power facilities against extreme weather, and reduce the impact of natural disasters and changes in energy demand on Taipower.
Protect environmental quality	Manage air pollutant emissions	Continue to reduce air pollutant emissions and establish integrated management capabilities in assessment, forecasting and dispatching.
	Strengthen water saving and control of materials	Reduce the water footprint of power generation, evaluate more effective methods of water use and recycling, create positive environmental influence, and continuously manage and reduce the environmental impact of radioactive nuclear back-end waste.
Focus on circular innovation	Establish a circular business model	Evaluate and establish Taipower's circular value creation plan so that the circular economy becomes the new direction for business partnership and development.
	Improve efficiency of resource utilization	Assess the recycling opportunities of waste generated by Taipower to improve the recycling ratio, reduce the resource demands in operation, and extend the life cycle of equipment or resources to obtain the benefits of resource efficiency improvement.
Refine management systems	Integrate environmental management systems	Integrate the environmental management systems of all Taipower's facilities and systematically control overall environmental input and output.
	Develop smart management	Through digitalization and artificial intelligence (including smart grids, smart meters, the Internet of Things, etc.), the ability to strengthen environmental management and monitoring with new technologies and software enhances efficiency and reduces the impact of business operations on the environment.
Create ecological inclusiveness	Manage biodiversity	Inventory the ecology surrounding power facilities and engage in relevant ecological conservation programs.
	Plan the fusion of the facilities and ecology	Introduce the design of environmental and ecological integration to promote the symbiosis of electricity facilities and the environment.
Expand internal and external engagement	Deliver information on electricity and the environment	Continue to communicate with internal and external stakeholders (including the general public, students, and suppliers) on issues related to the environment within the power utility industry, and raise the general public's awareness of Taipower's green actions.
	Lead the energy transition	Continue to lead and promote initiatives and activities related to low-carbon energy transition and to accelerate the development of low-carbon energy in Taiwan.

Setting up Short, Medium and Long-term Environmental Strategies

In order to implement the six aspects of its environmental strategy, Taipower will allocate responsibility for specific strategy implementation to specific, business divisions in accordance with each unit's degree of association and materiality. Each of the four business divisions, namely Power Generation, Nuclear Power, Transmission System, and Distribution & Service, as well as the construction system will develop its own corresponding short-, medium-, and long-term goals and action plans.

Strategy	Key strategy dimension	Short-term goal (By 2021)	Medium-term goal (By 2025)	Long-term goal (By 2030)
Respond to climate change	Promoting \mitigation procedures	Net emission intensity of thermal power generating units will be reduced by *7%* compared to 2016	Net emission intensity of thermal power generating units will be reduced by *15%* compared to 2016	Net emission intensity of thermal power generating units will be reduced by *20%* compared to 2016
Protect environmental quality	Managing air pollutant emissions	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
Focus on circular innovation	Establish a circular business model	Inventory of potential circular materials and feasibility trial of development business models	Implement a "circular resource supply model"	Establishment of a complete circular economic system
Refine management systems	Develop smart management	Coverage of smart management and services reaches *52%* (including the cumulative installation of smart meters in 1.5 million households, covering 69% of countrywide total power consumption information)	Coverage of smart management and services reaches *65%* (including the cumulative installation of smart meters in 3 million households, covering 81% of countrywide total power consumption information)	Coverage of smart management and services reaches *82%* (including the completion of installation of smart meters in 6 million households after the technology is deemed feasible, covering 85% of countrywide total power consumption information)
Create ecological inclusiveness	Plan the integration of facilities and ecology	Plan and construct at least *one* ecologically inclusive plan for a power facility	Plan and construct at least *three* ecologically inclusive plans for power facilities	Plan and construct at least *five* ecologically inclusive plans for power facilities
Expand internal and external engagement	Deliver information on electricity and the environment	Annual environmental protection information reporting in the power utility industry reaches *480 thousand* people	Annual environmental protection information reporting in the power utility industry reaches *700 thousand* people	Annual environmental protection information reporting in the power utility industry reaches *750 thousand* people

Implementing Environmental Impact Assessments

Taipower's facilities and operations may impact local communities through water, air, soil and noise pollution as well as through the creation of vibrations, odors, waste, toxic substances, land subsidence and radiative contamination or through damage to natural resources, the landscape and society, the culture or the economy. Therefore, Taipower has taken the necessary steps to minimize the impact of its development on the environment and surrounding communities through the framework of pre-development assessments and communications, post-assessment improvements and continual monitoring during construction.

Development projects	Actual results of implementing environment impact assessment
New Gas Generating Unit for Taichung Power Plant	Taipower plans to build two high-efficiency combined gas cycle units with a capacity of about 1-1.3 GW per unit at the Taichung Power Plant. On March 16, 2018, Taipower held a public meeting with an "Environmental Impact Statement for New Gas Generating Units of Taichung Power Plant" to explain the contents and details of the environmental impact assessment to stakeholders and collect the opinions and suggestions of local residents.
Phase 1 of the Offshore Wind Power Generation Project	In response to the government policy of energy diversification, development of self-produced clean renewable energy, and effective utilization of the abundant wind energy resources in the western coastal area, Taipower plans to set up 21 wind turbines with a single unit capacity of 5,200 kW in the waters offshore of Fangyuan Township in Changhua County. The total installed capacity will be approximately 109.2 MW. On June 26, 2018, Taipower held a public briefing session on the "Environmental Impact Statement for Phase 1 of the Offshore Wind Power Generation Project" to explain the project's content, environmental status, and environmental protection measures to the general public, and to understand the concerns of local residents.
Construction Plan for a Booster Station for Changhua Industrial Park's Offshore Wind Power Plant and the Zhangbin Substation	To develop offshore wind farms and to enhance the overall transmission capacity of renewable energy grid connections, Taipower plans to develop booster stations at the Changhua Industrial Park's Offshore Wind Power Plant and to connect them to Taipower's existing Zhangbin Ultra-high Voltage Substation through transmission lines. On July 4, 2018, Taipower held a public meeting on the "Environmental Impact Statement of the Construction Plan of the Booster Station at Changhua Industrial Park's Offshore Wind Power Plant and the Zhangbin Substation." The contents and items of the environmental impact assessment were explained to the local residents and concerns and opinions about the project were collected from them.
Decommissioning Plan for the Second Nuclear Power Plant	The existing 985 MW steam turbine generator sets of the Second Nuclear Power Plant have a total installed capacity of 1.97 GW. These generators will be decommissioned starting in 2021. According to the law, Taipower is obligated to report on its "Decommission Plan for the Second Nuclear Power Plant" by the end of 2018 and to conduct an environmental impact assessment. On February 14, 2018, Taipower submitted its environmental impact assessment of the decommissioning plan for the Second Nuclear Power Plant to the Ministry of Economic Affairs. The plan was then sent to the Environmental Protection Administration for review. On September 28, 2018, Taipower held a public briefing session on the second phase of the environmental impact assessment for the Decommissioning Plan for the Second Nuclear Power Plant. The session was held in order to explain the plan to the general public, along with current environmental conditions, and environmental protection measures. It was expected that consensus could be reached between the Company and the local residents. On December 27, 2018, Taipower Company submitted its "Decommission Plan for the Second Nuclear Power Plant and the application for a decommissioning permit for the Second Nuclear Power Plant to the Atomic Energy Council. The review is currently in progress at the Atomic Energy Council.

3.4.2 Environmental Accounting

Since 2008, Taipower employed an environmental accounting system (EAS) which requires employees to input corresponding 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 in order to compute the costs of environmental protection, occupational safety and health for each unit.

All environmental expenditures from 2016 to 2018

Unit : Billion

Year	Environmental protection	Occupational safety	Health	Total
2016	18	5.04	1.32	**24.36**
2017	19.76	5.10	1.30	**26.16**
2018	25.54	5.52	1.35	**32.41**

4 Human Resources

Human Capital Implications for Taipower

Talent is the cornerstone of an enterprise's sustainable development. Since the power utility industry is a highly specialized one, the recruitment, training & development, utilization and retention of talented staff requires comprehensive human resources planning and implementation. As Taiwan is currently in the midst of a retirement boom, more employees are departing as they reach the mandatory retirement ages, leaving remaining teams to operate without the retirees' rich experience. To address the challenges of succession and passing down essential knowledge at all levels of the Company, Taipower must actively cultivate talent and through effective planning in training. Taipower must also retain talent through the practical assignment of job duties, in-depth employee care, excellent welfare policies, and cultivating a strong talent pool. Indeed, much effort is directed at these issues so as to achieve the goals of maintaining the excellent quality and stability of the power supply.

SDGs	Connections between SDGs and Taipower	Associated sections and issues
8 DECENT WORK AND ECONOMIC GROWTH	Achieve fully productive employment so that all employees (including younger employees and those with physical/mental disabilities) are eligible for similar positions and wages. In addition to offering decent job opportunities, Taipower will facilitate improved safety in the work environment so as to safeguard labor rights.	– Human Resource Management Strategies – Enhancement Measures for Human Resources – A Sound Working Environment
16 PEACE, JUSTICE AND STRONG INSTITUTIONS	Emphasize corporate governance, integrity management and information disclosure and ensure that various communication channels operate smoothly.	– Implementing a Happy Workplace

Principal Investments

- A complete system of recruitment, training & development, utilization and retention with clear recruitment, promotion, and training channels assists Taipower employees to find the most suitable positions and continue their development
- Formulate employee performance evaluation guidelines and continue to establish a performance-oriented reward system to improve overall management performance and team honor
- Strengthen and fine-tune Taipower's occupational safety management
- Engaging in the cultivation of athletic talent: Taipower sponsors six teams, including baseball, volleyball (both men and women), badminton, soccer, and basketball teams, and plays an important role in sports development. Among state-owned enterprises in Taiwan, Taipower is arguably the one most supportive of ball sports

Performance Highlights

- Number of participants in education and training sessions is up to ***63,990***
- Taipower employees have obtained ***4,252*** certificates in related professional fields
- Taipower's occupational health and safety expenditures are at approximately NT$ ***313.8 million***
- The Company reinstates approximatel ***96.91%*** of employees following parental leaves
- For public construction projects with values of more than NT$200 million, ***real-time image inspection systems*** are required to effectively control and record the current occupational safety situation with the goal of zero occupational incidents

Future Plans

Taipower will continue to focus on the development and training of talent in order to support the future transformation of the Company, and will continue to provide employees with workplace development resources and corresponding compensation and retirement care. Moreover, Taipower will continue to improve its management of occupational safety, and pursue the goal of zero incidents in the workplace. Efforts will continue to be directed at creating a friendly, safe, and happy workplace which can serve as the foundation of recruitment, training & development, utilization and retention of talent and that allows employees to find the most suitable opportunities based on their abilities, personalities, and aptitudes.

4.1 Human Resource Management Strategies

Human Resource Policy

All employees of Taipower are paid at levels above the national minimum wage. The Company is currently experiencing the retirement of numerous senior staff, and must continue to hire new talent so that core expertise and know-how are passed down to new employees. Taipower makes good use of multiple recruitment channels to employ talent that meet the needs of business development and operations, as well as taking on current and future challenges and enhancing the value of human resources. Each human resource action plan and its performance will be incorporated into a rolling review by the "Human Resource Development Task force" and its working groups, or into key assembly or management meetings. In aiming to realize each goal, the Company will develop corresponding actions and management changes, so that Taipower can effectively attract outstanding staff, cultivate professional talents, and achieve the goals of human resource management for recruitment, training & development, utilization and retention.

Taipower's Human Resources Recruitment, Training and Development, Utilization, and Retention Strategy

Recruitment

- Balanced and rational human resource planning and systematic appointments
- Diverse personnel recruitment to satisfy human resource demands; increase recruitment channels, including staff exams, contract staff exams, scholarships for undergraduate and graduate students, vocational school scholarships, high school, vocational school and industrial-school cooperation, and promoting temporary staff to permanent staff positions

Training & Development

- Fortify essential techniques in each division and promote core operations
- Develop an innovative talent nurturing model and improve organizational learning performance
- Promote supervisor succession plans at the company level (for all divisions) and build a talent bank
- Utilize online resources to promote lifelong learning
- Strengthen the rationality of allocation, development and application for human resources

Utilization

- Effective distribution and management of personnel appointment budgets
- Improve the personnel system to make human resources deployment flexible and effective
- Implement job rotation and performance evaluation
- Make effective use of statistical analysis to provide supervisory decision-making reference
- Enhance the performance of division-level human resource departments

Retention

- Provide employees with public health insurance, subsidies for medical expenses incurred for injuries caused when executing job duties and health checkups through welfare policies
- Establish labor education courses and implement of recreational activities so that employees can adjust their lives for the sake of their physical and mental health

In facing comprehensive human resource challenges, Taipower will manage its human resources through holistic planning, and make adjustments following future organizational changes. Taipower has taken the initiative of inventorying current manpower, making advanced plans, deepening its thinking on talent pool management, improving the test system, and recruiting the most suitable talent for the Company. In addition, it is necessary for Taipower to connect the vocational education system with the Company, cultivate the base talents of the power utility industry, add new businesses in response to environmental changes, accurately select talent for each professional field, accelerate the cultivation of internal talent, relax the restrictions on seniority when registering for internal promotion examinations, and actively organize talent selection activities.

Respond to Manpower Shortages

Taipower's workers are highly professional. Therefore, the current wave of retirements has had a great impact on daily operations. In order to successfully navigate this challenge, in recent years Taipower has continuously implemented manpower structural improvement measures and focused on the experience and cultivation of power utility professionals. Taipower has managed to cope with the impact of numerous job handovers and the passing on of valuable experience.

Strengthen External Recruitment	• Increase recruitment to speed up renewal of human resources • Provide scholarships to attract talent
Apply Future Vacancy Plans in Advance	• Since total employee numbers must remain consistent, Taipwer has initiated a future vacancy plan to cover the years from 2012 to 2022. Vacancies appear after retirements but the plan allows the cutlivation and development of expertise in new employees in advance
Adjust Division Manpower According to Time Sequences	• Implement rolling reviews on the quality of each business unit/system business at different points in time, and set allocation principles for new employees • Each division /system may properly plan recruitment categories based on core technological items defined by the inventory done each year to meet business needs
Perfect Talent Cultivation and Mentor Systems	• Each division/system/unit should engage in regular reviews and define their respective core technologies • Establish digital curriculums for core technologies • Perfect mentoring systems • Implementing training refinements

4.2 Enhancement Measures for Human Resources

4.2.1 Human Resources Training

Taipower's work is highly professional, so in response to changes in the internal and external environment it is necessary to effectively cultivate future talent. Taipower has built a complete talent training system, systematically cultivating outstanding talent and constantly improving its training systems as well as the hardware and software of employee care. The following are descriptions of each core task:

Skill Training System

Recently recruited technicians need to receive long-term, intensive training at the Taipower's Training Institute. They are then sent to their respective units for further training. With the assistance of a mentor system, they continue to develop professional skills after entering the workplace. Taipower actively promotes a licensing system through license training classes and has formed the most solid human resources support force in the power utility business. In order to implement this training system and provide appropriate professional training venues, Taipower has four training centers throughout the country, namely the Wulai Training Institute, the Linkou Nuclear Energy Training Institute, the Guguan Training Institute, and the Kaohsiung Training Institute. The training institutes have different positions and missions, and actively carry out training programs required for the future development of the Company's operations. The licenses that new employees may study to obtain are in areas such as occupational safety, power distribution, nuclear power, power generation, power transmission and supply, operational maintenance, and general machinery, etc. Taipower's business needs are covered by these types of certification, and the certification system also encourages employees to continue to establish their own complete capabilities.

A total of 4,252 professional certificates were obtained by Taipower employees in 2018 and more than 70,000 certificates are held by current employees. The Training Institute also cooperates with various government agencies to plan and develop national-level technician certification categories for the core technical fields of the power utility industry. Employees can participate in training and be certified directly at the training units.

Cultivating Technology Talents

Taipower's Training Institute shoulders the responsibility of on-the-job training and preparation for new employees throughout the entire company. It is also the starting point for Taiwan's power utility talent in the coming decades. The Institute actively promotes information technology to provide trainees with technological experience and user habits. The application of technology to training and development is aimed at promoting the growth of the organization and employees. Current major planning projects include (1) e-schoolbags: training courses are digitalized and put online, (2) promoting blended learning: integrating web-based diverse information, (3) developing virtual reality (VR) simulation training courses to promote training experiences, and (4) establishing an instant survey feedback and discussion platform app, as well as continuing to improve the quality and relevance of training. After the development goals of each project are finalized, pilot training courses will be introduced and then gradually promoted to expand their effect.

Through the development of the facilities at the Training Institute, a large number of highly professional training courses can be improved. The introduction of technology changes the learning experience, which in turn promotes different learning processes and habits. In terms of teaching, instructors can use technology to assist students by monitoring their learning dynamics, and then give feedback and adjust their teaching to make it more effective. Students can make good use of online resources for preview and review. They are not limited to specific teaching materials, but draw relevant information from multiple sources and also achieve quick and easy learning through video clips. It is expected that these resources will strengthen the lifelong learning, sense of professionalism, and spirit of achieving perfection among Taipower's employees.

The Results of Education and Training

Taipower's work is highly professional, and it is necessary to effectively cultivate future talent in response to changes in the internal and external environment. Therefore, Taipower has been investing in education and training for years. The results of these efforts are as follows:

Statistics on Taipower Training

Training type	Training item		2018 No. of participants
Development training	New dispatch personnel orientation training		715
	Fundamental development training		875
	Total		**1,590**
On-the-job training	Professional training	Organized by the Training Institute	13,787
		Organized by other units	46,038
		External training	1,355
	Total		**61,180**
Manager training	On-the-job training for managers		681
	Cultivation training for managers		532
	Total		**1,213**
Cooperative education	Recommendations for graduate school	Master's degree programs	7
	Total		**7**
Total			**63,990**

Strengthening Training with Technology

Energy transition and technological change complement each other. Introducing new technology in training not only meets future talent needs, but also offers a way to recognize employee needs and effectively promote them. In addition to the introduction of various online learning systems, Taipower is attempting to enhance on-site safety performance through the introduction of a virtual reality (VR) system that allows for simulations in training courses that further the training experience.

Over the years, Taipower has attached great importance to lean training and training safety. Taipower hopes to ensure the skills and experience of each of our employee on the job through a phased and solid training process. With the help of the VR system, students obtain visual experience, build psychological resilience, learn to overcome fears, and experience learning in a safer environment – especially when it comes to climbing towers and entering the construction sites. This enables staff to complete their tasks safely and smoothly. In addition, the digital system can directly simulate and guide students through work tasks without explosure to the environmental constraints on actual sites, and thus helps trainees learn professional skills more efficiently.

Training of cleaning insulators on the top of 60-meter towers

4.2.2 Employee Performance and Evaluation Policy

All employees who have been officially appointed (hired) by Taipower and meet specific requirements (excluding professional chief engineers, VPs and personnel of higher rank) shall be subject to performance evaluations as required by Taipower's employee performance evaluation regulations. Supervisors of different ranks are expected to evaluate their subordinates' performance in seven major categories: professional competence, work performance, team spirit, work attitude, conduct, capacity for management, and leadership talent and award corresponding grades to each employee within the given timeline. This allows Taipower to award performance bonuses according to the results of evaluations.

In the future, Taipower will continue to establish a performance-oriented reward mechanism to enhance employee engagement and job performance. The main considerations for promotion are as shown in the following figure. For units or employees who work hard, instant rewards and benefits are given in the form of monetary prizes. This has increased cohesion among employees and encouraged all units to actively promote the Company's operating policies so as to improve operational performance and achieve a sense of honor for their teams.

Performance Management By the Responsibility Center

- 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 resonsibility center

Instant Reward Mechanism

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

4.3 A Sound Working Environment

4.3.1 Occupational Health and Safety

In addition to cultivating excellent human resources, maintaining occupational safety is the key to sustainable development. Avoiding safety incidents and reducing the impact on power stability through the suspension of units is listed as one of Taipower's 8 major business strategies within Taipower's five-year plan (2019-2023). The placement of this goal as a top-level, company-wide strategy illustrates Taipower's determination to implement a safe and healthy workplace.

Safety and Health Management Policy

Taipower's expenditures on occupational health and safety came to NT$313.8 million in 2018. The Company adheres to the principle of lives and occupational safety first, ensures personnel and operational safety, and pursues the 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 safety and health management in its construction contracts and actively assists and supervises contractors in establishing and implementing their own occupational safety management mechanisms. For construction contractors, Taipower has incorporated guidelines on contractor safety and health into its contracts. Public construction projects with values of more than NT$200 million are required to set up real-time image inspection systems to effectively control and record the situation on work sites. 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 and Bases

Dimension	Management Method	Management Basis/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 Handling Industrial Incidents
	Rewards and punishments	• Procedures for Punishments for Practitioners Violating Health and Safety Regulations • Procedures for Rewards for Practitioners Engaged in Excellent Health and Safety Performance
	Contractor management	• Procedures for Health and Safety Counseling • Procedures for Fines Concerning Health and Safety Contract Violations • Compulsory training due to health and safety contract violations
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 checking • 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

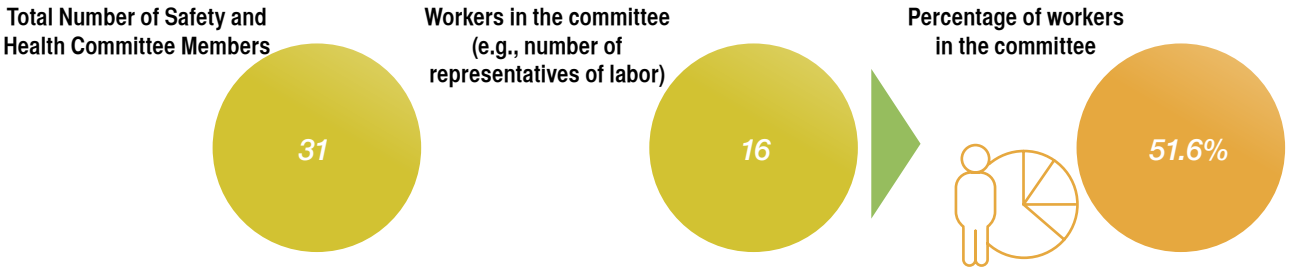
Future Improvement Strategies for Occupational Safety

Strengthen the system	• Amending relevant management procedures for punishment mechanisms • Promoting collective punishments for supervisors • Adding to and amending safety construction procedures
Manage procurement	• Using the most advantageous bid or the lowest bid that passed the selection standards for procurement, and improving the weight of the occupational safety assessments • A risk assessment report shall be submitted during bidding processes
Implement training and education	• Pre-service training and drills • Implementing qualification training • Organizing awareness campaigns
Increase the level of punishment	• Violators' classes (re-education) • Increasing the penalty limits for first-time offenders • Progressively increasing fines
Removal of those who violate the rules	• Suspending construction once hazardous situations occure • Elimination mechanisms for personnel violating the rules • Elimination mechanisms for vendors violating the rules
Implement controls	• Engineer safety early warning system tracking management • Audit supporting manpower • Strengthen industrial security checks • Handle review mechanisms • Increase the amount of fines

Organization of Occupational Health and Health

Taipower's "Occupational Health and Safety Committee" is comprised of 31 members, with 1 member acting as the committee chairman and 1 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. Other members include department supervisors of the Secretariat, Power Generation, Power Supply, Business, Power Distribution, Construction, Nuclear Power, Occupational Safety, Human Resources, Accounting and Power Equipment Repair departments along with the heads of designated construction units, occupational safety and health personnel, medical practitioners engaging in labor health service, and representatives of the Taiwan Power Labor Union (labor union representatives are required to occupy 1/3 or more of total seats in the committee).

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



Occupational Safety Performance

In accordance with Taipower's "Occupational Safety Accident Handling Procedures," employee/contractor accidents are reported to Taipower within one hour and responsible personnel file an accident reports. Accident reports serve as the basis for the compilation of relevant statistics and analytical reports for the occupational safety management of all units. This information is then used to minimize the likelihood of further occupational accidents. In addition, responsible personnel notify a local labor inspection agency within eight hours of the occurrence of the occupational accident. After an accident has occurred, investigation of the cause and case review are conducted as required by regulations in conjunction with an administrative liability review and disciplinary actions that are taken to prevent similar accidents from happening in the future.

The main causes of injury for Taipower's workers include traffic accidents, arc discharges, collapsed objects, electric shocks, and falls. The statistics of work-related injuries happened to employees and contractors in 2018 are as follows:

Statistics of Work-related Injuries in 2018

Worker category	Gender	Total number of work days	Total number of work hours	Absentee rate	Total number of occupational accidents	Injury rate	Number of days lost	Loss day rate
Employees	Male	5,766,840	46,134,720	0.57%	15	0.065	7,206	31.239
	Female	946,698	7,573,584	0.93%	0	0	0	0
	Total	**6,713,538**	**53,708,304**	**0.62%**	**15**	**0.056**	**7,206**	**26.834**
Construction contractors	**Total**	**5,095,113**	**40,760,906**	**0.83%**	**19**	**0.093**	**421,20**	**206.669**

Note: 1. Total number of work days: The actual number of work days for employees
2. Total number of work hours: The actual number of work hours for employees
3. Absentee rate (AR) = (Number of days absent from work / total number of work days) × 100%
(Days absent from work include sick leaves, special sick leaves and occupational sick leaves)
4. Injury rate (IR) = (Total number of injuries / total number of work hours) × 200,000
(this is calculated based on a 50 week of work per year, 40 hours of work performed per week per 100 employees)
5. Loss day rate (LDR) = (Number of days lost / total number of work hours) × 200,000
6. Number of days lost for contractors = Number of disabled persons * 10 + No. of deaths * 6,000
(Number of disabled persons * 10 is based on the statistics of Taipower's number of loss days for employee disability in 2015)
7. Construction contractors didn't compile their total person-work hours according to the gender this year, the data is therefore unavailable. The statistical method for this item will be improved in the future.
8. The occupational disease rate (ODR) is unavailable due to the fact that relative data was not collected. The statistical method for this item will be improved in the future.

Analysis and Statistics of Injuries in 2018

Type	Total	Contact of objects with great temperature difference	Hit by falling objects	Falls	Rolled into machinery	Electric shocks	Other
Employees	14 cases: causing 1 death and 14 disabilities	29%	29%	14%	14%	7%	7%
Contractors	17 cases: causing 7 deaths and 12 disabilities	6%	11%	22%	11%	17%	33%

4.3.2 Implementing a Happy Workplace

Employee Benefit Policy

Major Employee Benefits and Care

Resources for diverse workplace growth	• Provide hollistic training resources • Ensuring employees achieve capabilities required for their careers
Compensation guarantees	• Compensation system is open and transparent • Complete and performance-based reward system
Retirement care	• Establish a comprehensive retirement care system, and set up web pages specifying relevant rights and information about retirement; hold farewell activities for retirees to help them adapt to retirement in a timely manner
Diverse protection	• Provision of public employee insurance, labor insurance, and National Health Insurance • Medical expense subsidies for injuries caused when executing job duties • Health examinations • Recreational activities

Physical and Mental Care of the Employees

Taipower focuses on physical and mental health of its employees. The power utility industry requires staff to have both sound physical and mental health in addition to relevant skills. To address issues of personal health, the Heart-to-Heart program was founded in December 1988. Additionally, positions for part-time employee assistance staff have been established, and an employee assistance system has been set up.

The Heart-to-Heart program already has a 30-year history. Its service area extends to all parts of Taiwan. Through 640 employee assistance staff, Heart-to-Heart has integrated various resources from inside and outside the Company and used the employee assistance program to establish a self-help support system that translates into specific actions. The goal of the program is to increase employee engagement and enhance organizational competitiveness by helping individual physical and mental health and creating a healthy and friendly workplace environment. Heart-to-Heart has more recently expanded its offer of support to employee family members and the general public. The program is the most effective component of Taipower's efforts to provide stability to Taipower employees.

Parental Leave Application and Reinstatement Rate in 2018

Item	Male	Female	Total
Number of employees eligible for parental leave in 2018	2,125	505	2,630
Actual number of employees that applied for parental leave in 2018	21	98	119
Number of reinstated employees after parental leave in 2018	20	62	82
Reinstatement rate in 2018	100%	100%	100%
Number of employees reinstated after parental leave in 2017 that have been working continuously for a year	18	76	94
Retention rate in 2018	94.74%	97.44%	96.91%

Note: 1. The number of employees eligible for parental leave in 2018 was calculated based on the number of employees who have had maternity leave and paternity leave within the last four years (2015-2018).

2. The calculation method of reinstatement rate in 2018 = Number of reinstatement in 2018 / Total number of people who should be reinstated in 2018.

3. The calculation method of retention rate in 2018 = Number of employees reinstated after parental leave in 2017 that have been working continuously for a year since / Total number of reinstatement in 2017.

Labor-Management Communication and Collective Bargaining

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

Communication Performance

Communication channels	2018 Performance
Labor-management meetings	11 labor-management meetings were held at company and sub-system levels
Information and discussion sessions	2 labor-management negotiation and information sessions were held on the amendments of Labor Standards Act
Keynote speeches	Taipower held 9 keynote speeches for high-ranking supervisors to continuously communicate with employees about the Company's policies
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 the 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 its colleagues

Negotiations on Collective Agreement

On October 24, 2013, Taipower and the Taipower Labor Union (TLU) signed a Collective Bargaining Agreement (CBA). 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. During 2018, 12 consultative meetings were held.

Number and Ratio of Employees Covered by the Collective Agreement

Item	2014	2015	2016	2017	2018
Total employees	26,533	26,659	26,673	26,734	26,962
Percentage of employees that are union members	26,064（98.2%）	26,284（98.6%）	26,391（98.9%）	26,408（98.8%）	26,599（98.7%）

Results and Implementation Status of the Grievance Complaint System

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

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

Grievances and complaints filed by employees shall be handled by the "Working Personnel Difficulty and Grievance Matter 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 to the "Working Personnel Difficulty and Matters of Grievance Processing Committee."

4.3.3 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 2016-2018

Year		2016		2017		2018	
Total employees		26,673		26,734		26,962	
Local employees	Male	23,280	87.3%	23,183	86.7%	23,160	85.9%
	Female	3,393	12.7%	3,551	13.3%	3,802	14.1%
Direct personnel	Male	21,682	81.3%	21,526	80.5%	21,647	80.3%
	Female	1,807	6.8%	1,938	7.2%	2,068	7.7%
Indirect personnel	Male	1,598	6.0%	1,657	6.2%	1,513	5.6%
	Female	1,586	5.9%	1,613	6.0%	1,734	6.4%

Note: 1. The cut-off date for the statistics was December 2018.

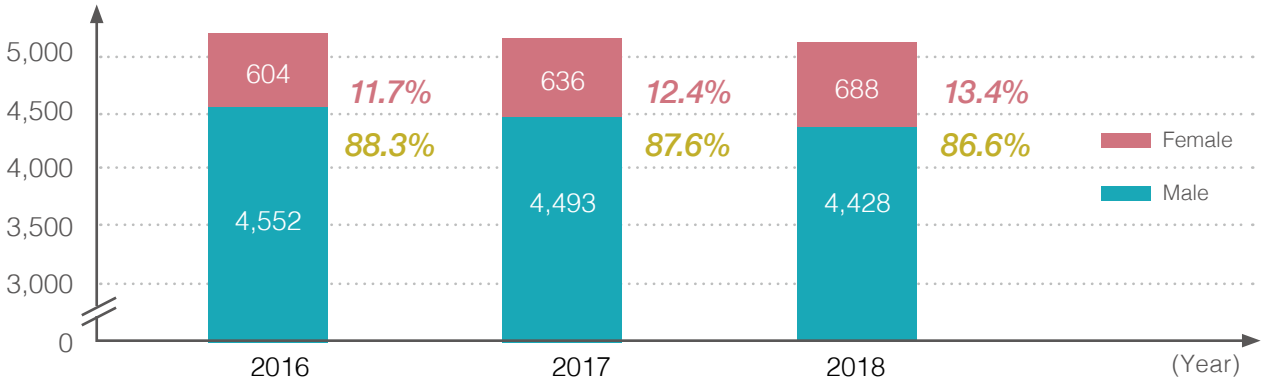
2. Direct employees are personnel who fall under the category of technical, sales and marketing employees at onsite departments; indirect employees are personnel responsible for administrative support, including document processing, business affairs, general affairs, and accounting, etc.

3. Decimal points have been rounded off.

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

Year		2016		2017		2018	
		Male	Female	Male	Female	Male	Female
Number of new employees		1,641		1,608		1,812	
Age	Under 30	715	196	818	191	895	284
	Between 41-50	592	127	414	166	448	172
	Over 51	10	1	14	5	12	1
	Total	1,317	324	1,246	362	1,355	457
Number of departing employees		1,630		1,543		1,600	
Age	Under 30	81	22	105	27	127	37
	Between 41-50	108	74	118	82	109	112
	Over 51	1,239	106	1,117	94	1,143	72
	Total	1,428	202	1,340	203	1,379	221

Number and Gender Ratio of Taipower Supervisors from 2016 to 2018

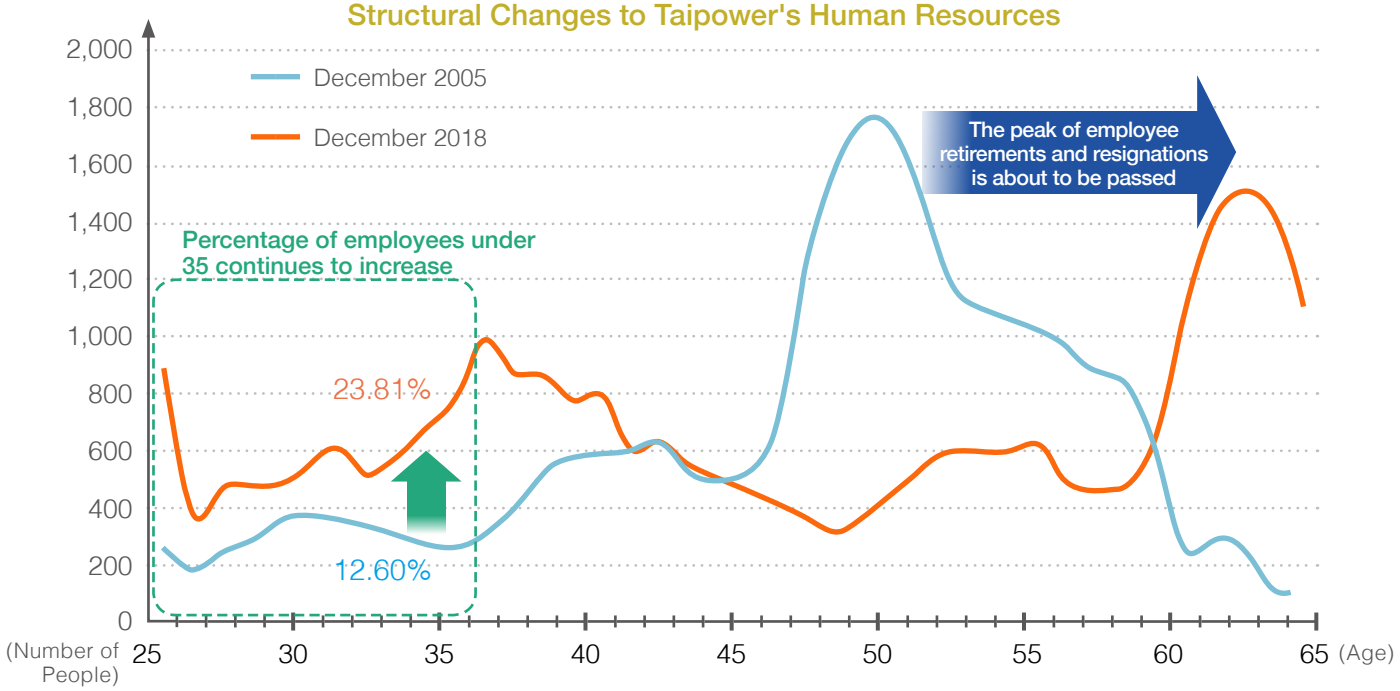


Note: 1. Based on Taipower's definitions, frontline management includes: section supervisors, deputy captains, station masters, plant managers, duty officers, service center officers, and service station officers; the supervisors included here are above the level of frontline supervisors.

2. Middle-level management includes: plant managers, directors, team chiefs, planning engineers, deputy central dispatch directors, deputy directors, managers, assistant managers, and duty managers.

3. Senior management includes: the chairman of the board, president, professional chief engineer, professional chief administrator, division directors, plant managers, center directors, station directors, division deputy directors, plant assistant managers, center deputy directors, station deputy directors, executive secretaries, central dispatching supervisors, general supervisors, director's secretaries, chief inspection officers, chief executive officers, deputy chief executive officers, and subdivision directors.

Structural Changes to Taipower's Human Resources



Outsourced Human Resources

As of the end of December 2018, Taipower human resources that were outsourced to sub-contractors were separated into two categories: manual dispatched labor and manual and service contract labor. The numbers of Taipower's outsourced manpower in 2018 are as follows:

Note: 1. Manual dispatched labor refers to work performed by outsourced personnel located at Taipower and therefore subject to the supervision of relevant units. Staff in these positions are used to fulfill business needs for engineers with technical expertise and administrators with management expertise in procurement and contract management.

2. Manual and service contract labor refers to tasks such as cleaning, janitorial services, document processing, call center agents, drivers and so forth.

3. The statistics above do not include outsourced work loads (Definition of outsourced work load: Except for manual and service contract labor outsourcing, the outsourcing procurement, such as manual labor, technical services, facilities operation and maintenance, implemented in any other ways).

4. The cut-off date for the statistics was the end of December 2018.

Taipower All-Stars: A Positive Force in Society

Throughout the years, a group of special Taipower employees has played an important role in promoting Taiwan's social and athletic development. Taipower has 6 sports teams playing men's baseball, men's volleyball, women's badminton, women's volleyball, men's soccer, and women's basketball. The Company is arguably the state-owned enterprise with the most sports teams and the organization that is the most supportive in ball games in Taiwan. Taipower teams have cultivated numerous sports stars. Players often have outstanding performances in major sports events at home and abroad. Their hard work means that Taipower not only provides power for Taiwan, but is also able to bring glory to Taiwan.

In addition to providing athletes the ability to steadily develop their abilities, Taipower promotes the concept of "rooting grassroots sports." This entails the conduct of different sports promotional activities such as the Caring Trains and Ball Games Fun Camps. At the camps, disadvantaged individuals receive the chance to engage in physical education. The program also enhances development opportunities for sports within disadvantaged groups.

Through the Taipower Caring Trains, Company personnel visit rural areas, remote towns and institutions for disadvantaged people to teach techniques required in ball games and to tell the students about athlete's experiences. The program is a wonderful opportunity to send love and hope to every corner of Taiwan. For example, the Company's baseball team went to Hengchun Junior High School and Daping Elementary School in rural Pingtung County to guide the young players in the techniques required for baseball. The men's volleyball team visited Baozhong and Maguang Junior High Schools in Yunlin County to interact with young players. The women's badminton team arrived at the Luofu Elementary School in Fuxing District of Taoyuan City to lead school children through a program about badminton. The women's volleyball team traveled to Jiayi and Wan'an Elementary Schools in mountainous areas of Pingtung County to help students discover their athletic interests. The soccer team went to Christian Mountain Children's Home, an orphanage deep into the mountains of the Liouguei District of Kaohsiung City. In all cases, players experienced positive interactions with children. The women's basketball team visited and interacted with local residents in Penghu, and shared their experiences to bring joy and warmth to those in need.

Throughout the years, Taipower has done its best to fulfill its corporate social responsibility by investing in sports and public welfare. Indeed, Taipower's efforts have been recognized by external institutions. Since 2015, the Company has won four consecutive Sports Activist Awards from the Ministry of Education's Sports Administration. In 2016, the Sports Administration held the "Taiwan i Sport" certification program for the first time. Taipower was certified in 2016 and again in 2018. The Company is currently the only certified state-owned enterprise in Taiwan.

5 Innovation and R&D

Intelligence Capital Implication for Taipower

The rise of artificial intelligence (AI) along with changes brought by information and communications technology (ICT), big data analytics, blockchain, cloud technology and other innovations have overturned the business models of the past and completely changed many industrial applications. Although Taipower is not among the first companies to bear the brunt of these shifts, the Company needs to keep up with the times by introducing relevant technologies, improving management efficiency, and increasing operational effectiveness. The Company aims to provide stable power and become a key promoter of green-power related industry by embracing technological changes and promoting smart grids, smart power development systems, and continuously investing in green power research and development.

Principal Investments

- Planning for the smart grid is complete and follows six major themes that promote the comprehensive development of smart grids
- Taipower plans to install a total of 1 million AMI smart meters and complete information management systems for our customers by 2020
- In order to effectively manage wind energy, Taipower has dedicated itself to the research and development of a Condition Monitoring System (CMS) for reducing wind turbine downtime through the early detection parts in need of replacement
- Develop highly efficient renewable energy storage devices that form a micro-grid structure

SDGs	Connections between SDGs and Taipower	Associated sections and issues
7 AFFORDABLE AND CLEAN ENERGY	Plan various renewable energy projects, improve operational and energy efficiency, and continue to increase the availability and popularity of electricity.	– General Planning for Smart Grids – Action Plans for Smart Grids – R&D in Green Power
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	Improve the energy efficiency and resilience of power infrastructure, and promote the innovative development of eco-friendly technologies.	– General Planning for Smart Grids – Action Plans for Smart Grids
11 SUSTAINABLE CITIES AND COMMUNITIES	Reduce urban impacts on the environment and focus on reducing air pollution and waste.	– General Planning for Smart Grids – Action Plans for Smart Grids – R&D in Green Power
13 CLIMATE ACTION	Actively participate in adaptation projects and mitigation actions to improve energy efficiency, develop renewable energy and improve climate resilience in power generation systems.	– General Planning for Smart Grids – Action Plans for Smart Grids – R&D in Green Power

Performance Highlights

- In preparation for smart grid development, Taipower set up ***71*** kilometers of optical cables and ***50*** sets of optical fiber communication systems
- In 2018, a total of ***963*** new automatic line switches were placed under supervisory control. These improved power supply reliability and shortened power outage times
- A total of ***200,000*** low-voltage AMI smart meters were installed for smart device customers in 2018

Future Plans

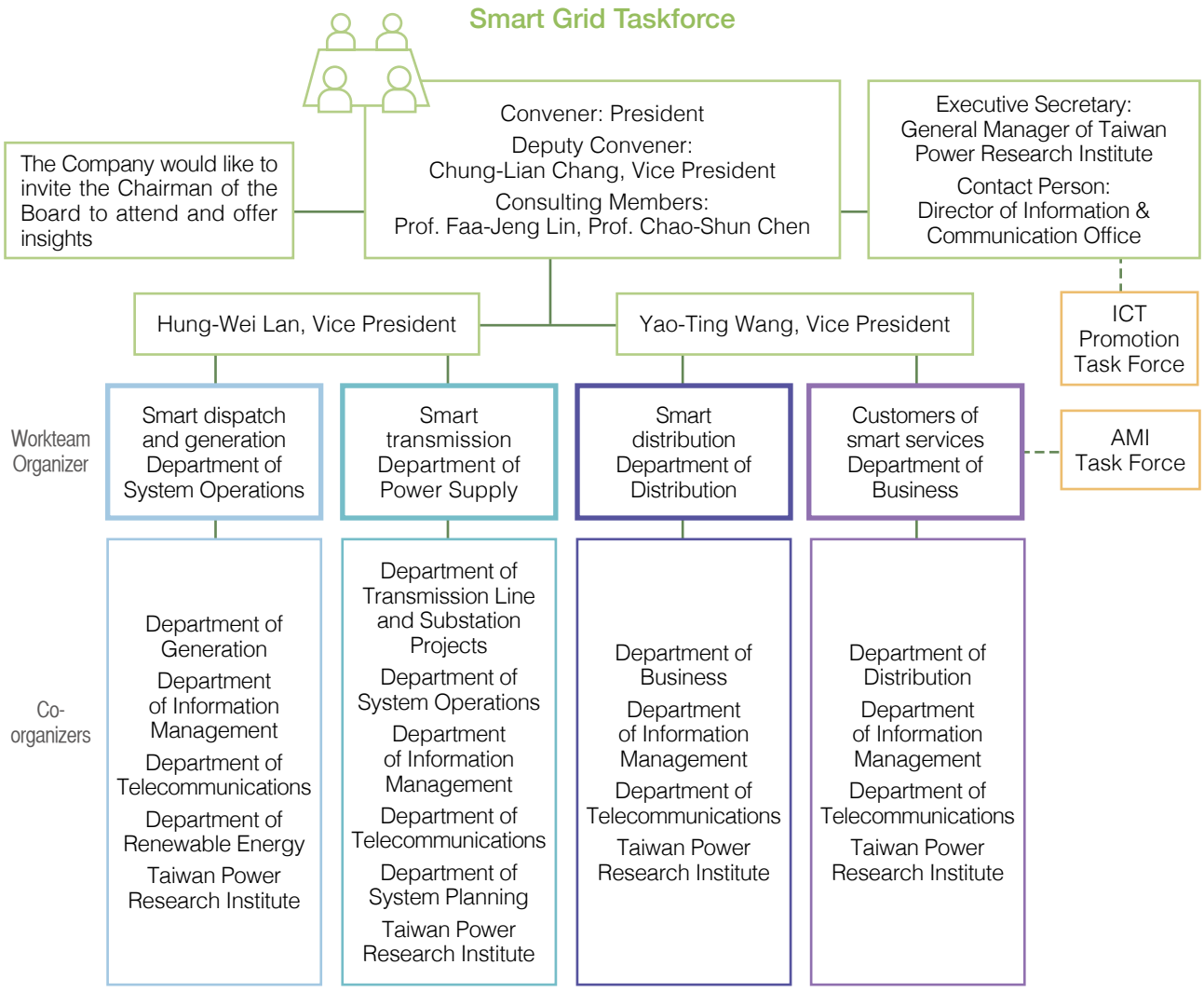
Taipower will continue to focus on innovation and R&D for smart grids and green power in near future. In keeping with the three-stage smart grid development plan, related facilities will be gradually built for power generation, dispatch, transmission, distribution, sales, etc. Regarding green power, Taipower will continue to invest in the research and development of renewable energy forecasting systems and to maximize the effectiveness of renewable energy, and gradually achieve the goal of energy transition.

5.1 General Planning for Smart Grids

Smart grids are vital for energy transition, industrial transformation and new economic development. To build a smart grid that is both effective and stabile, Taipower will strive to achieve three major goals: (1) control the amount of renewable energy generation and reduce the impact of intermittent power generation; (2) enhance grid resilience, strengthen the integration of power transmission and distribution systems, improve capabilities of disaster prevention and troubleshooting, and reduce power outage times; and (3) increase system effectiveness in supply and demand, employing load management as a method to strengthen customer participation opportunities.

A Comprehensive Plan for Smart Power

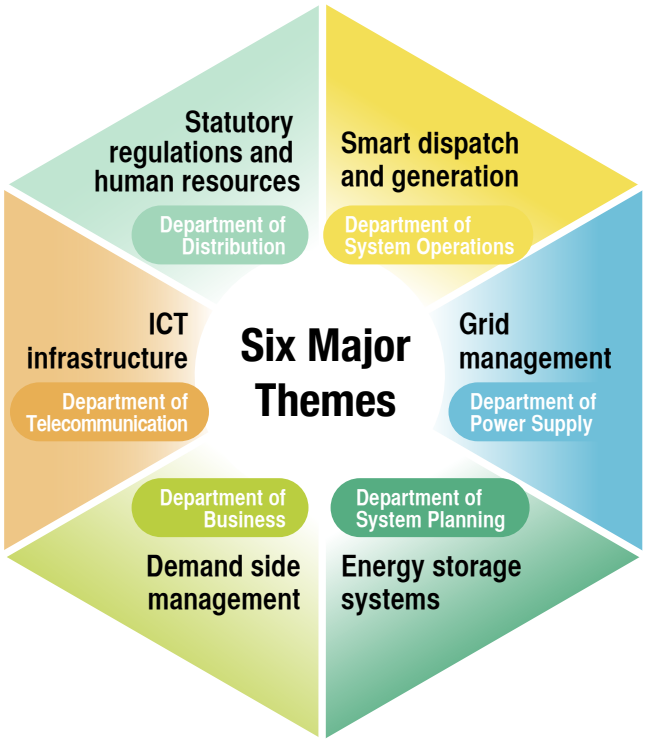
At present, the goals for developing a smart grid are prioritized as follows: (1) respond to the challenges of connecting renewable energy to the grid; (2) strengthen the resilience of existing facilities; and (3) introduce new technologies and improve supply and demand operations. The Executive Yuan initiated a Smart Grid Master Plan in 2012. Taipower is highly concerned about the implementation of the smart grid. As such, the President convenes and organizes a Smart Grid Task Force that is organized as follows:



Target and Timeline of Taipower Smart Grid

Aspects	Build-up Stage (2011-2015)	Expansion Stage (2016-2020)	Consolidation Stage (2021-2030)
Smart dispatch and generation	• Introduce IEC61850 standard communication protocol • Build a reliable and interconnected dispatch communication system • Strengthen information integration and various functions of the dispatch control platform	• Dispatch renewable energy connected with the grid on a large-scale • Demonstrate advanced equipment asset management • Dispatch demand response. • Implement an incentive system for renewable energy development	• Build variable speed operation control systems for pumped storage power plants • Promote advanced equipment asset management • Assess and apply advanced power generation technologies • Optimize the dispatching platform through review and renewal • Research large-scale energy storage systems
Smart transmission	• Execute a pilot program for a Special Protection System (SPS). • Digitize protective relays • Assess advanced protection technologies (e.g., Wide Area Measurement System (WAMS) and Advanced Power Transmission Malfunction Distance Measurement System)	• Renew heat-resistant wires • Build reactive power device control (RPDC) • Continue to renew protective relays • Monitor the dynamic thermal rating (DTR) of the network	• Construct smart substations • Make asset management equipment • Assess and apply Flexible Alternating Current Transmission Systems (FACTS)
Smart distribution	• Automatize distribution (an increase of 500 spots per year) • Construct smart substations • Research condition-based maintenance (CBM) • Review the mechanisms of demand response and electricity rates	• Strengthen the mapping system of distributed networks • Strengthen information management of the distribution system by employing data from smart meters • Research integration and apply a Common Information Model (CIM) standard	• Manage renewable energy grid connection capacities • Develop regional energy storage systems
Customers of smart services	• Build high/low-voltage automated metering infrastructure (AMI) • Research information system security	• Demonstrate demand response • Research and discuss an electricity rate system that reflects power supply costs and offers incentives for saving electricity • Review the control objects and methods of demand response	• Promote household-level distributed power and energy storage management systems

In response to the needs of energy transition, amendments to the Electricity Act, and the effects of the great blackout incident of August 15, 2017, Taipower has, after much work, developed a plan consisting of six major themes including smart dispatch and generation, grid management, energy storage systems, demand side management, ICT infrastructure, and statutory regulations and human resources. In the future, Taipower will gradually complete various action plans in accordance with the six major themes to promote the development of smart grids in a holistic manner.



5.2 Action Plans for Smart Grids

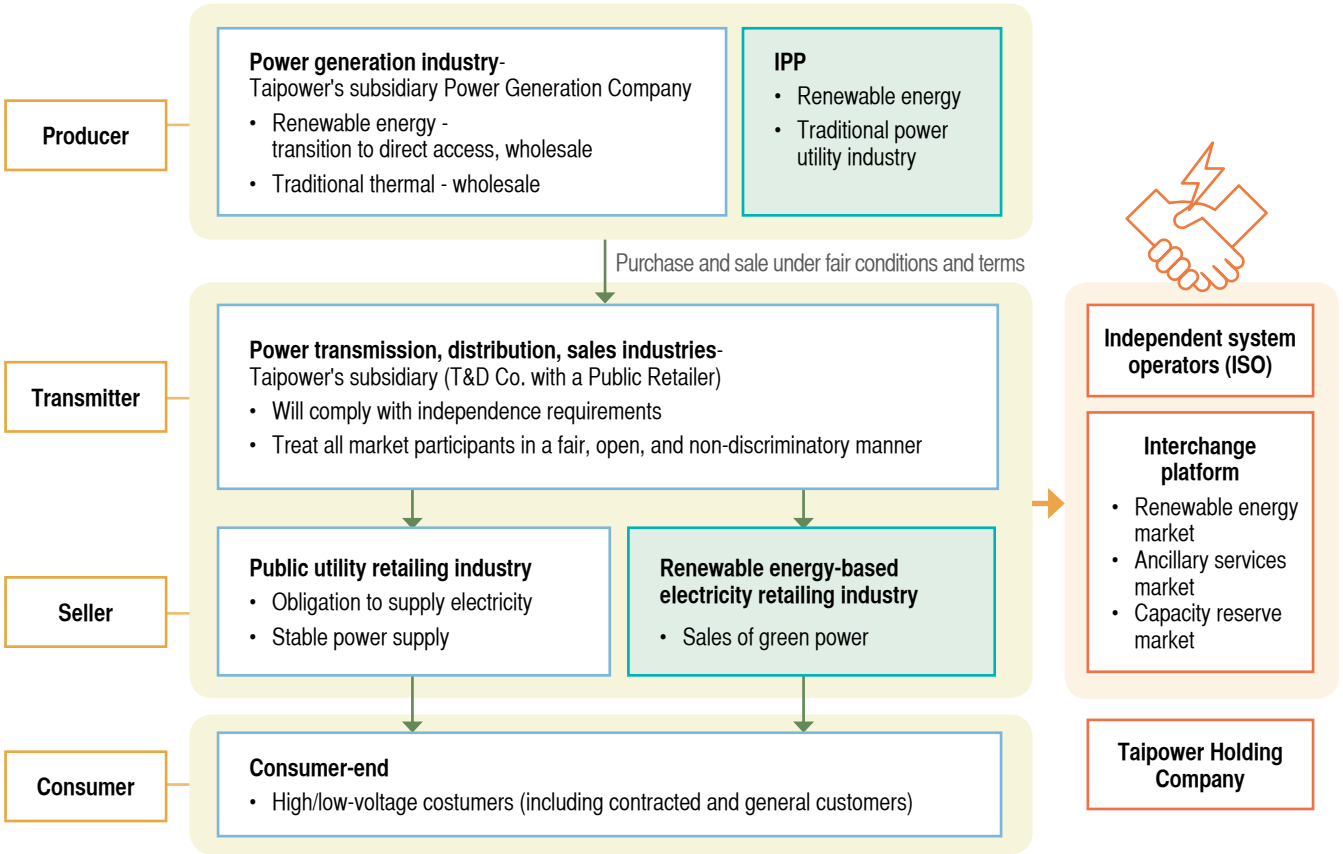
5.2.1 Smart Dispatching and Generation

For energy transition to occur, the existing generation equipment and power grid must be upgraded and enhanced to allow for the real-time monitoring and connection of power generation from multiple power plants and renewable energy installations. Since power generated through renewable sources is not as stable as that derived from traditional power plants, constant generation monitoring becomes necessary. This must be combined with data collected from smart meters and process using big data analytics to improve power generation forecasting. Together, these initiatives can reduce the uncertainty that comes with renewable power generation.

Additionally, recent amendments to the Electricity Act aimed at opening the market will increase the share of power generated by external sources year by year. In consequence, effective management and dispatching will be increasingly important issues that are closely tied to the development of smart grids. Through the transition, Taipower will pursue ongoing renewal of its existing coal-fired units. To mitigate against failures and decrease inspection times caused by furnace abnormalities during this process, the Company will introduce a real-time monitoring system.

To balance these challenges, Taipower has developed a series of key working items that create an optimal energy management system. Specifically, these items include the integration of renewable energy generation and an information management platform, an electricity market trading platform, and a big-data monitoring system for coal-fired units.

Positioning and Analysis of Power Utility Market Participants



5.2.2 Grid Management

The effective operation of a smart grids is dependent on the resilience of the grid. One major current challenge to grid resilience is that there is no uniform standard for communication among substation equipment. Moreover, old equipment cannot currently be monitored to provide advanced notice of an abnormalities. As the renewable energy supply gradually increases, there will be an increase in the voltage born by the power distribution system. Without automated feeders, checks and repairs will be difficult, and times required to restore operation will be extended.

To solve this challenge, Taipower is gradually introducing the IEC 61850 standard communication protocol at substations. The protocal improves interconnectivity between pieces of equipment at substations, thus reducing the occurrence and scope of accidents. Simultaneously, the Company will manage transmission equipment assets through a condition monitoring platform and big data analytics. This will allow for preventive maintenance and the avoidance of accidents. In addition, the introduction of a self-regulating function in smart inverters will also help to stabilize feeder voltages. As Taipower increases its feader automation deployment year by year, information from the renewable energy and smart meter systems will become increasingly integrated through the establishment of an advanced distribution management system (ADMS). Together, these initiatives will allow for the accurate identification of points of accidents and accelerate the recovery of power supply for customers.

In 2018, Taipower completed work on the introduction of IEC 61850 at the Lure, Xiayin, and Beihui substations. These substations can now be used for future grid operations and electrode protection. The current practice for internal state current monitoring in transformers calls for the testing of oil samples and the installation of a devices for manual readings. The protocol makes the immediate detection of internal transformer abnormalities unlikely. To rectify this problem, online flammable gas detectors must be installed for real-time operation. In 2018, Taipower completed wireless condition monitoring systems for the Dinghu E/S and Zhongli P/S. These systems can now be used to observe and monitor the operation of transformers at the substations through the internet.

Taipower plans to add automatic line switches every year and incorporate them under supervisory control. This measure will reduce the scope and shorten the duration of accidental power outages and increase the reliability of the power supply. In 2018, work on a total of 963 automated switches was completed.

5.2.3 Energy Storage System

Renewable energy generation is intermittent and variable. Moreover, solar photovoltaic power, for example, does not have an inertia response capacity like traditional units do. With the heavy use of renewable energy, additional reserve capacity is required to resolve generation increase needs. To tackle this issue, Taipower is actively developing energy storage systems that will improve power supply stability.

The system now in development will have a fast frequency control capability which can help stabilize system frequency. However, the cost of energy storage batteries is expensive making the construction of battery equipment intended to stabilize the system a major infrastructural priority. Additionally, the construction, operation and maintenance capabilities of battery equipment must be improved at the same time. Taipower plans to initially use an ancillary service system for energy storage levels, and will employ emerging technological developments in areas such as renewable energy device quantities, system control resources, and power generation forecasting to complete its energy storage systems.

5.2.4 Demand Side Management

Taipower will continue to strengthen the big data analytics of smart meters and value-added applications, improve system visualization and customer interaction, and guide customers to save energy. Meanwhile, the Company will implement measures such as strengthening demand-side management, promote user participation, reduce peak loads, and employ dynamic electricity rates and adjustments to the rate structure to guide customers to change their modes of consuming electricity. Additionally, Taipower will focus on potential customers who may engage in saving energy as it deploys smart meters. By the end of 2018, 200,000 low-voltage smart meters had already been installed, with a further 3 million to be in service by the end of 2024. As an indication of the priority assigned to this effort, before 2018, only 26,640 high-voltage and 231,774 low-voltage AMIs had been installed.

5.2.5 ICT Infrastructure

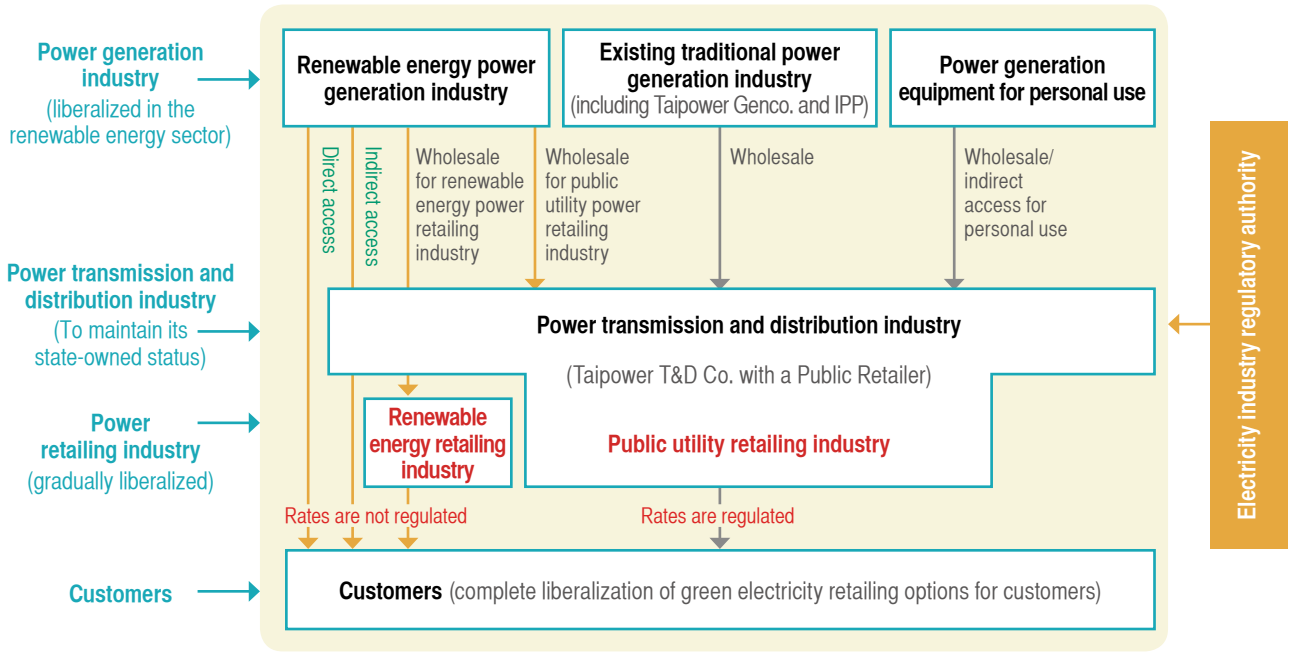
Sound ICT infrastructure is an indispensable part of smart grids. The bandwidth utilization rate of the existing fiber-optic communication system has exceeded 60%. In consequence, the current system cannot meet the demands of telecommunication for the future smart grid. Since smart grids are reliant on ICT, security issues cannot be ingnored, either.

To meet the applied communication demands of smart grid – for things like monitoring system applications, smart substations, ICT systems, renewable energy, distribution feeder automation switches, and high/low voltage AMIs, Taipower will build a cable broadband fiber network. The network will provide closed, secure, and real-time power telecommunications, conduct rolling reviews on the actual Internet Protocol (IP) broadband network and power IoT telecommunication service needs of each unit. At present, Taipower has set up 71 kilometers of its own dedicated optical cables and 50 sets of optical fiber communication systems. These provide 847 reliable telecommunication circuits.

5.2.6 Statutory Regulations and Human Resources

The development of a smart grid is, in part, a response to the reform of the utility industry and the liberalization of power market. As such, the successful completion of smart grids will require planning that establishes future market mechanisms. The additional need for cooperation with renewable energy providers and the policy prioritization of green energy makes this planning and regulatory work increasingly urgent. In the face of future changes to power grids, the Company must also keep pace with changing demands for human resources and quality improvements.

Structural Diagram of the Future Power Market



In response to the challenges mentioned above, Taipower will amend the Guidelines for Renewable Energy Interconnection Technology and Guidelines for Power Dispatching in accordance with the Renewable Energy Development and the Electricity Acts. Meanwhile, training on newly added or amended regulations for renewable energy (including those concerning energy storage equipment and data opening) will be arranged by Taipower's Human Resources Department.

Taipower Unveils its Smart Grid Showcase and Invites Visitors to be Dispatchers for a Day

In order to demonstrate and promote the smart grid, Taipower set up a smart grid display site at the Headquarters building. The Smart Grid Exhibition introduces methods for smart grid operation in a lively way through a variety of interactive models and devices. The display incorporates augmented reality (AR) technology and animated films, to enhance the general public's participation, deepening energy awareness and promote the goal of national energy transition.

The exhibition features six major areas including: Development and Vision, Smart Dispatch, Smart Distribution, Friendly Innovation, Self-Powered Generation and Smart Customers. By combined technologies for creating energy with storage, conservation and ICT infrastructure, power supply-end customers and users can communicate with each other. This promotes more flexible and stable power applications and creates a low-carbon environment for sustainable development.

5.3 R&D in Green Power

Taipower's efforts to promote low-carbon electricity are tireless and never-ending. However, the potential challenges of renewable energy cannot be ignored. Through various auxiliary devices and analytical technologies, renewable energy should be able to meet public electricity utilization demands. But, a combined power forecast system and energy storage system for peak load shifting will also be necessary and will allow Taipower to ensure competitiveness in the energy industry.

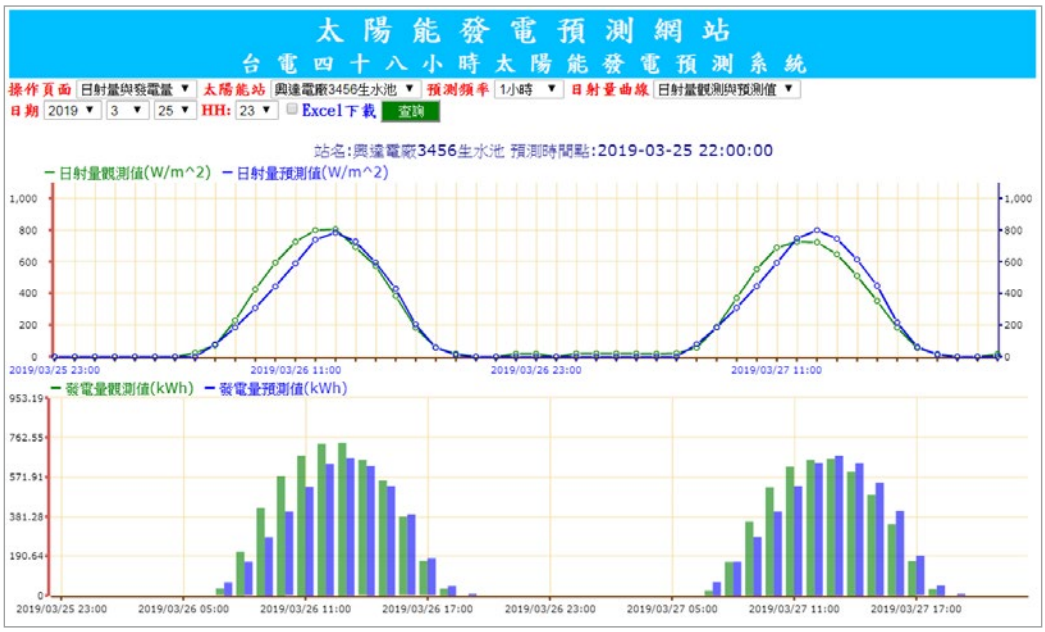
5.3.1 Strengthening the Application of Low-Carbon Energy

The Renewable Energy Forecast and Application System

Wind and solar photovoltaic power are intermittent energy sources. The injection of electricity from these sources into the grid will lead to instability of the power system. The unpredictable energy output of renewable sources will be more difficult to dispatch and increase the costs of investment in and operation of the grid. Therefore, the ability to predict generation rates of wind and solar photovoltaic power will be an important component of business models in the power industry of the future.

Taipower is seeking to manage the effects of unstable renewable energy output by developing a short-term (6-hour) and medium-term (48-hour) forecast systems for the Company's wind farm. The Company has also developed a 48-hour solar photovoltaic power output forecast system as part of its Phase 1 Solar Power Station development. In the future, Taipower will develop monitoring capabilities for wind turbine operation and maintenance, solar photovoltaic operation and maintenance, rainfall forecasting and water level changes in reservoir catchment areas. These forcast capabilities will improve the efficiency of green power dispatching, and the development of these and other related developments is a priority for the Company.

Solar Power Forecasting System Diagram



Advanced Technologies for Wind Power Generation Engineering Analysis and Monitoring Diagnosis

Wind power generation is one of the main factors in Taipower's drive to promote renewable energy. In recent years, onshore wind fields have become saturated, and offshore wind farm development has been on the rise. Offshore wind farm development in Europe has illustrated that the construction and operation of these facilities is far more difficult than for onshore wind turbines. Therefore, initial preparations such as assessments and technology introduction are key factors affecting the availability and reliability of future wind farms.

In order to effectively manage wind energy, Taipower is developing a Condition Monitoring System (CMS), which has the advantage of being able to obtain running data of the turbines, and to prepare components in advance for when maintenance is needed. This development will allow Taipower to reach its goal of shortening downtimes as much as possible.

However, many challenges exist. The fault monitoring systems for wind turbines and blade operations available from international suppliers are costly. Moreover, they are difficult to apply widely for Taipower's wind turbines. In addition, most monitoring functions are based on vibrations or noises, and it is hard to find a system based on both.

In view of these technical difficulties, Taipower has developed and completed its own operational monitoring system that monitors both vibration and noise within wind turbine towers. The system provides early warning of potential faults and blade, machinery and motor conditions. The system assists Taipower in minimizing time loss and costs caused by severe damage, and improves the availability and efficiency of wind power generation. Potentially, Computer Aided Engineering (CAE) could be used to build analysis models allowing the CMS monitoring system to analyze vibration frequency in the wind turbine structure. Meanwile, Taipower could build an analysis database by accumulating research data that will eventually strengthen its wind farm management abilities.

In the future, Taipower will conduct risk assessments, blade maintenance inspections and monitoring as well as dynamic simulation for its onshore wind farms and turbines. The goal is to steadily develop wind energy in Taiwan by collecting and analyzing wind power data over the long-term.

5.3.2 Utilization of Stable and Low-Carbon Power

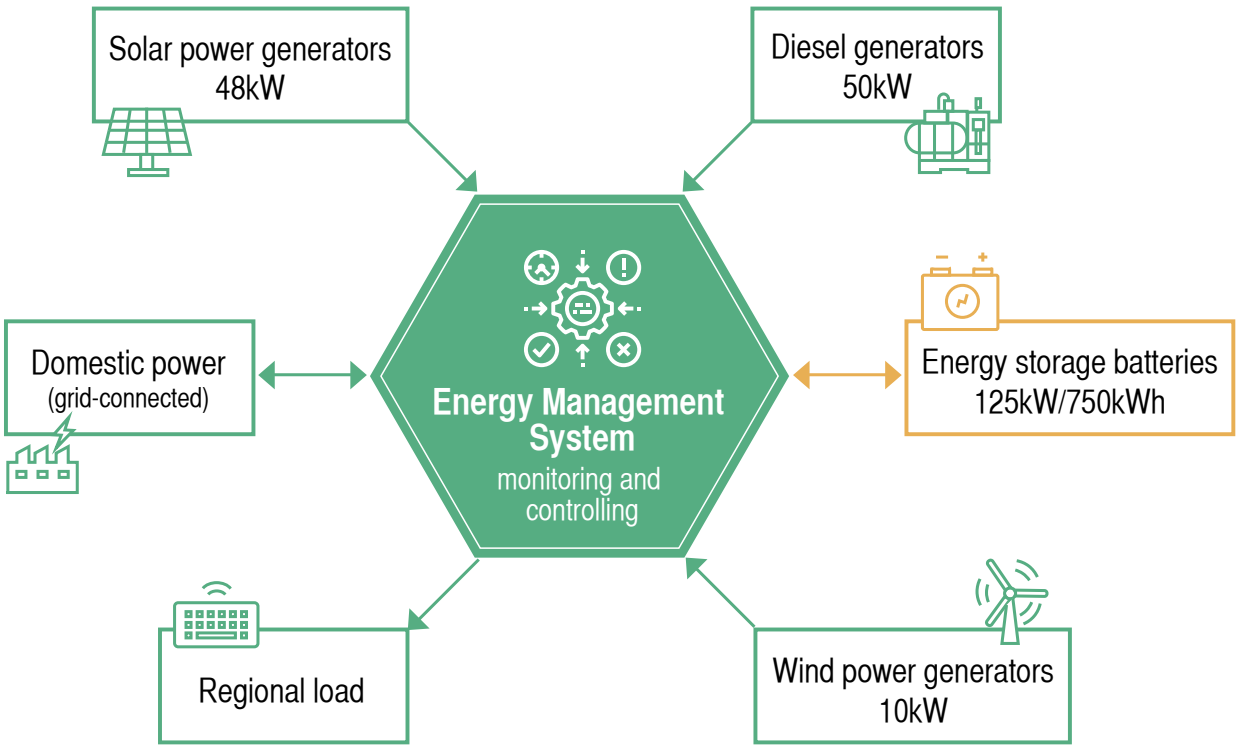
Power Storage Devices – A Comprehensive Micro Grid System

Energy storage will eventually enable the use of a large-scale renewable power supply in Taiwan. It will do this by smoothing the peak load curves and compensating for the irregular generation of green energy. At this time, the cost of power storage devices will have a great impact on Taipower, and there are still many improvements to be made in the technology. In consequence, Taipower is engaged in ongoing research on energy storage as a means of enhancing power distribution.

At present, Taipower is actively developing vanadium redox flow batteries (VRFB) for micro grids, and as high-performance energy storage devices. In order to study and verify the efficiency and effectiveness of the energy storage batteries in the power grid, a 125kW/750kWh flow battery was built at the Shulin campus of the Taiwan Power Research Institute. An energy management system was also introduced. In conjunction with existing solar power batteries, wind power, generators, and loads the addition of these technologies effectively creates the architecture of a micro grid. The energy storage system, through the micro grid, is built as a demonstration system, and serves as a technical basis for future research, development and practical experience.

In the future, Taipower will research power storage and renewable energy based applications of kW-class VRFB storage systems, renewable energy storage systems for micro grid application evaluations, MW-level energy storage and management system application evaluations, a low-carbon island project and Continuous Emission Monitoring Systems (CEMS).

Taipower Micro Grid Project



6 Social Co-Prosperity

Social and Cultural Capital Implications for Taipower

Taipower's corporate culture of pursuing integrity and compliance through feedback from the general public is the driving force behind the Company's operations and progress. Therefore, through integrity management, Taipower has actively established a relationship of positive bilateral engagement with the general public. This has allowed the Company to accumulate social capital and create sustainable competitiveness. Through strategic communication with stakeholders, in-depth management of partners and investment in culture, art, sports, and public welfare activities, Taiwan's cultural and social energy is strengthened, and Taipower establishes a deeply rooted reputation for corporate social responsibility.

SDGs	Connections between SDGs and Taipower	Associated sections and issues
12 RESPONSIBLE CONSUMPTION AND PRODUCTION	Improve the overall energy efficiency and resources required for the overall generation/transmission/distribution process in order to reduce the environmental footprint of the power supply.	– Fuel Suppliers – Material and Equipment Suppliers
13 CLIMATE ACTION	Actively participate in adaptation plans and mitigation actions while improving energy efficiency, developing renewable energy and enhancing the existing power generation system's climate resilience.	– Fuel Suppliers – Material and Equipment Suppliers
16 PEACE, JUSTICE AND STRONG INSTITUTIONS	Emphasize corporate governance, integrity management and information disclosure while ensuring various communication channels operate smoothly.	– Integrity and Compliance – Stakeholder Communication and Engagement

Principal Investments

- Implement three defense mechanisms for internal control to ensure integrity management
- Strengthen the transparency and readability of official website information, operate a Facebook fan page, a Green Net website, a YouTube channel and other social media accounts. Continue to operate the 1911 customer service hotline, online service counter, and Taipower e-counter app
- Establish stable communication mechanisms with partners and implement inspection and screening mechanisms
- Invest a total of NT$1,556,855 (in 2018) in art bank painting rental activities and performances

Performance Highlights

- Taipower's 1911 customer service hotline has received approximately ***2.608 million*** calls; ***95.95%*** of incoming calls have been answered by designated personnel within 20 seconds
- The customer satisfaction score in 2018 was ***95.5*** points
- In 2018, a total of ***102*** green procurement cases with a value of NT$***1.05 million*** were handled
- Organized a "***Power Infrastructure as Landscape: Taiwan Power's Cultural Heritage***" exhibition in September, 2018

Future Plans

Taipower will continue to engage in communication with stakeholders, disclose necessary information in an open and transparent manner, meet the expectations of stakeholders, and eliminate other concerns about the environment and nuclear safety. At the same time, the Company will continue to build on long-term contracts to stabilize the supply of raw materials for suppliers and maintain safety stock. In the investment of social welfare, Taipower will continue to promote vital elements of Taiwanese society such as culture, art, and sports under the premise of fostering long-term development.

6.1 Integrity and Compliance

6.1.1 Integrity Management

Taipower believes in integrity management and has made a conscious effort to adhere to the principle of "authentic operation and autonomous management." This has led the company to promote a series of codes of ethics and to optimize its internal control mechanisms while ensuring legal compliance and fulfilling its corporate responsibilities.

Ethical Code

All personnel	All Taipower employees shall abide by laws and regulations such as the "Ethics Code for Personnel under the Ministry of Economic Affairs" and "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 personnel 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 to its procurement personnel to help them perform their duties in compliance with pertinent laws in a manner that is fair and honest without giving, asking, or expecting favors. Taipower has also established Anti-Corruption and Legal Affairs Offices to offer consultation services. The Company emphasizes fair and open procurement processes so as to improve procurement efficiency, performance and quality.
Management	Taipower maintains clearly defined rules for the governance of administrative liability. Both personnel involved in fraud/bribery and their managing supervisors will be held accountable to facilitate the development of stricter integrity management.

Anti-corruption Measure

As a state-owned enterprise, integrity management and legal compliance are the most fundamental principles that Taipower operates by. In accordance with specific policies and measures from the "National Integrity Building Action Plan," Taipower has implemented the planning and promotion of various ethics-related tasks and integrated them with a consensus on anti-corruption within the private sector, as the Company employs the highest integrity standards for itself.

In order to implement "management by walking around" the Department of Civil Service Ethics has set up a plan for the integrity supervision of the business administration every year. The Department visited each unit and conducted on-the-spot checks, case file investigations and comprehensive seminars to check the implementation of civil service ethics within each unit. The aforementioned tasks were conducted in order to correct mistakes found in previous projects, improve performance, and demonstrate the integrity of civil service ethics institutions. In 2018, a total of 16 units were inspected, and civil service ethics units in most departments have effectively implemented tasks related to the civil service ethics.

In addition, according to the Company's Integrity Work Plan, an annual integrity risk assessment is conducted. In 2018, 84 units were evaluated (including the Headquarters), an evaluation rate of 100%. Through integrity risk assessments, a material corruption risk was identified by Taipower – essentially, employees could have had improper contact with vendors during the process of procurement performance management, leading to unreliable final project acceptances and corruption cases involving employees and vendors.

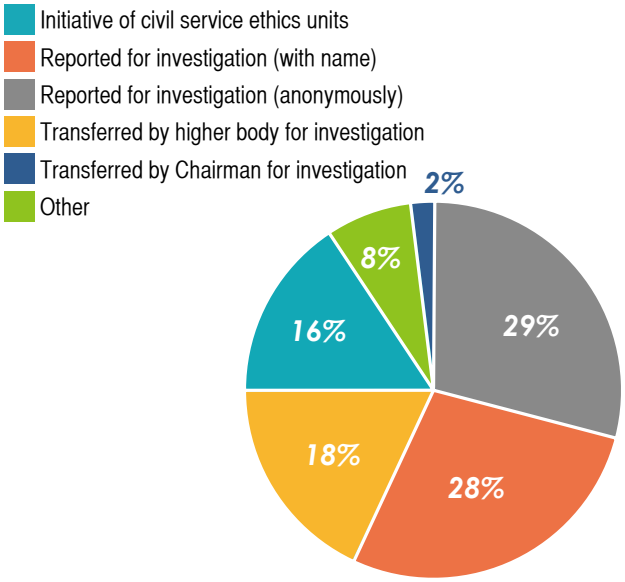
Taipower's Anti-Corruption Regulations

- Precautions on Interactions between Taipower Procurement Personnel and Other Businesses
- Established Operating Directions for Taipower Procurement Spot Check Teams
- Implementation Plan for the Enhanced Dissemination of Civil Service Ethics at Taipower
- Taipower's Guidelines on Administrative Liability and Accountability of Personnel and Their Managing Directors Following Involvement in Fraud or Bribery

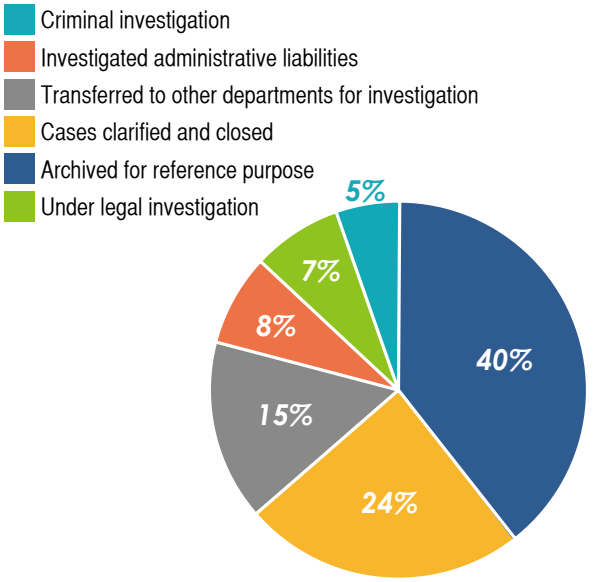
Cases Investigated in 2018

A total of 337 ethics-related cases were closed in 2018. The figures below show the breakdown of cases by source. The figures illustrate the fact that anonymous reports still contribute to a significant percentage (29.08%) of cases filed. Nevertheless, all reports that include concrete and verifiable information or data are handled in a prudent and unbiased manner, regardless of whether they are submitted by anonymous or named sources.

Sources of Corporate Ethics Cases in 2018



Handling of Corporate Ethics Cases in 2018



Cases in Which Employees Are Charged with Regulatory Violations

One case took place in 2018, in which a Taipower employee committed embezzlement and was prosecuted by the prosecutor for the crime of "misappropriation related to occupation." The said employee received one major demerit from the Company due to this prosecution.

In 2018, Taipower had one case of affirmed conviction for alleged bribery:

- One inspector, who was tasked with inspecting the construction of a pylon, allegedly asked for a bribe from the vendor. The Taichung Branch of the Taiwan High Court ruled on October 17, 2018 that the accused was not guilty, maintaining the verdict from the first instance. Since the prosecutor did not appeal the verdict, the case was settled and the inspector received one major demerit from the Company.
- In 2016, the inventory/cost manager of a power plant was prosecuted because he/she failed to follow procurement regulations in terms of project final acceptance and pricing and tried to seek personal benefit. In 2018, the Taiwan High Court revoked the verdict from the first trial and convicted the defendant of the crime of recording and publishing false content in documents related to job duties during their execution. The verdict has been appealed and the case is currently under review by the Supreme Court of the Republic of China. The manager involved in this case received one demerit from the Company and was suspended from his/her post.

Internal Risk Control

Following the Regulations Governing Establishment of Internal Control Systems by Public Companies issued by the Financial Supervisory Commission and the Enforcement Rules for Internal Inspection of National Corporations under the Ministry of the Economic Affairs issued by the Ministry of the Economic Affairs, the Internal Inspection Office of the Board of Directors devised and executed a "2018 Annual Inspection Plan." In 2018, inspected items included internal control management and self-regulatory mechanisms, risk management, effect and efficiency of major operational project targets, information, communication, and reporting, compliance with relevant laws and regulations, required items from the Board of Directors/Audit Committee, requests by higher authorities for revisions and other matters.

Taipower's 2018 Annual Inspection Plan further included the Department of Civil Service Ethics as one of the patrol inspection units. In addition, when the units engaged in patrol inspection, the civil service ethics section of each unit was also included in the scope of inspection to audit the actual implementation of the operation so as to achieve three effective lines of defense.

Three Lines of Defence for Internal Auding and Control

In 2018, the actual implementation of the patrol inspections included 65 units and 27 special project inspections. The Company completed an annual internal control system self-assessment report. The scope of assessment included all of Taipower's operating units. This allows the Board of Directors and the President to assess the effectiveness of the Company's overall internal controls through the report. The report also serves as the primary basis for 2018's Annual Internal Control System Statements.

6.1.2 Compliance

Taipower is a state-owned public utility, and the Company operates under the mandate of the Administrative Law of State-Owned Enterprises. As a result, the establishment of Taipower's organization, accounting, auditing, budgeting, business planning, utility rates, and long-term purchase and sale contracts must be approved by the competent authorities, in this instance the Ministry of Economic Affairs. Specifically, the Ministry's State-owned Enterprise Commission is responsible for supervising and managing the various operations at Taipower, as well as communicating other directives from other ministries, such as the Ministry of Economic Affairs itself, the Bureau of Energy, the National Development Council, or the National Audit Office. The implementation of corporate policies must comprehensively consider the provisions of various laws and regulations and their impact 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 has made a point of organizing multiple sessions of a Practical Legal Issues – Case Studies and Solutions Seminar at different units. The Office also arranges other legal affairs training events each year. In addition, the Legal Affairs Office provides various legal consultation services in order to help with the legal issues that different units encounter in their operations to ensure that all employees abide by the pertinent regulations.

Administrative Sanctions for Labor Issues

In 2018, Taipower received a total of three administrative sanctions for labor issues by the Ministry of Labor's Inquiry System on Institutions (Employers) that have violated Labor Regulations. Two of the three cases are still in the midst of administrative proceedings, while in the remaining case it was determined that the Company was in violation of Paragraph 2 of Article 32 of the Labor Standards Act, and a NT$20,000 penalty was imposed. At present, the relevant sanctions have been reviewed and responsive strategies have been proposed. For example, the Company will continue to execute awareness campaigns on labor issues through various conferences and seminars. Also, the assignment of job duties will be based on the Labor Standards Act and the Company's relevant internal regulations.

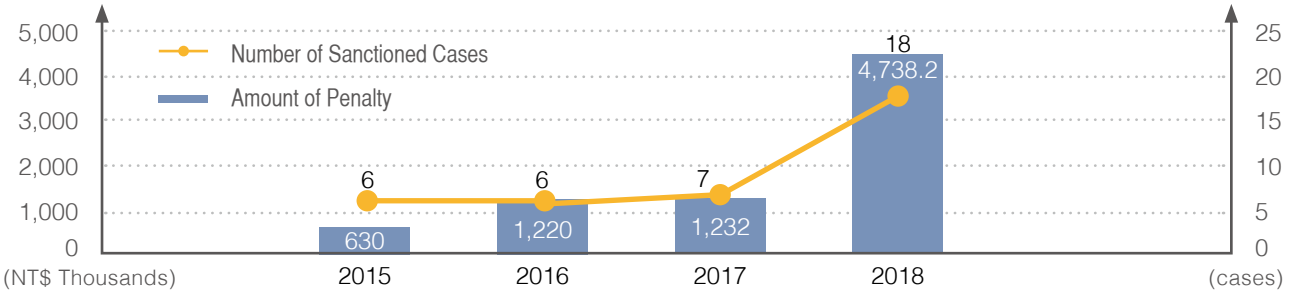
Administrative Sanctions for Industrial Safety

In 2018, Taipower received a total of three administrative sanctions for industrial safety and was fined a total of NT$126,000. Following these cases, the Company strengthened its awareness campaigns, relevant protective measures, related simulation exercises, as well as its promotion of safety culture and the enhancement of the management by "walking around" when dealing with high-risk tasks.

Administrative Sanctions on Environmental Protection Issues

The total number of administrative sanctions and the amout of penalties incurred by Taipower for environmental protection issues increased in 2018. The key issue underlying this increase was wastewater treatment at one of the Company's power plants. Other penalty cases were the result of contractor failure to implement regulations. These penalties have been reviewed by the Company and responsive strategies have been proposed, such as strengthening education and training, and requiring contractors to allocate a certain proportion of their environmental engineering budgets for environmental improvement. Taipower has also strengthened its management by "walking around" and implemented various audits.

Number of Sanctions and Penalty Amounts



Note: The number of administrative sanctions in 2018 (after deducting 7 cases related to policy factors) was an increase over those from 2017. The total amount of penalties in 2018 (after deducting NT$3,589 thousand in fines related to policy factors) was less than in 2017. The current regulatory environment has resulted in many amendments to laws and regulations and an increase in the intensity and severity of law enforcement. Moreover, the Company is currently launching a series of major power facility development projects. As such, Taipower's ability to maintain this level of compliance in 2018 is a great achievement. In 2018, the Company strengthened its control measures to reduce the number of sanctions and the amounts of fines. The main implementation measures were as follows:

1. Inspections on environmental protection for on-site operations without prior notice.
2. Training on environmental protection regulations and environmental protection inspections in order to strengthen awareness of environmental protection regulations.
3. On-site environmental protection personnel participated in professional and awareness training on environmental regulations organized by the EPA.
4. Strengthened the auditing of environmental law and regulation compliance.
5. Conducted annual discussions on cases of violations of environmental protection.
6. Moved to execute an air pollution reduction plan for existing power generation units as soon as possible.
7. Promoted the setting of prices for individual environmental protection facilities and requested implementations.
8. Cooperated with the EPA's "Emergency Control Guidelines for Severe Deterioration of Air Quality" and implemented reductions of emissions and loads.
9. Coal-fired units used the AQI index to carry out friendly load reductions, voluntary load reductions, and mandatory load reductions – especially during the fall and winter when air quality is poor.

Product Responsibility and Personal Information Protection

Taipower's main product is electricity. Electricity prices are set in accordance with government laws, regulations, and policy directives. Moreover, Taipower handles all customer information, electricity payments in arrears and suspension of electricity service in accordance with the Personal Information Protection and the Electricity Acts. Staff are instructed to follow these laws and regulations to prevent branch employees from unintentionally leaking customers' personal information. Employees are also supervised as they complete related tasks. Taipower has clearly laid out appropriate methods for verifying applicant's identities and checking identification for all inquiries related to customers' personal information. This includes personal inquiries by customers, inquiries representatives on behalf of customers, personal visits, telephone (or fax) communications, and online inquiries (or printouts). In 2018, Taipower had no violations relating to the provision of products or services.

6.2 Stakeholder Communication and Engagement

6.2.1 Stakeholder Communication Performance

Stakeholder Communication Results

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

Stakeholder	Materiality to Taipower	Issues of Concern	Frequency and Methods of Engagement	Engagement Results
Board of Directors	The Board of Directors functions at the core of Taipower's operations and is responsible for leading the Company towards sustainable management.	• Integrity and sustainable management • Transformation into a new energy utility group • Management and financial performance	• One monthly board meeting and Project Review meeings • At least one Audit Committee meeting every quarter • Training for directors (including independent directors) • Annual performance assessment for the Board of Directors	• Convened 12 Board meetings • Convened 19 Project Review meetings • Convened five Audit Committee meetings • 33 directors (including independent directors) participated in training courses on corporate governance and completed 126.5 hours of training • Performance for 2018 was evaluated in accordance with the "Performance Evaluation Guidelines for Boards of Directors" and the results are available on Taipower's official website
Shareholders	Maintaining the Company's operational performance and safeguarding shareholders' rights are fundamental commitments for Taipower.	• Integrity and sustainable management • Management and financial performance	• Shareholders' meetings • Taipower's official website and Market Observation Post System (MOPS)	• The annual shareholders' meeting was convened on June 22 • Relevant information is disclosed on the MOPS and the corporate governance/shareholders sections of Taipower's official website
Employees	Employees are the soul of Taipower; they shape Taipower's corporate culture and function as the groundwork for the Company's sustainable development.	• Transformation into a new energy utility group • Integrity and sustainable management • Safety management and crisis response • Worker health and safety • Stakeholder engagement and information transparency	• On-the-job Training • Labor-management Meetings • Themed lectures and seminars • Organized information sessions on amendments to laws and regulations	• Organized two information sessions on amendments to the Labor Standards Act • Organized orientation training for 1,590 new employees, on-the-job training at the Training Institute and in all units of the Company, as well as external training for 62,400 participants • Organized 9 themed lectures for high-ranking supervisors • Organized 11 labor-management meetings and one information session on major labor-management issues • Total number of personnel audited on-site for occupational safety: 35,458

Stakeholder	Materiality to Taipower	Issues of Concern	Frequency and Methods of Engagement	Engagement Results
Partners	Taipower must share its social responsibilities with its partners and screen its partners based on the principle of sustainability.	• Supply Chain Management • Worker health and safety • Environmental impact management and compliance • R&D of technology and in innovation	• Routine/ad hoc audits • Interviews and communication with suppliers by phone • Annual meetings with suppliers to review contracts • Internal and external communication meetings • Education and training	• Held a "Taipower Materials Management and Control Taskforce Meeting" every (other) quarter • Audited a total of 326,440 contractor personnel and found 705 instances of violations
Government/ Competent Authorities	As a state-owned enterprise, government policies have a substantial impact on Taipower's operations and development. As such, the Company is committed to maintaining adequate communications with the government to ensure stable operations and power supply.	• Power supply stability and reliability • Electricity tariff rationalization • Stakeholder engagement and information transparency • Renewable and clean energy development • Power industry reform and fair competition	• Board of Directors meetings • Official correspondence • Submission of reports on the progress of various projects • Participation in relevant meetings and conferences • Smart power generation and dispatching dimensional meetings • Project communication meetings	• Important issues to be reviewed during 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 • Submission of relevant data and participation in State-Owned Enterprise Review Meetings when required by the government (ad hoc) • Submitted 12 progress reports for "Smart Power Generation and Operation" and convened 4 "Smart Power Generation and Operation" dimensional meetings • Organized 6 power system stability and reliability team meetings • Participated in periodic "Small Hydro and Renewable Energy Development Strategic Platform Meetings" organized by the Water Resources Agency • Participate in small hydro-related conferences organized by government agencies and legislators (ad hoc) • Participated in the formulation of the "Discussion of Responsibility Clarification for the Promotion of Major Projects by MOEA Subordinate Units Meeting Memo" by the State-owned Enterprise Commission on January 16
Elected Representatives	Through communicating with elected representatives, Taipower listens to the voices of the people, understands their needs and helps to promote relevant regulations.	• Energy efficiency • Electricity tariff rationalization • Power plant renewal and decommissioning • Stakeholder engagement and information transparency • Renewable and clean energy development • Safety management and crisis response	• Participation in committee meetings at the Legislative Yuan • Coordination meetings and public hearings • Offered relevant materials and information on the Company's operations • Hosted visiting legislators	• Taipower's senior managers (VPs and higher) participated in 100 sessions at the Legislative Yuan • Supervisors and employees from Taipower have taken part in a total of 1,101 coordination meetings and public hearings organized by the staff of legislators, and have provided relevant documents • Taipower's senior managers (VPs and higher) participated in a total of 115 communication sessions with legislators

Stakeholder	Materiality to Taipower	Issues of Concern	Frequency and Methods of Engagement	Engagement Results
Media	The media is Taipower's partner when it comes to communicating with the general public. Through positive interaction with the media and building appropriate means of information delivery, Taipower will be able to foster awareness and help the general public understand the Company's operations.	• Stakeholder engagement and information transparency • Transformation into a new energy utility group • Renewable and clean energy development • Environmental impact management and compliance • Power supply stability and reliability	• Press releases • Printed materials • Public hearings/information sessions • On-site visits/visits by designated personnel • Taipower's corporate website • Market Observation Post System (MOPS)	• In 2018, Taipower published 104 press releases and 96 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 further dissemination of information • Regarding issues that have drawn significant public attention in recent years, Taipower has 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 • Taipower has taken steps to improve its spokesperson system by offering immediate responses and publicizing Taipower's key policies in response to issues that are closely related to the livelihoods of members of the general public
Private Organizations	Private organizations serve as a source of momentum that propels Taipower to grow. The urgings of and exchanges with the private sector have always driven Taipower to improve itself.	• Stakeholder engagement and information transparency • Climate change response strategies • Air quality • Energy efficiency • Power plant renewal and decommissioning • Development of humanistic spirit • Development of local communities	• Organized information sessions • Initiated visits • Participated in relevant forums and activities • Taipower's official website • Taipower publications	• In four districts of Kinmen, a proposed candidate site in Taitung, and Beihai, a total of 275 local activities, promotional booths, information sessions and seminars were set up to promote Taipower programs with 46,880 people reached • Co-organized a keynote speech with theCenter for Japanese Studies at National Taiwan University and invited Mr. Masakazu Toyoda, Chairman & CEO of The Institute of Energy Economics, Japan (IEEJ) to introduce Japan's national energy policy in a speech titled "Sustainable Energy Policy for Japan as an Island Economy" • Organized a "Global Future Energy Trends Forum" and invited the Director-General of the World Nuclear Association (WNA) and the Director of The Center for Green Economy at the Chung-Hua Institution for Economic Research to serve as keynote speakers. Experts and scholars were also invited to participate in the forum to discuss global energy trends • About 1,300 people visited the smart grid exhibition at the Headquarters building between January and April 2019
Residents/The General Public	The key to the completion of Taipower's major development projects and improvements to the power supply lies in the maintenance of smooth communications with the general public. Striving for harmonious coexistence and sharing credit for accomplishments with residents from areas in close proximity to power plants is also a vital issue that Taipower needs to consider.	• Stakeholder engagement and information transparency • Environmental impact management and compliance • Air quality • Development of humanistic spirit • Development of local societies	• The Taipower Facebook page • Relevant information disclosed on the corporate website	• Taipower's Facebook page reached out to approximately 25 million users in 2018 • The "Information Disclosure Section" of Taipower's website discloses information on the Company's operations and electricity tariffs. In addition, Taipower set up an independent website on sustainable development as a channel to present the Company's performance in sustainable development • Disclosed financial information and corporate governance information in the official websites "Corporate Governance Section"

Stakeholder	Materiality to Taipower	Issues of Concern	Frequency and Methods of Engagement	Engagement Results
Customers	Maintaining customer relationships is the key to Taipower's sustainable operation. After the market is liberalized in response to the amendment of the Electricity Act, Taipower must focus more on customer needs in order to stay competitive with potential competitors that emerge in the market.	• Power supply stability and reliability • Accessibility and availability of electricity • Electricity tariff rationalization • Demand side management and power conservation	• Convened power supply meetings • Visits from designated personnel • Education and training • Electricity bills • A customer opinion mailbox • Brochures and pamphlets (ad hoc)	• Established a comprehensive and tightly knit network of services with 24 branch offices and 268 service stations across Taiwan to communicate directly with customers • Organized annual power quality management and improvement meetings for high-tech parks, industrial areas and export processing zones on a yearly basis • Held routine review meetings for power consumption plans submitted by ultra-high voltage customers each month • Visited customers with consumptions of over 100 kW to disseminate information and promote the use of equipment with better energy efficiency so as to raise awareness of energy conservation; Taipower visited a total of 5,290 customers in 2018 • Handled a total of 4,778 customer feedback e-mails • Organized a total of 1,441 events in 2018 promoting energy conservation and the effective use of high-efficiency household appliances; these events were attended by approximately 330,000 people • Offered community-based energy saving services and consultations in 691 communities • Held a "Save Power and Get a Present from Taipower" campaign to promote energy conservation over six consecutive years

Material External Communication Policy

Media Communications

Taipower actively releases complete news materials for media reporting. Releases show specific actions taken by the Company in response to government policies and social expectations. In the case of issues of concern, emergencies, such as those related to nuclear energy, regional blackouts, and major incidents, Taipower promptly clarifies misunderstandings through the issue of press releases and "real-time clarifications" when necessary. In addition, Taipower has actively assisted in arranging media interviews for a range of topics, such as the development of new cultural products like coal ash coasters. The Company also organized an online variety show featuring "Working at Taipower for One Day" to attract more media coverage and shape the corporate image.

Communication with Elected Representatives

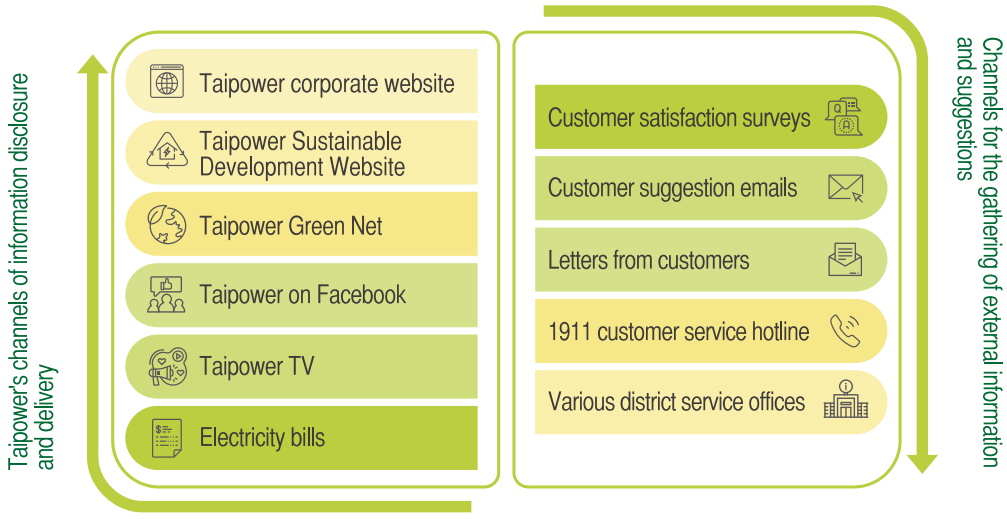
Elected representatives are on the front line of the Company's communications with the public about policy directions and planning. Taipower actively defends its policy positions by responding promptly to questions proposed by the legislators, attending legislative committee meetings, public hearings, and press conferences related to energy issues. These measures allow the Company to explain current policies and related practices, and to achieve bidirectional communication. Additionally, Taipower actively establishes contact with each legislator as soon as possible, pays visits to the legislators who are concerned with power-related issues, and assists in the handling of cases related to Taipower's operations. This is done with the aim of establishing good relationships based on mutual trust and assistance so that the Company can respond effectively in situations of crisis management. Through various types of engagements, Taipower gains understanding of the concerns held by elected representatives and can quickly explain problems, express a willingness to cooperate and outline difficulties in order to develop the best plans for handling situations and achieving win-win outcomes.

Communication with Customers and the General Public

Taipower actively maintains honest communications with its customers and the general public. Being open and transparent is a matter of principle. Through the Company's various district offices and diverse media channels (as shown in Chapter 6.2.2), 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, so that the general public can engage in deeper interactions with Taipower and establish sustainable social relations.

6.2.2 Diverse Channels for Engagement and Communication

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



Taipower Corporate Website

Taipower utilized a responsive web design (RWD) for its entire corporate website. The site subsequently officially went online in February, 2018. This development helped to accommodate the general public's need to view information from different devices. The information disclosure section, which generates the most views, continues to provide the latest and most comprehensive information regarding 29 topics from all six dimensions of operations. In addition, in 2018, instant images of the chimneys of all 19 coal-fired units were added to allow real-time viewing. The continuous improvement of data quality along with the principle of open data were used to enhance the quality and convenience of data disclosure and searches for the general public.

http://www.taipower.com.tw

Taipower Sustainable Development Website

In order to present our performance in sustainability more clearly, Taipower continues to provide every year's Sustainability Reports in both Chinese and English versions for readers to download. The English version of Sustainable Development Website has been launched in 2019. Furthermore, the Site Map of the Website is provided so that users are able to search information related to sustainable development easily. The website is also linked with other sustainability-related websites operated by Taipower, such as the Green Net, making the content of the disclosed information more ample and diverse.

https://csr.taipower.com.tw

Taipower on Facebook

In 2018, Taipower continued to introduce power-related knowledge in a lively way on its Facebook fan page. Social networking was used so that more people could be reached with information related to Taipower. Currently, there are related theme plans for each month and quarter. Themes are focused on topics like saving electricity or electricity safety, and also combine and use current events to improve business results through creative communication.

https://www.facebook.com/TaiwanPowerCompany/

Taipower TV and the YouTube Channel

Video sharing has become an important platform for the discussion of issues. To capitalize on this trend, Taipower TV has been producing 1 video per day since May 1, 2013. In addition to presenting the story of the Company, Taipower TV teaches the general public about the Company's business operations and planning. As of the end of 2018, the videos had been played more than 2.5 million times, and their contents have been referenced by other major media sources. Taipower TV now acts as a video library for external communication between the Company and the general public.

http://tv.taipower.com.tw

Youtube: TaipowerTV

Taipower Electricity Bills

In order to strengthen awareness of energy saving and carbon reduction, Taipower continues to report customers' CO_2 emissions for the current period on their electricity bills. Bills also list the average amount of power consumed in neighboring areas and by customers in the same category. The goal is to remind customers to save electricity. In July 2018, a mobile payment service for electricity bills was launched. A QR Code was printed on each electricity bill to provide customers with a means of checking and paying their bills on their phones. The system allows payments to be made even after deadlines, strengthening customer service.

6.2.3 Creating Customer Satisfaction

Customer Management

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 service 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.

Customer Feedback Channels

Taipower has established diverse channels such as the 1911 customer service hotline, online counters, and the Taipower e-Counter App to fulfill different customers' needs for a variety of services.

Customer Feedback Channels

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.

A total of *4,778* letters from customers were handled in 2018.

The 1911 customer service hotline was set up to provide 24/7 service. Services include electricity bill and business inquiries, acceptance of applications for electricity utilization and power line and equipment repair.

Around 2.608 million calls were received.
A full *95.95%* of the calls were answered within 20 seconds by designated personnel.

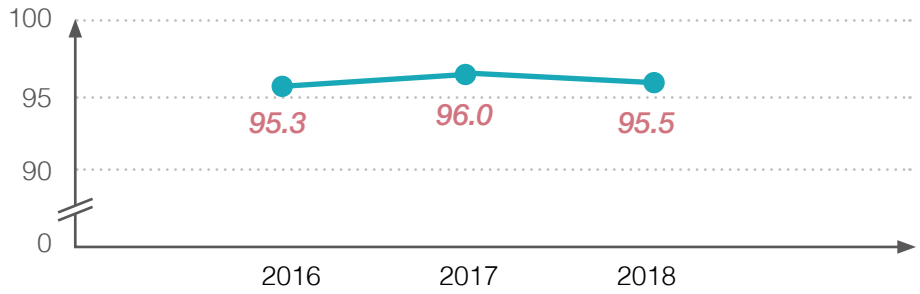
In order to strengthen customer-oriented services, Taipower provides dedicated services to customers using high-voltages, national trade associations and village/neighborhood offices so as to maintain good communications with customers.

Communication and dedicated services were provided to customers a total of *40,644* times.

Customer Satisfaction

In 2018, Taipower undertook a survey of its general, medium and large-sized customers. The scope of the survey included the services, the corporate image of Taipower, customer feedback, and overall customer satisfaction. The survey was conducted from December 19 to December 28. The result shows that the Company has maintained customer satisfaction scores above 90 points for three consecutive years. This reflects the fact that Taipower's quality of service has been broadly acknowledged by the general public.

Customer Satisfaction Scores from 2016-2018



In the future, Taipower will continue to follow the Ministry of Economic Affairs' Implementation Plan to improve service efficiency, plan customer service-related operations and strengthen communication with customers to make services even better.

6.2.4 Participation in External Organizations

The power utility industry requires a high level of professionalism and its related technologies change and advance swiftly. To keep pace, Taipower actively participates in major technology and exchange organizations and maintains communication with 89 institutions. They include industry players, associations and academic organizations such as the Business Council for Sustainable Development of Taiwan (BCSD-Taiwan), the Chinese National Association of Industry and Commerce, Taiwan (CNAIC), the Industrial Safety and Health Association (ISHA) of the R.O.C., the Taiwan Wind Industry Association (TWIA), the Taiwan Cogeneration Association, the Employer Committee of the Chinese National Federation of Industries (CNFI) and the Taiwan Association of Energy Service Companies (TAESCO). The focuses of interaction includes energy transition, clean energy, technology, sustainable governance, the energy economy, and occupational health and safety.

6.3 Strengthening Supplier Management

Taipower's supplier management adheres to pertinent regulations. Suppliers must satisfy all environmental, social and other legal requirements for all services and materials they provide. The Company uses these criteria to select appropriate partners during tendering and evaluation stages. Additionally, suppliers are required to sign a statement of compliance for environmental and social performance management.

6.3.1 Fuel Suppliers

Fuel Control

Taipower adheres to the four strategies of energy supply diversification, fixed-term supply contracts, safe inventories, and stable coal transportation to ensure its fuel supply is stable, sufficient, timely, cost-effective and capable of provide for the needs of power plants to ensure the safety and stability of the power supply.

Energy Supply Diversification

Coal

- Setting caps per country of coal origin and per supplier for regular contracts
- Investment in offshore mining operations

LNG

- Exclusive supply of LNG by CPC; efforts will be made to track CPC's sources of supply
- CPC has long-term contracts with sources from Malaysia, Indonesia, Qatar, Australia, Papua New Guinea and the United States to ensure energy supply diversification

Nuclear

- Spread 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 thus achieve a steady fuel supply.

Coal

- Fixed-term contracts at 70-80%, with the remainder achieved through spot contracts

LNG

- Signing a fixed-term contract with CPC
- Taipower plans to independently construct LNG receiving stations at the Taichung and Xiehe power plants and to independently import LNG to be used by some of the newly constructed gas units

Nuclear

- 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

Fuel oil

- Fuel oil is procured from local suppliers through fixed-term contracts to guarantee security in supply

Safe Inventories

Coal

- By law, coal inventory must be sufficient for 30 days
- Taipower has adopted 35 days of inventory as its planning basis for 2019, in which one day of inventory is defined as the average daily usage of coal for 2018

LNG

- 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 LNG inventories ready for dispatching to Yong'an and Taichung Plants at more than 80,000 and 50,000 tons, respectively
- Together with CPC, Taipower has planned corresponding responses in the event of accidents and established terms of coordination that both parties should abide by

Nuclear

- The safety stock for uranium is set at three year's usage volume
- All units at the nuclear power plant require one batch of nuclear fuel component in inventory

Fuel oil

- The operating reserve for fuel oil is 180,000 ± 40,000 kiloliters
- The diesel inventory is established in accordance with the specific supply and transmission conditions at each power plant

Stable Coal Transportation

Taipower currently owns 6 coal carriers, which transported 6.82 million tons or 24.25% of coal shipped in 2018. The self-management of coal transportation ensures fuel supply and dispatching.

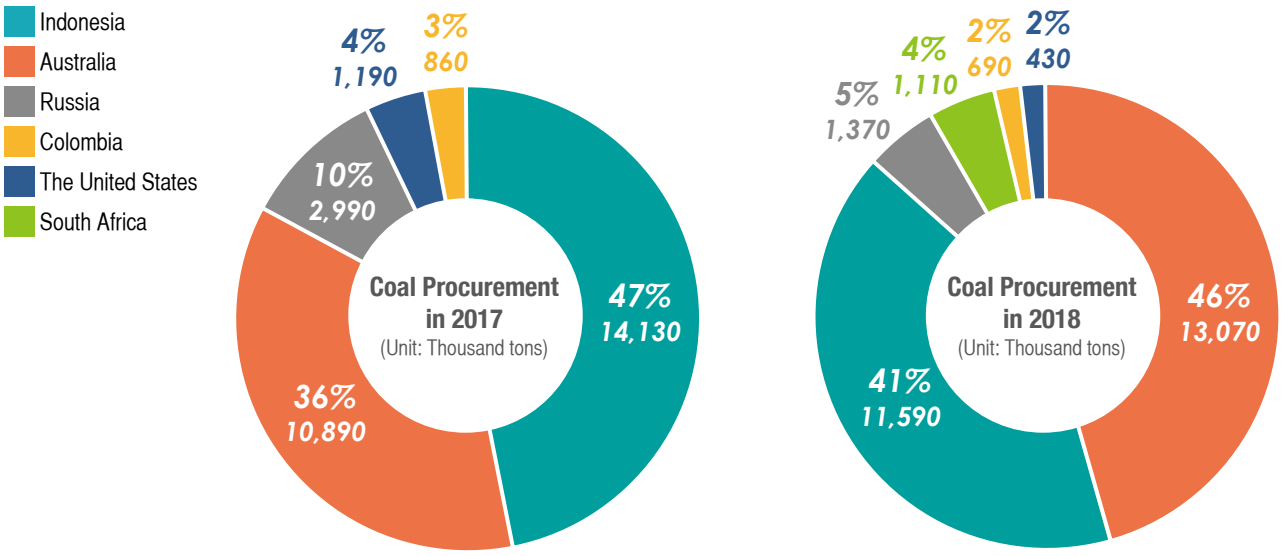
Fuel Procurement

Coal Procurement

For coal procurement, Taipower has established a Coal Procurement Review Taskforce, with membership consisting of personnel from the materials, procurement regulation enforcement, procurement and legal affairs departments. Through various meetings with external energy and economic experts and scholars, the taskforce 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.

In 2018, Taipower's list of qualified and regular suppliers included 45 qualified vendors. This total was composed of 22 vendors from Australia, 14 from Indonesia, one from China, three from Russia, one from South Africa, two from Colombia, and one from the United States. This included three new suppliers that had been added to the list in 2018, consisting of one each from Indonesia, Colombia and the United States. The Company has dispatched designated personnel to carry out on-site inspections at vendors' mines, and the results of the inspections were in line with the requirements for qualified suppliers of Taipower. One qualified suppliers from the list failed to update required evaluation documentation and as such was removed from the list.

Coal Procurement from Different Regions and Total Procurement Quantities for 2017 and 2018



In addition, by relaxing procurement regulations for sources of coal, Taipower has improved the competitiveness of tenders, flexibly utilized market volatility, and executed spot procurement strategies in a timely manner 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$5.472 billion.

Fuel Oil and Natural Gas Suppliers

Taipower currently purchases fuel oil and natural gas from CPC and the Formosa Petrochemical Corporation. Both contractors have supply capability and conform to the relevant governmental laws and regulations. Fuel oil inventory was kept between a 10 and 15-day supply, while diesel inventory was established in accordance with the specific supply and transmission conditions at various power plants.

As for the procurement of natural gas, Taipower will spread out its sources of supply in the future. Apart from purchasing LNG from CPC, Taipower also plans to construct its own LNG receiving stations at the Taichung and Xiehe power plants and has obtained the government's approval to purchase LNG from the international market to be used by newly constructed gas units at the Taichung, Tongxiao and Xiehe power plants. This not only enables Taipower to have greater autonomy in its sources of LNG in order to reduce the overall cost of fuel procurement but also works to Taipower's advantage for power dispatching and provides system characteristics that increase LNG supply stability and safety.

Currently, CPC is the most important supplier of fuel and 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 Company has been implementing supply chain management in accordance with the "Taipower and CPC Linked and Early Warning Mechanism for LNG Supply and Demand." The mechanism involves communication with CPC regarding gas demand on a yearly, quarterly, monthly and daily basis to ensure reliable power supply.

Taipower and the CPC Gas Supply Engagement Mechanism and Frequency

Frequency	Means of communication
Annually	• Each year before August 20, Taipower will send CPC 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 will inform CPC by mail of any revisions to its monthly estimates of total gas consumption • Each year before the end of May, Taipower will send revised data to CPC if monthly estimates for gas consumption in the second half of the year require revision
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 will fax 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 in accordance with Taipower's requests
Daily	• CPC will update 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 work day, Taipower will fax its "Daily LNG consumption estimates for the next fortnight" to CPC. If the gas usage for the next fortnight will affect 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 will affect the supply of LNG, Taipower will coordinate with CPC first to make optimal arrangements

Nuclear Fuel

The procurement of nuclear fuel involves the purchase of uranium and subsequent processing services for conversion, enrichment, and fabrication. Procurement is primarily conducted through long-term contracts (uranium long-term contracts must account for no less than 50% of Taipower's uranium supply) that are supplemented with mid-term to short-term and spot contracts. All nuclear fuel processing services are procured through long-term contracts. To ensure a stable supply, Taipower maintains 3 years' worth of inventory for uranium. In light of the government's nuclear-free homeland policy, Taipower has stopped all uranium procurement.

6.3.2 Suppliers of Materials and Equipment

Review and Procurement Standards for Taipower Suppliers

Supplier Review Standards are Pursuant to the Government Procurement Act

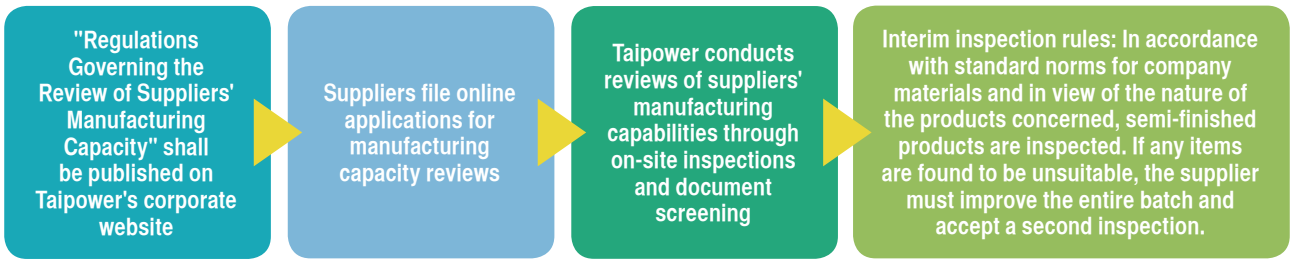
In order to ensure the quality of materials, maintain power supply safety, and improve procurement efficiency, Taipower reviews the bidding documents of the suppliers in keeping with the Government Procurement Act. If the Company has doubts about the contents of the documents provided by suppliers that participate in the bidding, it may notify the said suppliers and ask them to provide further information. The procurement of electrical equipment (such as cables and gas-insulated switchgear, etc.) must comply also 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 2018, Taipower received a total of 3,225 domestic material procurement tenders, with a total bid amount of approximately NT$83.1 billion. The bid amount for selected tenders came to roughly NT$41.7 billion and constituted approximately 51% of Taipower's total procurement of property. The bid amount for items that fell under the purview of the localization policy came to approximately NT$26.4 billion and made up roughly 32% of Taipower's total procurement of property.

The process of screening the list of selective bidding materials, equipment and qualified suppliers of Taipower

In order 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 so as to save costs.

Taipower has established a list of qualified material and equipment suppliers, who are screened according to the following process:



Taipower's Green Procurement and Sustainable Use of Waste Assets

In 2018, Taipower handled 102 green procurement cases (such as environmentally friendly recycled toner cartridges), with a purchase amount of about NT$1.05 million.

In addition, in order to promote the sustainable use of resources and create positive value, some scrapped assets that can still be used were put up for online auctions as "second-hand goods." This constituted a new method of waste disposal for Taipower. The method generates saves administrative costs, increases revenue and accelerates the disposal of scrap. Since 2016, the policy of selling off scrapped assets has been fully promoted by the Company within all units. According to statistics, by the end of December 2018, the Company completed 1,689 online auctions with transaction amounts reaching NT$49,190,845. A total of 79 units participated in the online auctions. The average selling price was about 1.99 times higher than the upset price, demonstrating the enthusiasm Taipower employees feel for environmental protection and recycling.

6.3.3 Power Suppliers

To ensure a reliable power supply while improving the economic vigor and versatility of the private sector, the government has lifted restrictions on private power development and adopted Taipower's avoidable costs of self-power generation as a basis for its pricing principles. According to the announcement from the Ministry of Economic Affairs that allowed for the establishment of private power plants, Taipower may purchase electricity generated by thermal independent power producers (IPPs). The Ministry of Economic Affairs first conducts qualification reviews, and the qualified operators then submit their electricity prices for bidding. Taipower then 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 Cogeneration System and Renewable Energy Development Act. Taipower is obligated to purchase the electricity wholesale, without having to follow a bidding procedure as outlined in the Government Procurement Act. Now, following the promulgation of amendments to the Electricity Act, the Ministry of Economic Affairs will no longer permit privately-owned power plant license applications. The power supply capacity of Taipower will be announced by the electricity industry's regulatory authority to assess the power supply. When there is demand for electricity, the procurement procedure will be initiated. The contract will be reviewed and the starting price of 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 the suppliers who are interest in bidding, and then bidding will be closed and finalized after a qualification and specification review, as well as bargaining and comparing prices.

By the end of 2018, Taipower had contracts with 9 IPPs, 51 co-generation power providers and a total of 23,763 contracts for renewable energy (including solar power, wind power, hydro power and others). Taipower purchased a total of 50,627 GWh of power from IPPs in 2018 and will purchase approximately 49,597 GWh from IPPs in 2019.

6.4 Corporate Humanistic Culture and Community Outreach

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 intangible collective 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 a development-oriented growth model, promoting corporate humanities, public welfare and the building of a cultural corporate image.

6.4.1 Cultural Investment

To fulfill Taipower's commitments to preserving historical inheritance and sustainable operations, the Company is committed to the development of a broader understanding of Taiwan's power utility industry by injecting diversity into society and promoting the use of value-added knowledge. To achieve this, a "Cultural Heritage Preservation, Operation, and Maintenance Project" was launched. In order to examine the cultural heritage of the Company beyond its physical buildings, Vice President Hong-Chou Lee acts as the convener of Important Cultural Artifacts and Heritage Preservation, Operation, and Maintenance Project Meetings that examine, preserve and display cultural artifacts and documents related to Taiwan's power utility industry. In September 2017, a Division of Historical Documents and Materials was established within the Secretariat to administer the preservation of cultural heritage so as to promote resource sharing and activation, and to fulfill corporate social responsibilities.

In order to preserve, research, and communicate about Taiwan's power utility industry, the Company will undertake a phased development. Current policy calls for "collection and research first, and display and education later." The intention is to provide new value to cultural and historical artifacts and data through inventorying them as historical objects. The project is expected to achieve three goals: (1) preserving cultural heritage; (2) assisting cultural and historical research; and (3) strengthening social communication.

Conservation of Cultural Heritage

Taipower possesses a wealth of cultural heritage related to the power utility industry. As this heritage is a valuable public, cultural asset, Taipower will shoulder its corporate social responsibility by conducting in-depth studies and promotion of this legacy. The main action plans for the future are as follows:

- **Gradually complete the puzzle of Taipower's culture and history**

  Select a theme every year to highlight Taiwan's century-old power utility industry. Use the historical context created by electricity and its cultural path in order to leave a record for future generations, continue the mission of our predecessors, and create value for Taipower.

- **Build a digital collection and communicate with the general public**

  Provide public access to the digital collection and make it easier for the general public to see Taipower's emphasis on and efforts in the preservation of cultural heritage.

- **Connect a network of experts and scholars**

  Connect a network through forums, educational and training programs, etc., so that the professional community can see the preservation of Taipower's cultural heritage and speak up for the Company.

- **Localize the cultural heritage of the power utility industry**

  Combine the cultural resources of each arena with the historical context of local development, bring value to it and invite local historians and cultural experts to participate together with the general public.

- **Educate through the lively display and interpretation of power utility cultural heritage**

  Translate information on professional power generation technology to make it relevant to people's daily lives through interdisciplinary partnerships. Taipower organized the "Power Infrastructure as Landscape: Taiwan Power Cultural Heritage" exhibition in 2018. For more details, please refer to the related section of this report.

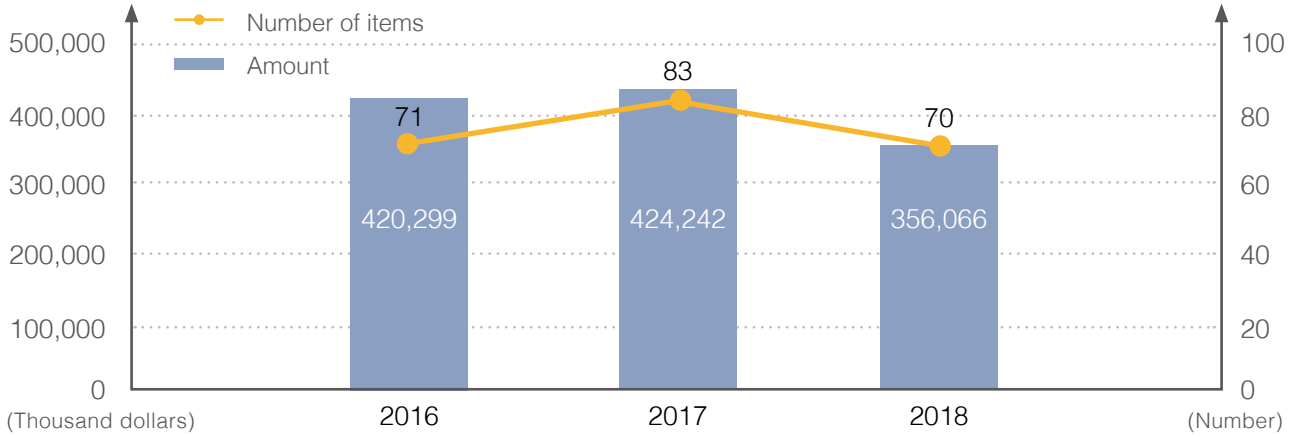
Professional Curation and Activities

Through professional curation and interdisciplinary cooperation, exhibitions can be enriched and deepened in their interpretation of power utility culture 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. It also allows Taipower to convey the cultural value of its brand and values. For more details on the "Power Infrastructure as Landscape" exhibition of 2018, please refer to the related section of this report.

Investment in Cultural and Art Activities

Taipower has spared no effort in its support of literary and artistic activities. The Company regularly supports the art and cultural industries in Taiwan in a number of ways. From 2015 to 2018, the Company invested in art bank painting rental activities and performances to constantly encourage young, Taiwanese artists and performers. Through professional exhibitions, the overall atmosphere of the office space has improved and the thinking of staff has been subtly influenced and upgraded from the inside out. As the arts and humanities enter our institutions, the general public can engage in art exchanges as it walks into Taipower's buildings.

Statistics on Painting Rentals



Exhibition Activities

		2017	2018
Art Gallery	Number of exhibitions	9	5
	Amount	3,137,400	323,350
Exhibition and Activities in the Grand Hall	Number of exhibitions	29	26
	Amount	698,011	877,439

6.4.2 Investment in Public Welfare

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 to enhance the corporate image. Taipower holds numerous public welfare activities of various sizes. In 2018, there were a total of 1,598 events and instances of investment with 7,393 people participating for a total of 28,345 hours.

Over the years, Taipower has placed great emphasis on service to society. One of the Company's most notable efforts is the "Taipower Volunteer Service Team" which has been operating for many years. At present, the volunteer group's activities mainly focus on the four major themes of energy conservation and carbon reduction services, community services, social and humanistic care and environmental protection. The group is typically of service at events organized by local authorities near local Taipower locations.

Major Public Welfare Activities and Sponsorship Investments

As a driving force in Taiwan's economic development, Taipower has become a long-term partner in local development through care and investment in local communities. To respond effectively to community needs, Taipower formulates Neighborly Work Auditing Plans in accordance with the Company's Neighborly Work Guidelines. Moreover, implementation of subsidy (donation) assistance programs is audited along with handling procedures and whether expected goals and outcomes have been achieved. The results of these audits serve as a reference for the future approval of subsidy (donation) programs.

In 2018, Taipower's electricity development assistance fund spent a total of NT$2.725 billion. Money spent benefited municipalities, county and city governments, township (city and district) offices, farmers' and fishermen's associations, public (vocational) high schools, junior high schools, elementary schools, and domestic non-profit organizations and groups approved by the competent authorities in areas near power plants.

Public Welfare Activities Assisted by Taipower in 2018

Light Up for Love: Care for the Elderly Living Alone at the End of the Year

The end of the year is a time for reunions with family and for cleaning out the old while welcoming the new. For elderly people that live alone, this is often the lonliest time of the year. Taiwan's Taitung County is a region with a high proportion of elderly residents. Among them, a majority are poor and have low incomes. Taipower responded to this situation with its "Light Up for Love: Care for the Elderly Living Alone at the End of the Year" event for seniors. The event was held at the end of the year in conjunction with the Taitung Christian Hospital and A Kernel of Wheat Foundation. The year 2018 was the 14th year for the event.

In 2018, a total of 270 elderly people living alone were invited to dine on hotpot, and Taipower arranged to buy New Year's goods and hold happy home delivery activities. Another 170 elderly people who were unable to attend the event due to insufficient mobility, received home deliveries. During the event, a total of 25 Taipower employees served as volunteers and passed their love to rural and remote townships. Taipower hoped that this activity would enable the elderly living alone in Taitung to celebrate the New Year. In fulfilling its social responsibilities, the Company hoped to spread warmth and raise awareness of the needs of seniors that live alone.

The Fireflies Children's Reading Project

Some remote areas in Hualien and Taitung are poorly equipped with educational resources leaving many disadvantaged school children in dire need of learning assistance. Since 2007, Taipower has cooperated with the A Kernel of Wheat Foundation to promote the "Fireflies Children's Reading Project." In 2018, 11 children's classes were set up in remote areas such as Hualien and Taitung to promote character education (including training for teachers) and talent teaching. Through an action book car, summer reading growth camp, and an end-of-the-year Little Angels Club activity, the program enhanced the reading and learning abilities of school children. Taipower hopes to use this program to provide assistance and resources for disadvantaged schoolchildren in remote areas, and to reduce the learning gap caused by the urban-rural resource gap.

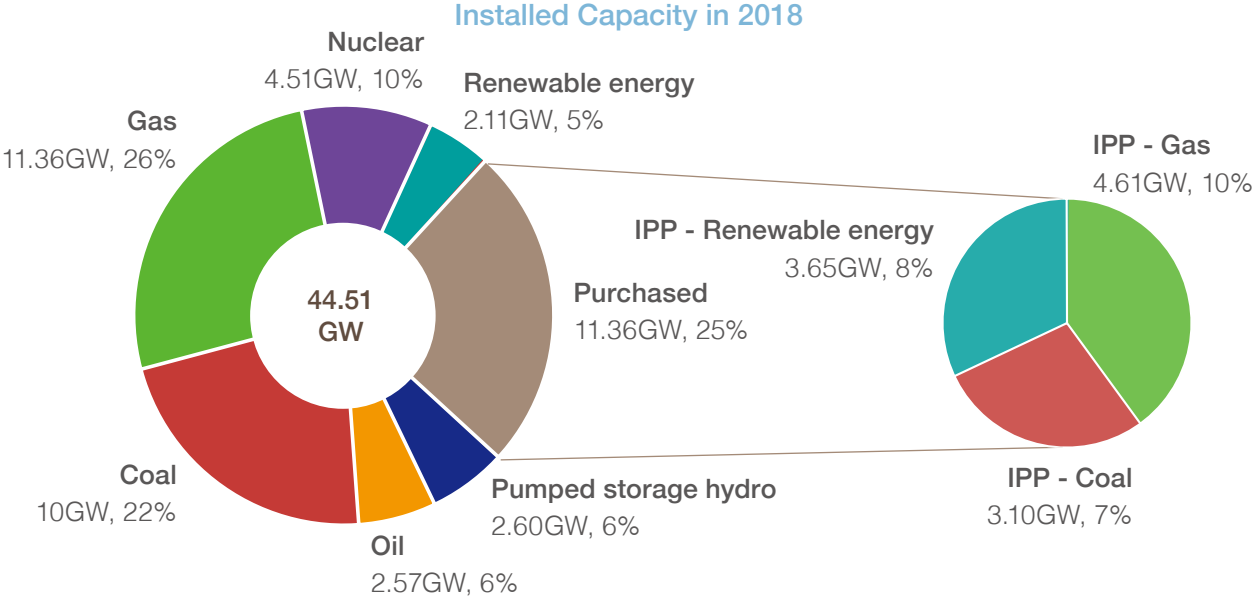
Seeds of Hope: Cultivating Hope

There are many aboriginal families in Eastern Taiwan that are unable to pay for their children's educational costs so that they can successfully complete their studies. Taipower cooperated with the A Kernel of Wheat Foundation, the Taitung Christian Hospital, the Mennonite Christian Hospital in Hualien, and the Heng Chun Christian Hospital to promote the "Seeds of Hope: Cultivate Hope Project," which entered its 14th year in 2018 and continues to assist disadvantaged aboriginal youth by reducing the burden of tuition fees.

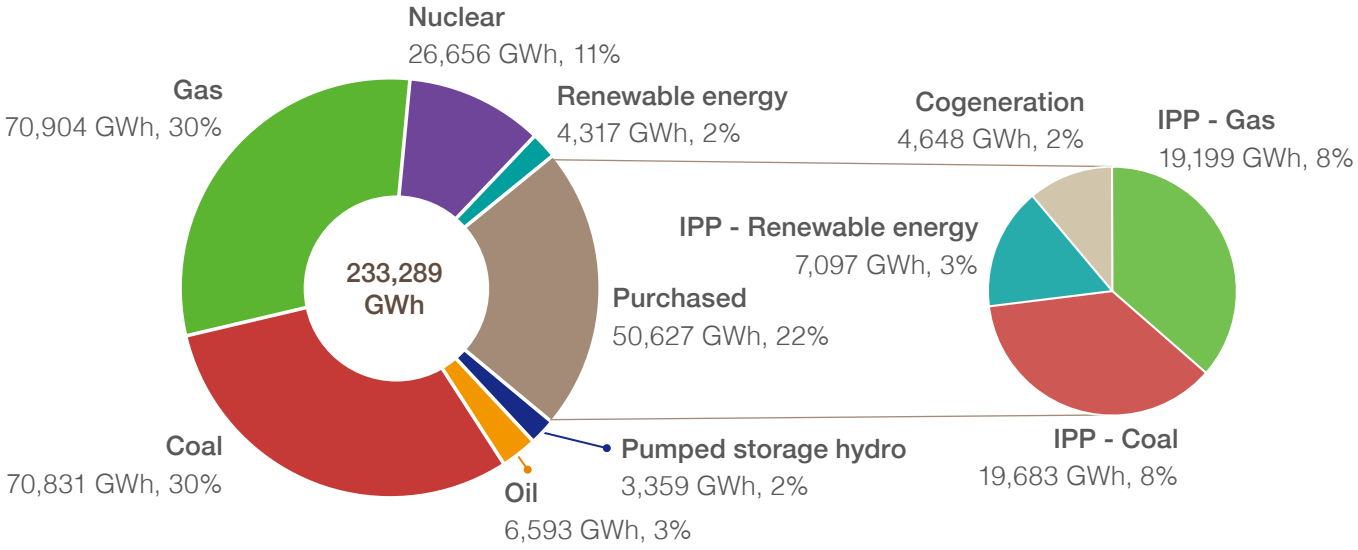
This project provides opportunities for disadvantaged aboriginal university students to returning to their registered domiciles in Taitung, Hualien and Pingtung so that they can work during the summer vacation. Through the years, the project has effectively encouraged aboriginal youths to return and cultivate themselves in their ancestral hometowns, so that they can earn money for school while serving their communities. Apart from social welfare and medical institutions, students are allowed serve their communities through tribal services such as the "Tribal Health Census," "Meal Deliveries for Seniors Living Alone," "Home Cleaning for Seniors Living Alone," "Day Care for Senior Citizens" and "Tutoring for Disadvantaged Elementary School Children," etc.

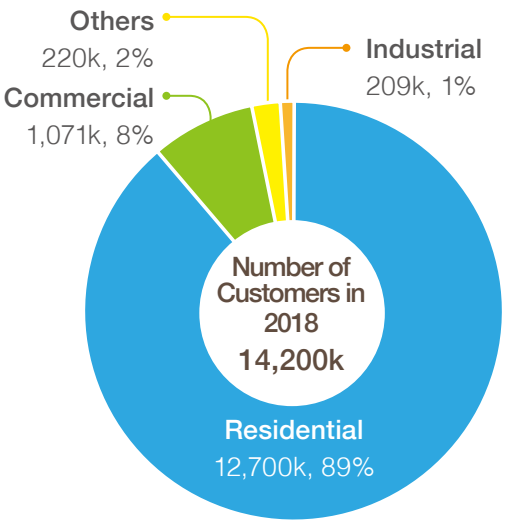
Appendix | Corporate Highlights

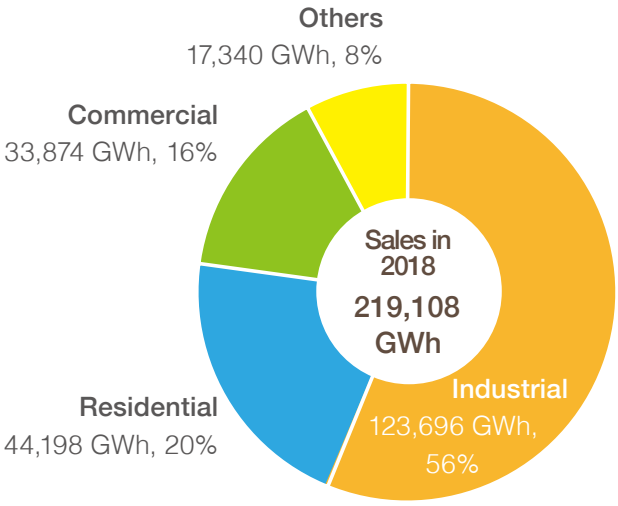
Installed Capacity in 2018



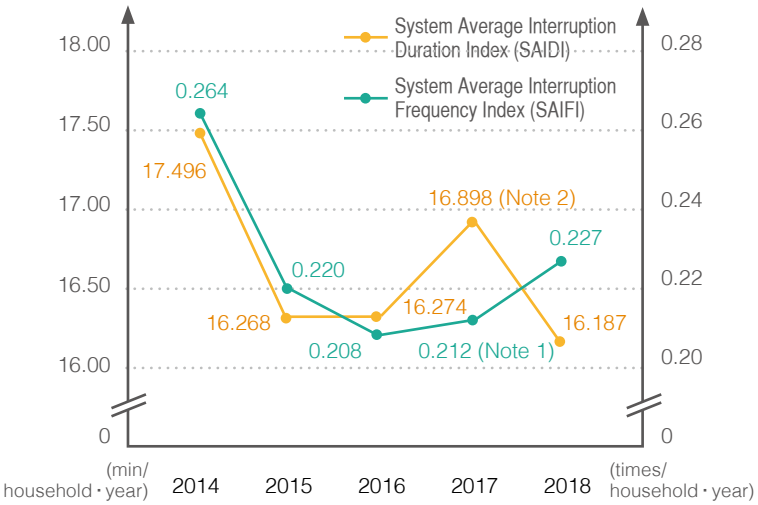
Net Generation and Purchased Power in 2018



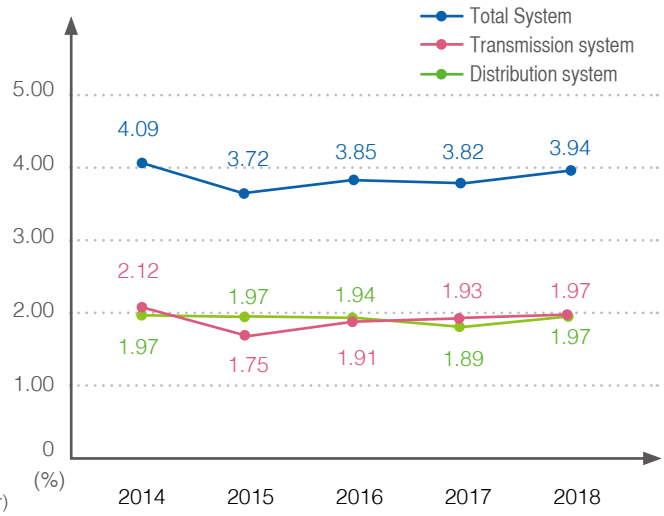




System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) from 2014 to 2018



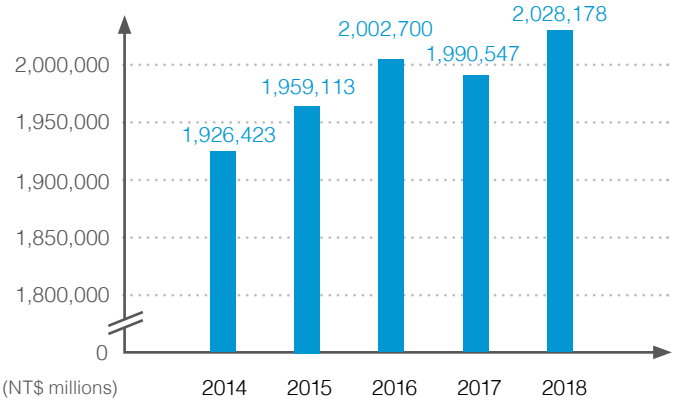
Line Loss Rate from 2014 to 2018



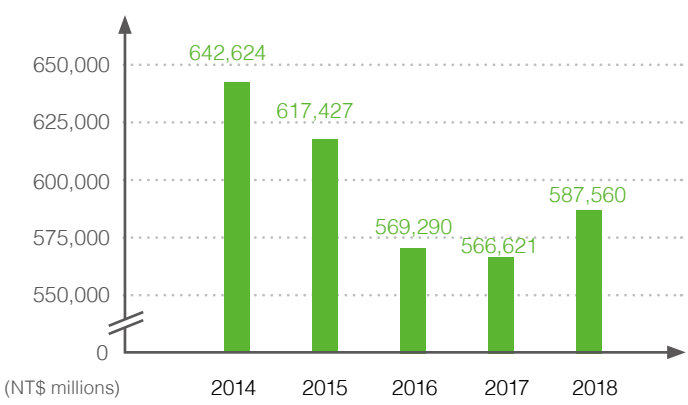
Note: 1. Data excludes the impact of the large-scale blackout on August 15, 2017. The blackout was mainly due to the interruption of the gas supply from the CPC Corporation, and Taipower was not held responsible. The blackout total average effect added an additional 0.553 (times/household·year).

2. Data excludes the impact of the large-scale blackout on August 15, 2017. The blackout was mainly due to the interruption of the gas supply from the CPC Corporation, and Taipower was not held responsible. The blackout total average effect added an additional 32.572 (minutes/household·year).

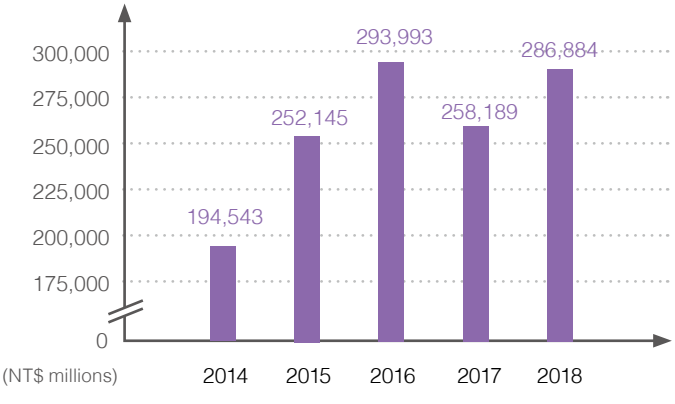
Total Assets



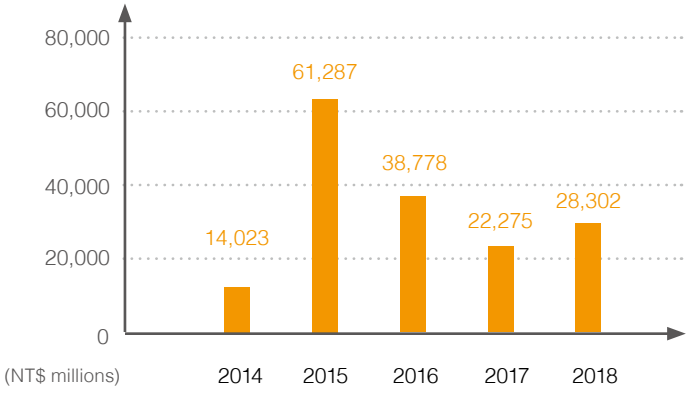
Operating Revenue



Stockholders' Equity



Net Profit/Loss Before Tax



Note: Figures above have been audited by CPAs using the IFRS that was adopted in 2013.
As a state-owned enterprise, figures in Taipower's financial report are based on the final audit accounts of the National Audit Office. As such, the aforementioned figures on Taipower's assets in 2017 are slightly different from those in the 2018 Sustainability Report.

Appendix | Financial Performance

Taiwan Power Company – Balance Sheet

Unit: NT$ thousands

Assets	December 31, 2018 Amount	%	December 31, 2017 Amount	%
Current assets				
Cash and cash equivalents	3,262,922	-	3,151,146	-
Notes receivable	116,926	-	135,759	-
Accounts receivable	39,343,319	2	39,675,229	3
Other receivables	11,232,215	1	8,289,675	-
Inventories	43,935,812	2	38,386,108	2
Prepaid expenses	2,261,466	-	2,787,365	-
Other current assets	244,438	-	168,259	-
Total of current assets	**100,397,098**	**5**	**92,593,541**	**5**
Non-current assets				
Financial assets measured at FVTOCI	1,821,530			
Financial assets carried at cost	-	-	79,204	-
Investment accounted for by the equity method	2,405,655	-	2,298,232	-
Property, plant and equipment	1,571,820,729	78	1,558,912,978	78
Investment-based real property	7,627,256	-	15,228,052	1
Intangible assets	376,788	-	401,046	-
Deferred income tax assets	6,793,336	-	5,573,338	-
Nuclear back-end fund	327,117,463	16	310,783,289	16
Other non-current assets	9,818,349	-	4,677,318	-
Total of non-current assets	**1,927,781,106**	**95**	**1,897,953,457**	**95**
Total assets	**$ 2,028,178,204**	**100**	**$ 1,990,546,998**	**100**
Liabilities and Stockholders' Equity				
Current liabilities				
Short-term debts	117,344,907	6	72,096,288	4
Short-term notes and bills payable	141,172,774	7	157,796,553	8
Accounts payable	33,295,827	2	33,980,073	2
Contracts payable	33,693,832	2	28,838,696	1
Other payables	42,824,469	2	43,429,791	2
Current portion of long-term debts	107,493,611	5	117,550,368	6
Other current liabilities	3,338,340	-	2,565,857	-
Total current liabilities	**479,163,760**	**24**	**456,257,626**	**23**
Non-current liabilities				
Bonds payable	336,027,051	17	344,381,559	17
Long-term loans	359,565,741	18	340,313,794	17
Liabilities reserve	474,014,652	23	502,368,839	26
Deferred income tax liabilities	56,363,449	3	56,158,007	3
Long-term construction payables	1,006,114	-	327,487	-
Long-term deferred revenue	521,687	-	540,265	-
Net defined benefit liabilities	29,168,421	1	26,593,341	1
Other non-current liabilities	5,463,115	-	5,416,621	-
Total non-current liabilities	**1,262,130,230**	**62**	**1,276,099,913**	**64**
Total liabilities	**1,741,293,990**	**86**	**1,732,357,539**	**87**
Stockholders' Equity Attributable to the Company				
Ordinary share capital	330,000,000	16	330,000,000	17
Losses to be compensated	(44,659,757)	(2)	(71,815,147)	(4)
Other equity	1,543,971	-	4,606	-
Total stockholders' equity	**286,884,214**	**14**	**258,189,459**	**13**
Total liabilities and shareholders' equity	**$ 2,028,178,204**	**100**	**$ 1,990,546,998**	**100**

Taiwan Power Company – Statements of Income

Unit: NT$ thousands

	2018		2017	
	Amount	%	Amount	%
Operating revenue				
Sales of electricity	569,857,473	97	552,892,420	98
Other operating revenue	17,702,937	3	13,728,955	2
Total operating revenue	**587,560,410**	**100**	**566,621,375**	**100**
Operating cost	566,396,452	96	522,965,112	92
Gross profit	21,163,958	4	43,656,263	8
Operating expenses				
Marketing expense	9,451,043	2	6,955,993	1
Administrative expense	1,856,709	-	1,809,243	-
Research and development expenses	4,103,827	1	3,961,388	1
Total operating expenses	**15,411,579**	**3**	**12,726,624**	**2**
Net operating margin	5,752,379	1	30,929,639	6
Non-operating income and expenses				
Interest income	4,378,217	1	4,105,619	1
Recovery of the tariff stabilization reserve	37,298,566	6	3,882,751	1
Other income and losses	128,227	-	2,317,434	-
Financial costs	(19,543,783)	(3)	(19,226,024)	(4)
Expected credit impairment loss	(3,064)	-	(2,788)	-
Share of corporate profit or loss recognized using the equity method	291,592	-	268,457	-
Total non-operating income and expenses	**22,549,755**	**4**	**(8,654,551)**	**(2)**
Net profit before tax	28,302,134	5	22,275,088	4
Income tax expenses (benefits)	(509,668)	-	2,437,251	1
Net profit of the reporting period	28,811,802	5	19,837,837	3
Other comprehensive income				
Items that will not be reclassified subsequent to profits or losses				
Remeasurement of defined benefit plans	(2,366,501)	-	(1,131,162)	-
Unrealized valuation loss (gain) on investment in an equity instrument measured at FVTOCI	51,882	-	-	-
Share of other comprehensive income recognized using the equity method	719	-	(5,027)	-
Income tax relevant to items that will not be reclassified	500,291	-	192,901	-
Items that will not be reclassified subsequent to profits or losses	**(1,813,609)**	**-**	**(943,288)**	**-**
Items that may be reclassified to profit or loss				
Share of other comprehensive income recognized using the equity method	6,952	-	(18,207)	-
Income tax relevant to items that may be reclassified	(834)	-	2,185	-
Items that may be reclassified subsequent to profits or losses	**6,118**	**-**	**(16,022)**	**-**
Other comprehensive income for the reporting period	(1,807,491)	-	(959,310)	-
Comprehensive income or losses for the reporting period	$ 27,004,311	5	$ 18,878,527	3
Earnings per share (NT$)	$ 0.87		$ 0.60	

Taiwan Power Corporation Employee Compensation and Benefits

Unit: NT$ thousands

	2018	2017
Post-employment benefits		
Defined contribution plans	641,826	629,052
Defined benefit plan	1,444,233	1,421,754
Post-employment benefits	**2,086,059**	**2,050,806**
Other employee benefits		
Payroll expenses	20,173,322	19,876,405
Directors' Compensation	4,004	4,118
Insurance costs		
Labor and civil servant insurance premiums	931,329	898,010
National Health Insurance premiums	1,129,580	1,129,821
Others	12,037,398	11,507,318
Other employee benefits	**34,275,633**	**33,415,672**
Total employee compensation and benefits	$ 36,361,692	$ 35,466,478
Summarized by functions		
Operating costs	30,802,633	30,102,262
Operating expenses	5,559,059	5,364,216
Total employee compensation and benefits	$ 36,361,692	$ 35,466,478

Appendix| GRI Standards Index

GRI Standards		Chapter and Section	Page No.
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102-4	Location of operations		
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Assurance Statement

ASSURANCE STATEMENT

SGS TAIWAN LTD.'S REPORT ON SUSTAINABILITY ACTIVITIES IN THE TAIWAN POWER COMPANY's CORPORATE SOCIAL RESPONSIBILITY REPORT FOR 2019

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 2019 (hereinafter referred to as CSR 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 this report.

The information in the TPC's CSR Report of 2019 and its presentation are the responsibility of the management of TPC. SGS has not been involved in the preparation of any of the material included in TPC's CSR Report of 2019.

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.

The SGS protocols are based upon internationally recognized guidance, including the Principles contained within the Global Reporting Initiative Sustainability Reporting Standards (GRI Standards) 101: Foundation 2016 for accuracy and reliability and the guidance on levels of assurance contained within the AA1000 series of standards and guidance for Assurance Providers.

This report has been assured using our protocols for:

- AA1000 Assurance Standard (2008) Type 1 evaluation of the report content and supporting management systems against the AA1000 Accountability Principles (2008) 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.

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. Financial data drawn directly from independently audited financial accounts 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.

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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.

VERIFICATION/ ASSURANCE OPINION

On the basis of the methodology described and the verification work performed, we are satisfied that the information and data contained within TPC's CSR Report of 2019 verified is accurate, reliable and provides a fair and balanced representation of TPC sustainability activities in 01/01/2018 to 12/31/2018.

The assurance team is of the opinion that the Report can be used by the Reporting Organisation's Stakeholders. We believe that the organisation has chosen an appropriate level of assurance for this stage in their reporting. In our opinion, the contents of the report meet the requirements of GRI Standards in accordance with Core Option and AA1000 Assurance Standard (2008) Type 1, Moderate level assurance.

AA1000 ACCOUNTABILITY PRINCIPLES (2008) 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.

GLOBAL REPORTING INITIATIVE REPORTING STANDARDS CONCLUSIONS, FINDINGS AND RECOMMENDATIONS

The report, TPC's CSR Report of 2019, 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 recommended to have more descriptions of TPC's involvement with the impacts for each material topic (103-1), and how efforts were given to mitigate the impacts. When reporting on goals and targets for each material topic, the expected results are suggested to be set, if applicable, with quantitative objectives

Signed:
For and on behalf of SGS Taiwan Ltd.

AA1000
Licensed Assurance Provider
000-8

David Huang
Senior Director
Taipei, Taiwan
25 June, 2019
WWW.SGS.COM

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This report uses FSC certified paper
and environmentally friendly soy ink

Invisible Electricity

Tangible Efforts