5 Provider of Services for Smart Living

The Implication of Provider of Services for Smart Living

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

Major Investments

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

Performance Highlights

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

Future Plans

Taipower continues to promote and refine its various demand response measures every year. In line with its deployment of smart meters, the Company will develop diverse demand response solutions to help reduce net nighttime loads and combine the automatic demand response solutions of smart home appliances and energy management systems with real-time prices that dynamically reflect the power supply situation and encourage users to manage electricity consumption more flexibly. Demand response uses monthly operation planning, day-ahead economic scheduling, and same-day economic dispatch to provide flexible adjustment in the power system dispatching. The demand response participation target in 2021 is 2.55GW and is expected to reach 3.0GW by 2030.

5.1 Smart Electricity Service

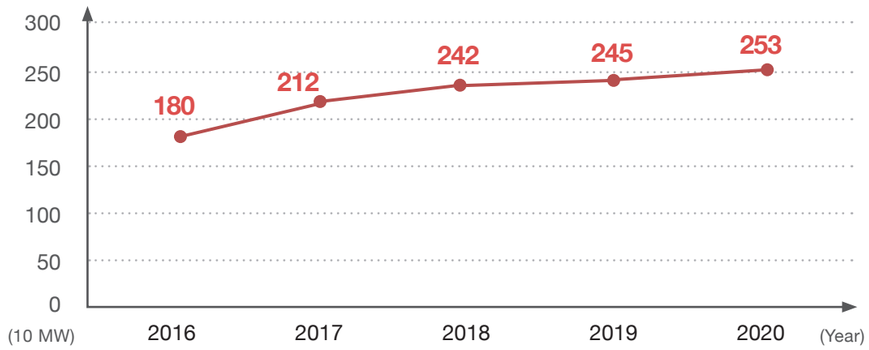
5.1.1 Demand Side Management Measures

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

Demand-Based Bidding

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

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



In the future, Taipower plans to provide more real-time power consumption information through smart meters, and to refine demand response scheme designs. For example, the Company will coordinate the increasing number of renewable energy grid-connections to adjust the periods for users to suppress power consumption. This will provide more flexible resources for the power system. Taipower will also be reviewing and piloting a variety of demand response plans.

Time-of-Use Rates

The Time-of-Use (TOU) rates set different electricity rates for peak and off-peak periods. This reflects the power supply costs in different periods and guides users to reduce or shift peak power consumption to off-peak periods. Beginning in 1979, Taipower has used TOU rates for more than 40 years. At present, there are a total of 12 TOU rates for all kinds of customers. Among them, TOU rates have been fully applied to high-voltage users since 1989, while low-voltage users are free to choose to participate or not.

Time-of-Use (TOU) Rates User Ratio

Power consumption category	Total customers (households)	TOU customers (households)	Ratio (%)
Meter-rated lighting for non-business	13,027,865	38,247	0.29
Meter-rated lighting for business	1,031,734	111,824	10.84
Low-voltage electricity	298,972	35,030	11.72
High-voltage electricity	24,449	24,449	100.00
Ultra-high-voltage electricity	651	651	100.00
Total	14,383,671	210,201	1.46

In line with the deployment and application of smart meters, Taipower launched simplified residential/commercial TOU rates in 2016 and new, standard three-stage TOU rates for meter-rated lighting and low-voltage electricity three-stage TOU rates on May 1, 2021. In the future, Taipower will introduce more diversified electricity rate schemes, allowing users to be more selective and increasing load management efficiency at the same time.

Automated Metering Infrastructure (AMI)

Electro-mechanical meter

Electricity meter

Demand Side Management Measures

Measure		Description	Applicable customers	Results
Use of TOU rates since 1979		Reflect the cost of electricity during different periods. Encourage off-peak electricity use to reduce energy consumption at peak hours.	Optional for meter-rated lighting and low-voltage customers; applicable to all high-voltage customers	The cumulatively suppressed peak load reached **4.05 GW** in 2020
Launched Simplified Residential/Commercial TOU rates in 2016		To provide more diverse rates for residential/commercial customers, price signals are used to guide users to reduce electricity consumption during peak hours, thereby achieving the goal of reducing peak load.	Residential, small shops and other customers	
Demand Response Load Management Measures	**Implemented Air Conditioner Duty Cycling Load Control Measures in 1991**	The central air-conditioning system is paused for 15 minutes every 60 minutes of operation. Packaged air conditioning systems are paused for eight minutes with 22 minutes of operation to suppress peak load.	Non-productive customers (e.g. office buildings, schools)	
	Implemented Power Consumption Reduction Measures in 1987	Provide reduced rates as incentives to encourage customers to reduce electricity consumption during peak hours or shift to off-peak hours, to reduce system peak load.	Either (super) high-voltage customers of more than 100 kW of capacity as specified in their contracts (could include factories and educational institutions) or schools	Daily peak load reduced by **1.08 GW** on the peak load day of 2020 (July 23, 2020)
	Implemented Demand-Based Bidding Measures in 2015	Through user-defined feedback pricing, more autonomy is given to customers to attain their power-consumption mitigation potential and improve system loads. This mitigates the demand for new power development and reduces the risk of power shortages	Above High-voltage frequent power users	
	Implemented new Demand-Based Bidding Measures - Joint Solution in 2017	Allow customers to apply for Demand-Based Bidding in groups	Above High-voltage frequent power users	
Power-Saving Service Team		Monthly visits to high-voltage users. Teams use high-voltage AMI data analysis and simple equipment diagnostic questionnaires (air-conditioning equipment, motors, lighting equipment, etc.) that help users grasp power consumption, inventory power saving potential, and promote Demand Response Measures to maintain a stable power supply.	Above High-voltage users	Taipower's Power-Saving Service Team has visited **5,410 users** in 2020, with an estimated power saving potential of **96.41 GWh**
Community Energy Saving Campaigns		Provide free power-saving advocacy services for communities and associations. Taipower uses the occasion of assemblies to promote power-saving, share energy-saving related knowledge and experiences. Taipower advocates proper power-saving techniques, the use of high-efficiency energy-saving products (e.g. LED lighting), and provides electricity improvement recommendations for public facilities.	Local community, association	A total of **1,559 seminars** were organized in 2020, with approximately **250 thousand participants**
Visits to customers consuming more than 100 kW		Improve the overall efficiency of energy-saving services through regular visits, continuously pay attention to the use of large power users, and learn how to help them save electricity	Customers above 100 kW	A mechanism for initial visits and revisits has been established

5.1.2 Power Saving Performance

In order to encourage customers to implement energy conservation in practice, Taipower has employed power-saving incentives since July 2008 that prompt users to maintain power-saving motivation over the long term. In addition, a registration mechanism was introduced in 2018. Customers who sign up through the website, customer service hotline, or over the counter will receive a reward of $0.6 per kWh of electricity saved, with a minimum bonus of $84 per period (2 months). In the same year, the Power-Saving Reward Points app was launched. This allows users to collect points by participating in various energy-saving puzzle activities on the app. The points may be redeemed for prizes or to participate in sweepstakes. The goal is to promote the concept of power-saving among the public and form a power-saving culture and habits.

Power Savings Reward Performance in 2020

Year	Amount of saved electricity (billion kWh)	Reward amount for saving electricity (NT$100 million)	Carbon dioxide emission reduction (10,000 metric tons)	Equivalent number of Daan Forest Parks (for CO_2 absorption capacity) in one year
2018	1.32	9.9	67	1,722
2019	1.43	11.7	73	1,877
2020	1.19	10.3	61	1,568

Notes: 1. Based on the nation's electricity emissions coefficient of 509 grams CO_2e/kWh of 2019 announced by the Bureau of Energy, Ministry of Economic Affairs in June 2020 and the Bureau of Energy's 2020 report that the absorption capacity of one Daan Forest Park is 389 metric tons of CO_2 per year.

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

5.2 User Communication and Management

Diverse Channels for Engagement and Communication

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

Diversified Information Communication Channel

User Communication and Management

Through the Medium of District Service Offices

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

Online Feedback Channel

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

Customer Feedback Channels

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

Customer Satisfaction

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

In the future, Taipower will continue to handle customer service-related businesses in accordance with the Ministry of Economic Affairs' Implementation Plan for Improving Service Efficiency, and strengthen its communication with customers to make service delivery even better.

Customer Satisfaction Scores from 2018 to 2020