



# DIGITAL UTILITY

Sustainability Report 2019  
Provincial Electricity Authority

60<sup>th</sup>



**PEA**  
PROVINCIAL ELECTRICITY AUTHORITY

Brightness for *Life* Quality

# Step into the 6<sup>th</sup> Decade of Sustainable Electrical Energy Development

## 1884-1959: The first stage of electricity in Thailand

Electricity was first available in Thailand in 1884, having Field Marshal Chaopraya Surasakmontri (Chem Saeng-chuto) as the originator of Thailand's electricity business, starting from the installation of power generators, electrical cable wiring, and installation of electric lamps at the Department of Royal Guards, which is where the Ministry of Defence is located at present.

The provincial electricity business was officially initiated when the authority established the Electricity Unit in the Burapiban Division, Department of Public Health, Ministry of Interior, and electricity was generated for Mueang Nakhon Pathom Municipality to be sold to the public for the first time in 1930. After that, it was upgraded to the Electricity Division and Provincial Electricity Division, respectively before being formed as "The Provincial Electricity Organization" in 1954.

## 1971-1980: 2<sup>nd</sup> Decade, acceleration of electricity expansion to provincial areas

PEA accelerated the expansion of electric power distribution systems to rural villages in response to the increasing demands for electricity by creating important project plans as follows:

- The electricity development acceleration project to distribute electric power for villages nationwide within 15 years.
- The sub-district electricity development project to accelerate electric power distribution for villages within 6 years.
- Distribution of electric power to rural villages through electricity development by allowing opportunities for the communities to contribute 30% of investments in the electrical system construction to accelerate the electricity service.

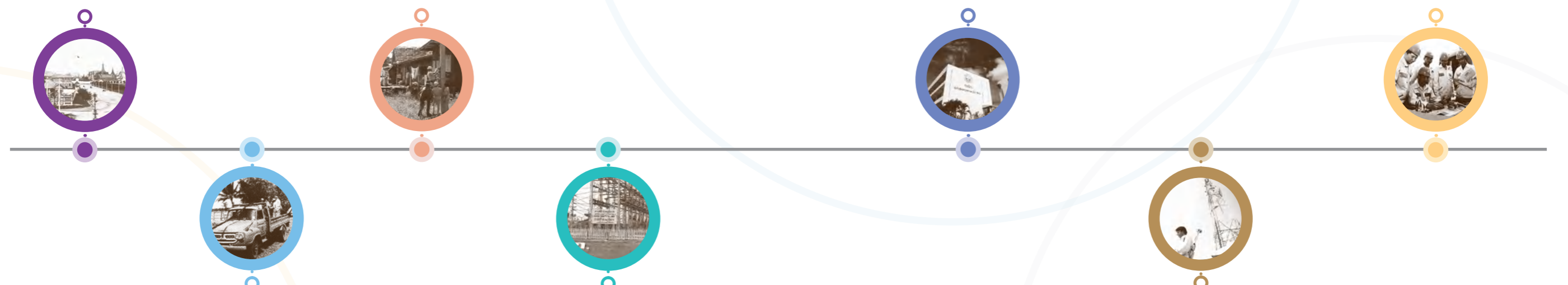
From such the implementation, rural villages could increase the electricity for use from 10% in 1972 to 35% at the end of 1980.

## 1991-2000: 4<sup>th</sup> Decade, application of advanced technology to develop international standards of services

PEA focused on the operations to support and promote development of industries into rural areas, tourism industry and community development, and the Eastern Seaboard and Southern Seaboard Development Programs, with an emphasis on improvement and enhancement of electrical system efficiency and stability to meet the demand for electricity consumption with speedy and efficient services through the application of new technology.

## 2011-Present: 6<sup>th</sup> Decade, quality development of electrical systems and services to transform the organization to PEA Digital Utility

PEA has been determined to provide efficient electric power services, continuously develop the organization both in terms of quality and services to excel in electric utility in response to the demands of customers, and create value to the society and environment with digital technology. PEA is ready to move forward and transform the organization to PEA Digital Utility by operating the business in compliance with good corporate governance to be ready for its 60<sup>th</sup> year of business and to become a modernized utility service provider through digital innovations and technological development with an aim to achieve excellent electric power systems, which will serve as an important part of steering the country and developing a stable and sustainable future.



## 1960-1970: 1<sup>st</sup> Decade, pioneer construction to bring electricity to communities

PEA was founded according to the Provincial Electricity Authority Act, B.E. 2503 (1960) through the business succession of the Provincial Electricity Organization, with 200 electricity offices under its supervision, and the maximum electric power of only 15,000 kW in 1960, which could generate electric power of 26.4 million units (kW-hour) per year to service people.

In the first decade of the Provincial Electricity Authority's operation, the business was very successful and was praised as the first-class state enterprise in 1970 with outstanding performance at the forefront during that time.

## 1981-1990: 3<sup>rd</sup> Decade, support of development to businesses and industries

Electric power distribution systems were prepared to support the increasing demands for electricity by increasing the electric power distribution system cycles in the areas with high-level electric power consumption, upgrading the voltage system, and connecting the power plants under the Provincial Electricity Authority with substations of the Electricity Generating Authority of Thailand instead of electricity generation by diesel power plants.

In addition, 33 kV distribution systems were constructed and linked using submarine cables from Khanom Substation of the Electricity Generating Authority of Thailand to Ko Samui, with the approximate distance of 25 kilometers, which was the first submarine cable laying in Thailand and the start of the application of natural resources, such as hydropower and solar power for generating electricity.

## 2001-2010: 5<sup>th</sup> Decade, development of the organization to move forward to energy business at an international level

The organization was restructured by focusing on increasing distribution system stability with technology. The business was expanded, which could be divided into two areas, namely electrical system networks, and electric power distribution and services. In addition, project management was improved to be comprehensive, personnel capability was developed, and resources were managed to achieve optimum efficiency to be ready for running an energy business at an international level.

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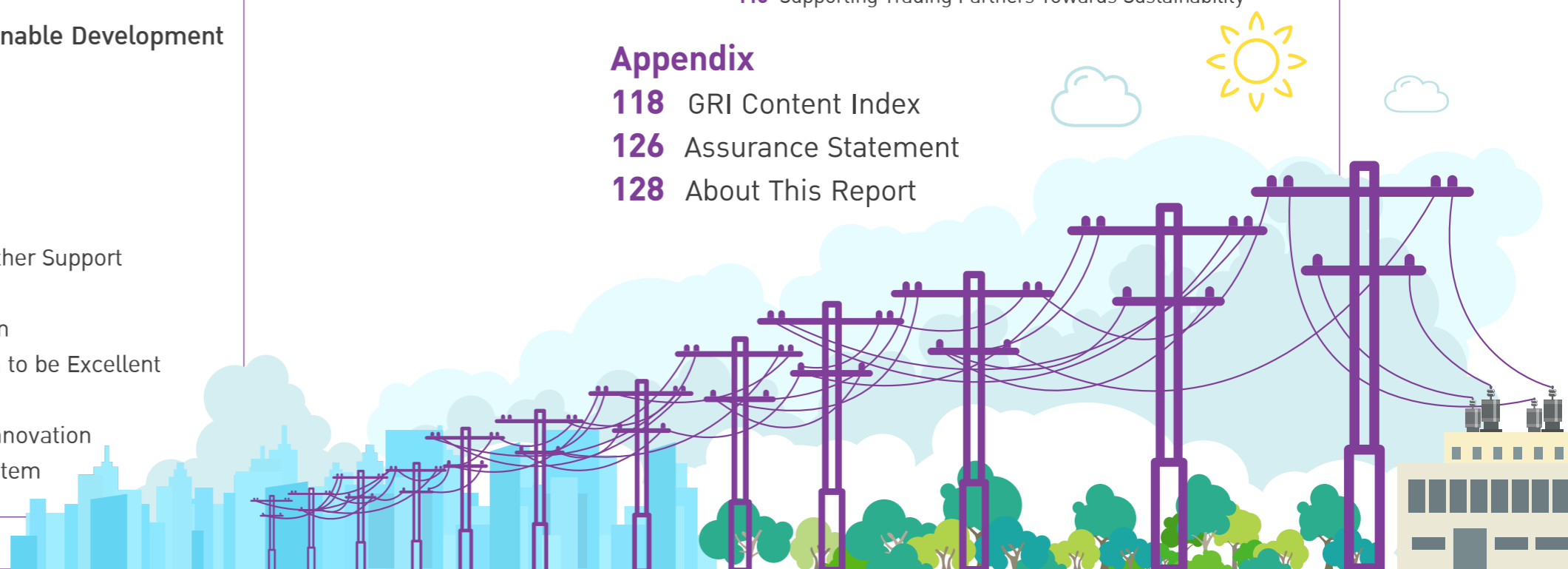
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## Message from Governor <sup>[102-14]</sup>

The Provincial Electricity Authority or PEA has operated its business under the KEEN 14 Policy—Keep Improving Existing Business, Enhance New Business, Employ Innovation and Technology, and Nourish Human Resource – to ensure operating continuity and improve work process that handle changes during the transformational state of becoming a Digital Utility. In 2019, PEA made a tangible Key Change that benefits society through its 5 operating objectives as follows:

**Digital Energy Operation** – PEA has been developing its distribution system to match the ever-changing technologies. These include the Distribution System Reliability Improvement Project, the Smart Grid Development Project, and the Underground Cable Construction for Big Cities Project that aimed to improve the electrical stability of distribution system.

**Connected Customer** – PEA launched novel and user-friendly services through digital technology channels (social media), and the One-stop Customer Service through the Internet Project (PEA Smart Plus Application) to adapt to its customers changing behavior and requirements.

**Next Generation Enterprise** – In order to manage and analyze data with ease in the future, PEA has gathered, formatted and organized all its data in a systematic way as part of the GIS Data Cleansing Project, Corporate Key Performance Tracking System (Corporate Data Center: CDC), and Centralized Electronic Document Management System.

**Workforce of the Future** – PEA has encouraged its employees to incorporate technologies into work processes and instilled the mindset of enhancing digital skills fit for the technology era through the Corporate Value Strengthening Program by Executives, the use of Corporate Governance eSYSTEM (CG e-SYSTEM), and the establishment of Innovation Hub.

**Digital Platform** – PEA developed new businesses and digital platforms to cope with future operations including EV and Charging Station Infrastructure Project, and Advanced Patrolling System Application.

Apart from the above-mentioned outcome, PEA also aimed to operate the utility to comply with the sustainability framework covering the economy, society and the environment under the corporate governance along with stakeholder engagement principles. PEA has incorporated different aspects into the finalized outline of PEA Sustainability Strategy. It is aimed at determining clear strategies for the tangibility of sustainability-related operations while building and strengthening relationships with and among all stakeholders; transforming CSR work into CSV work in order to truly transfer value to the stakeholders.

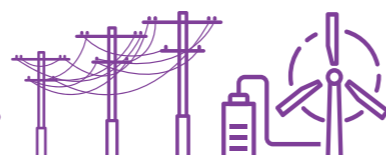
## The Provincial Electricity Authority improve work process transformational state of becoming a Digital Utility.

In the past year, PEA has been recognized domestically and internationally with prestigious awards such as 2019 Excellent State Enterprise Award, Outstanding Award for Disclosure and Transparency (for 3 consecutive years). Outstanding Award for Social and Environmental Operations (for 3 consecutive years). Outstanding Award for Digital Enterprise Development, Honorable Mention Award for Outstanding Creativity and Innovation, Asia Responsible Enterprise Awards (AREA) 2019 from the One Sub-district One Electrician Project in the International CSR Summit in Taipei, Taiwan, and Invention Awards from the competition in "The 47<sup>th</sup> International Exhibition of Inventions Geneva 2019" in Geneva, Swiss Confederation.

PEA is determined to continue evolving in line with its mission to improve quality of life of the Thai people and to become a leader in the utility business as well as an important driver for sustainable economic, society, and environmental development.



(Mr. Sompong Preeprem)  
PEA Governor



## Awards of Pride

With the commitment to operating its business towards organizational sustainability, the Provincial Electricity Authority (PEA) has widely been recognized by leading entities both domestically and internationally. Some of the awards PEA has received in 2019 are as follows:

### National Level

#### 01

5 Outstanding State Enterprise Awards 2019 from the State Enterprise Policy Office (SEPO), Ministry of Finance as follows:

- Best State Enterprise Award 2019
  - Outstanding State Enterprise Award for Corporate Social and Environmental Responsibility Activities (3 consecutive years)
  - Outstanding State Enterprise Award for Information Disclosure and Transparency (3 consecutive years)
  - Digital Transformation Initiative Award 2019 (Honor Award)
  - Creativity and Innovation Award (Honorable Mention) (2 consecutive years).
- These show the organization's commitment to operating its business towards efficiency and excellence.



#### 02

Outstanding Award for Energy and Alternative Energy Conservation Promotion in Thailand Energy Award 2019 from the Department of Alternative Energy Development and Efficiency (DEDE), Ministry of Energy, which shows that PEA has placed great importance on adopting energy-saving technology in the organization and promoting more consumption of alternative energy.



#### 03

Honor Award and Certification as Government Easy Contact Center (GECC) 2019 from the Office of the Prime Minister, which shows that the organization is committed to improving and maintaining public service quality according to the GECC standards.



#### 04

Superbrands Award 2018, which shows the organization's success in creating PEA brand awareness, consumer confidence, impression, and service excellence.



#### 05

Honor Awards in Zero Accident Campaign 2019, which include one office with platinum level, 5 offices with silver level, 59 offices with bronze level, and 162 offices with basic level from Thailand Institute of Occupational Safety and Health (Public Organization).



#### 06

National G-Green Logo Award 2019 from the Department of Environmental Quality Promotion, Ministry of Natural Resources and Environment, which consists of 45 offices with excellent (G gold) level, 2 offices with very good (G silver) level, and 15 offices which could maintain their renewal level, totaling 62 offices, together with Honor Award from providing cooperation in continuously participating in the project organized by the Department of Environmental Quality Promotion, which reflects the organization's dedication to promoting Green Offices, reduction of energy and resource consumption, reduction of waste, reduction of greenhouse gas emissions into the atmosphere, and carrying out environmentally friendly activities.



#### 07

Public Sector Excellence Awards (PSEA) 2019 under the category of government service, which reflects the organization's attempt to upgrade service quality to facilitate convenient, fast, transparent, fair, and satisfactory services for the public.

#### 08

Thailand HR Innovation Award 2019 (Silver Award) from the project "Development of Personnel Potential in Response to Changes in the Electric Power Market through PEA CCSR" from the Personnel Management Association of Thailand (PMAT), the Thailand Productivity Institute, and the Faculty of Human Resource Development, National Institute of Development (NIDA), which reflects development of innovations to continuously benefit organizational development.



#### 09

Winner Award under the category "Single Fund" for state enterprises with the fund of over 20,000 million baht in the 8<sup>th</sup> Outstanding Provident Fund Contest Project 2019 (3 consecutive years) from the Association of Provident Fund, which shows that PEA is committed to the management for continued development to bring confidence for members of the Provident Fund.

#### 10

Sustainability Disclosure Award 2019 from Thaipat Institute, which reflects that PEA has placed great importance on publicizing operation information in terms of organizational development towards sustainability in addition to financial information.

International Level

01

HR Asia Best Companies to Work for in Asia Award 2019 (Thailand Edition), organized by Business Media International Company, Malaysia, which shows that PEA is a leading organization in continued management and development of human resources and is a model organization in human resource management in Asia.

02

5 awards from 4 inventions at the international stage "The 47<sup>th</sup> International Exhibition of Inventions Geneva 2019" in Geneva, Swiss Confederation as follows:

- Double Gold Award and Special Prize on Stage from the Korea Invention Promotion Association for creative invention from the invention of "PEA Solar Hero Application, which is an application for comprehensive solar rooftop installation by the team of inventors from the headquarters



- Gold Award from the work "Vuzala," a cordless cable cutter, by the team of inventors from PEA Area 2 (North), Phitsanulok Province

- Silver Award from the invention of Safety Keep Communication Lines Tools by the team of inventors from PEA Area 2 (Northeast), Ubon Ratchathani Province

- Bronze Award from the invention of Triple Drum Winch for String Cable Machine by the team of inventors from the headquarters. All of these awards reflect that the organization is committed to promoting its personnel to be creative in inventing new things to support its operations and business in the future.



03

7 awards from 4 inventions at the international stage "The International Trade Fair-Ideas, Inventions and New Products (iENA2019), in Nuremberg, Federal Republic of Germany as follows:

- Gold Award and Special Prize from Iran (FIRI Award) from the invention of Universal Remote Control Switch (RCS) Control Unit by the team of inventors from PEA Area 1 (Central Region), Phra Nakhon Si Ayutthaya Province

- Gold Award from the invention of Cable Reel Spinner (Moveable Type) with Automatic Cable Reel Supporter by the team of inventors from the headquarters

- Silver Award and Special Prize from China (CAI Award Invention & Innovation) from the invention of Low Tension Switch Grip Head and Remover Tool by the team of inventors from PEA Area 2 (Central Region), Chon Buri Province

- Silver Award and Special Prize from Indonesia (Indonesia Invention and Innovation Promotion Association) from the invention of Vuzula, a cordless cable cutter by the team of inventors from PEA Area 2 (North), Phitsanulok Province. All of these awards reflect that the organization is committed to promoting its personnel to be creative in inventing new things to support its operations and business in the future.

04

4 awards from 4 inventions at the international stage "SEOUL International Invention Fair 2019 (SIIF 2019) in Seoul," Republic of Korea as follows:

- Gold Award from the invention of PEA Weather Forecast by the team of inventors from PEA Area 3 (North), Lop Buri Province

- Silver Award from the invention of Advanced Patrolling System Application (APSA) by the team of inventors from PEA Region 1

- Bronze Award from the invention of GIS for Outage Management in case of Disaster Event by the team of inventors from the headquarters

- Special Prize from the Patent Office of Cooperation Council for



the Arab States of the Gulf from the invention of Searching Fault Location Analysis (SFLA) by the team of inventors from PEA Area 2 (Northeast), Ubon Ratchathani Province.

All of these awards reflect the organization's commitment to

promoting its personnel to be creative in inventing new things, with the focus on adopting technology and innovations for steering the organization.



05

Asia Responsible Enterprise Awards (AREA) 2019 for Resource Investment from 1 Tambon 1 Electrical Technician Project in International CSR Summit 2019 in Taiwan. This shows that PEA has outstanding performance in social and environmental responsibility, which further highlights its standpoint as the leader in sustainability, with an aim to grow with the society.

# Sustainability Highlights 2019

**AAA**  
the organization credit rating by TRIS Rating Co., Ltd.

**3.17**  
the ratio of return on assets (ROA).

**2.64**  
the profit margin ratio.

**1.26**  
the total asset turnover ratio.

**1.40**  
the current ratio.

**92.19**  
the score of the Integrity and Transparency Assessment (ITA) by NACC in 2019.

**80.79%**  
the percentage of the procurement of major supplies came from domestic manufacturers.

**3.10**  
**times/customer/year**  
the System Average Interruption Frequency Index (SAIFI).

**73.82**  
**minutes/customer/year**  
the System Average Interruption Duration Index (SAIDI).

**5.37%**  
the percentage of the distribution system loss.



**4.51**  
the average of employee commitment.

**28,789**  
**employees** receiving a functional competency assessment.

**100%**  
employees were evaluated for their performance and career development.

**0.1200**  
the Disabling Injury Index.

**137,232**  
**new rural households** that expansion of the electrical system was completed.

**12,465**  
**remote rural households** that expansion of the electrical system was completed.

**4.4962**  
the scores of the customers' overall satisfaction in products and services.

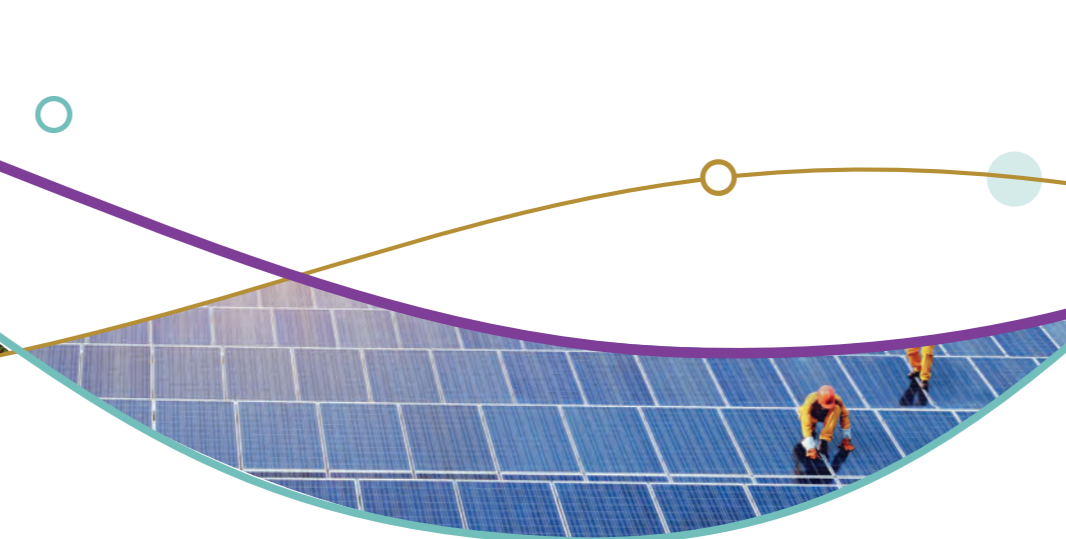
**60 minutes**  
the period of system restoration.

**0** **minute**  
the highest acceptable interruption period of the information technology system.

**1,378**  
**households** benefited by Alternative Energy Promotion for Community Enterprises Project.

**1,675**  
**households** gained skill development for jobs from the 1 Tambon 1 Electric Technician Project.

**26**  
**new suppliers** selected based on the environmental criteria.





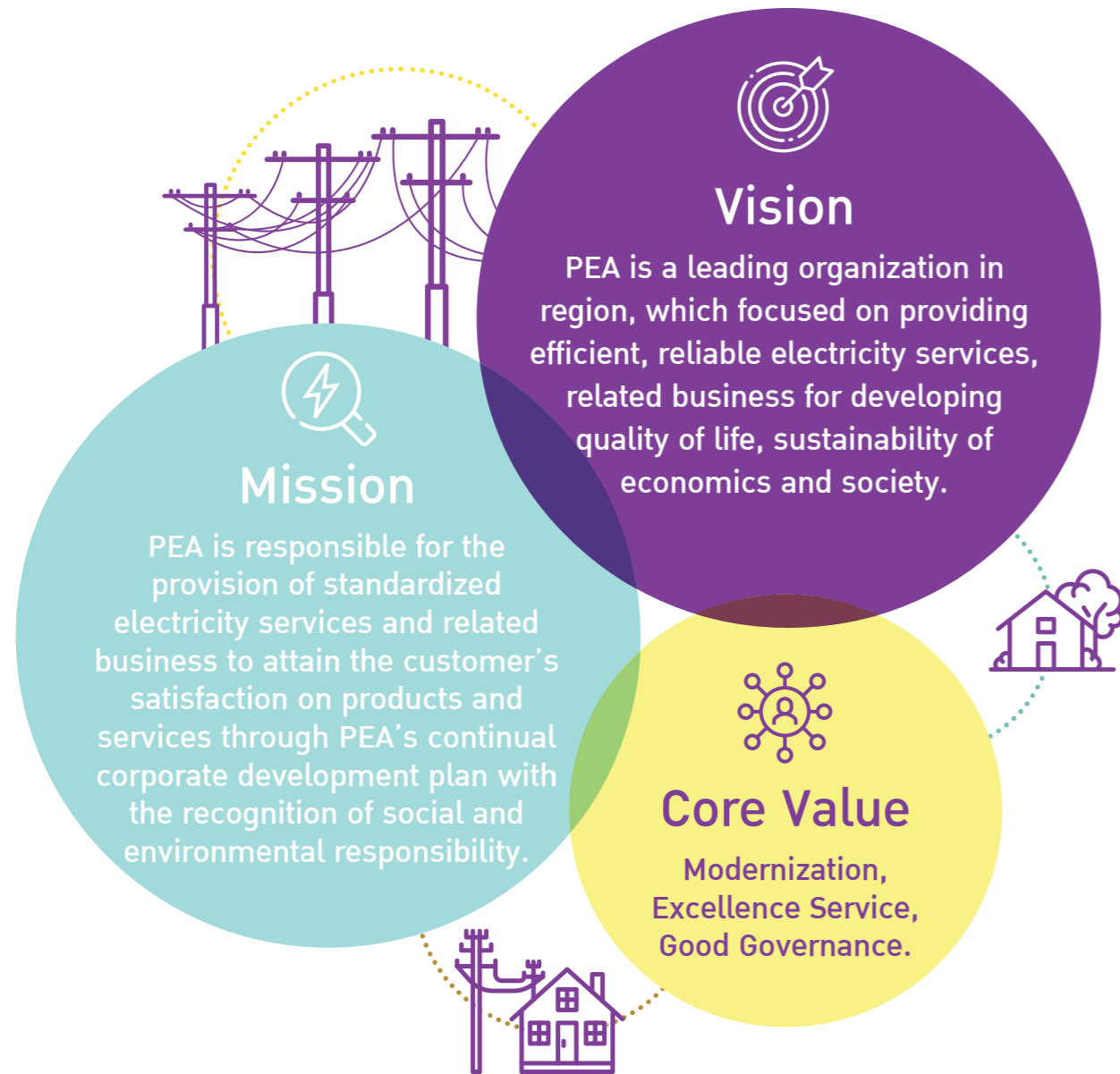
# PEA's Business

**Because** the world never stops spinning, “PEA” needs to move forward to modernize our organization and to improve the operations in response to the evolving digital society. We stand ready to serve as a comprehensive digital utility service provider, and maintain balance between economic, social development, and environmental protection to create a stable and sustainable future.



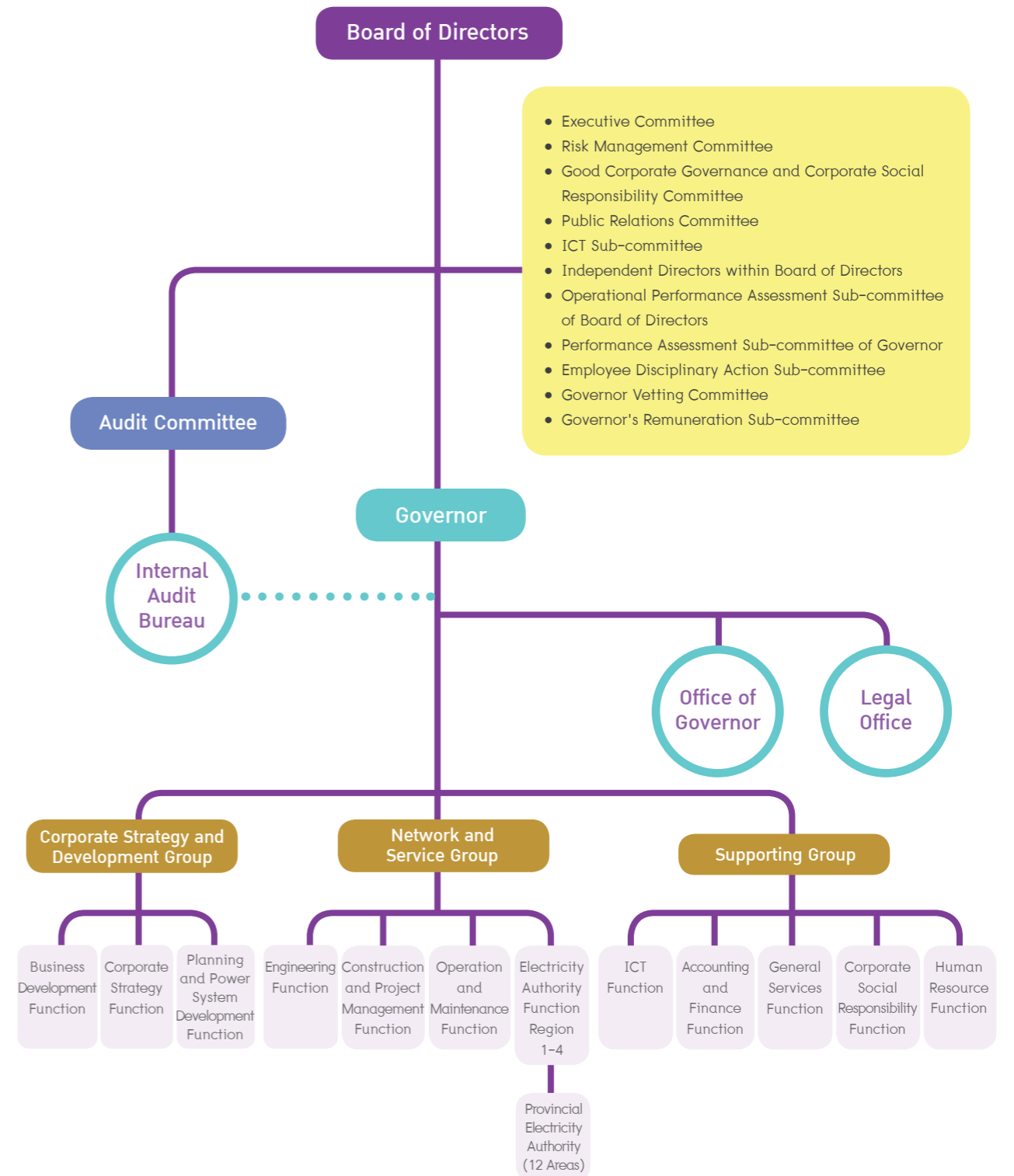
## PEA's Business

**Provincial Electricity Authority or PEA** <sup>[102-1]</sup> is state enterprise under the Ministry of Interior, operating in energy business <sup>[102-5]</sup>. PEA mainly focuses on procuring and providing electric power service, including other related business in terms of power distribution service and PEA's customer support service, such as construction work for users, inspection, repair and maintenance work, and asset rent or utilization <sup>[102-2]</sup>.

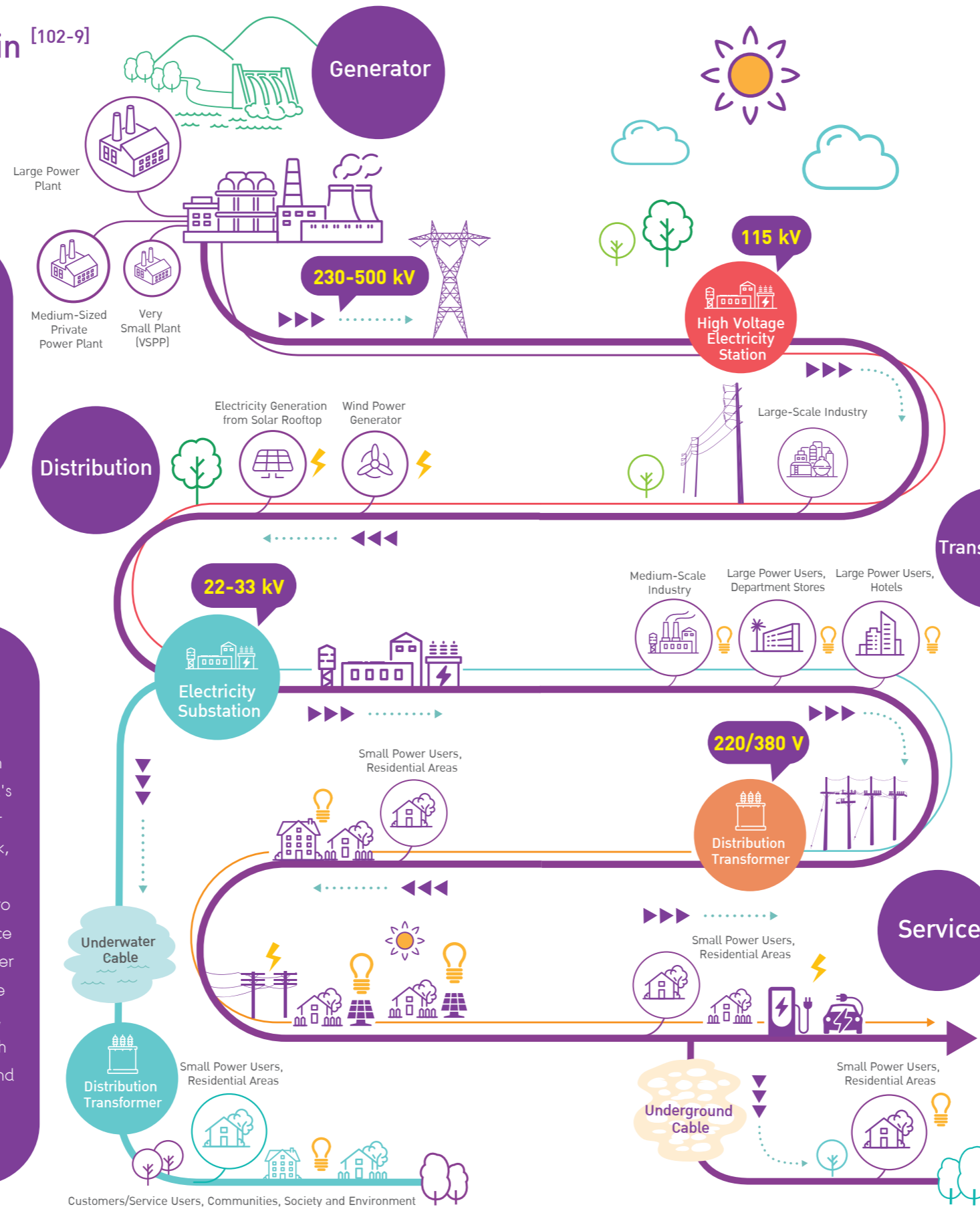


## Sustainable Operation Structure <sup>[102-18]</sup>

In 2019, PEA changed its administration structure by setting up Business Development Function <sup>[102-10]</sup> for appropriate administration to support new business development and growth, and to be consistent with PEA's current mission.



# PEA's Business Value Chain [102-9]



**Power Procurement and Distribution Business**

Procuring power supply from power producer network system and distributing to various groups of electric power users through four regional agencies in North, Northeast, Central, and South regions.

**Power Trading Management Business**

PEA uses its expertise in power distribution system to operate businesses in power trading management business, develop and provide channel in power trading, develop and monitor power system that connect power production source, prosumer and energy storage in various areas, as well as provide balanced and effective power management under appropriate cost.

**Power Service Supportive Business**

**Related Business :** is supportive business that enhance PEA's power distribution service both domestically and internationally or support PEA's customer service such as construction work for users, inspection, repair and maintenance work, and asset rent or utilization.

**New Business :** is service business in response to rapidly changing technologies. Firstly, the service business through digital platform service in power distribution, power management, and software development for equipment control. Secondly, product and service development business such as solar rooftop, smart home, electric vehicle and charging station.

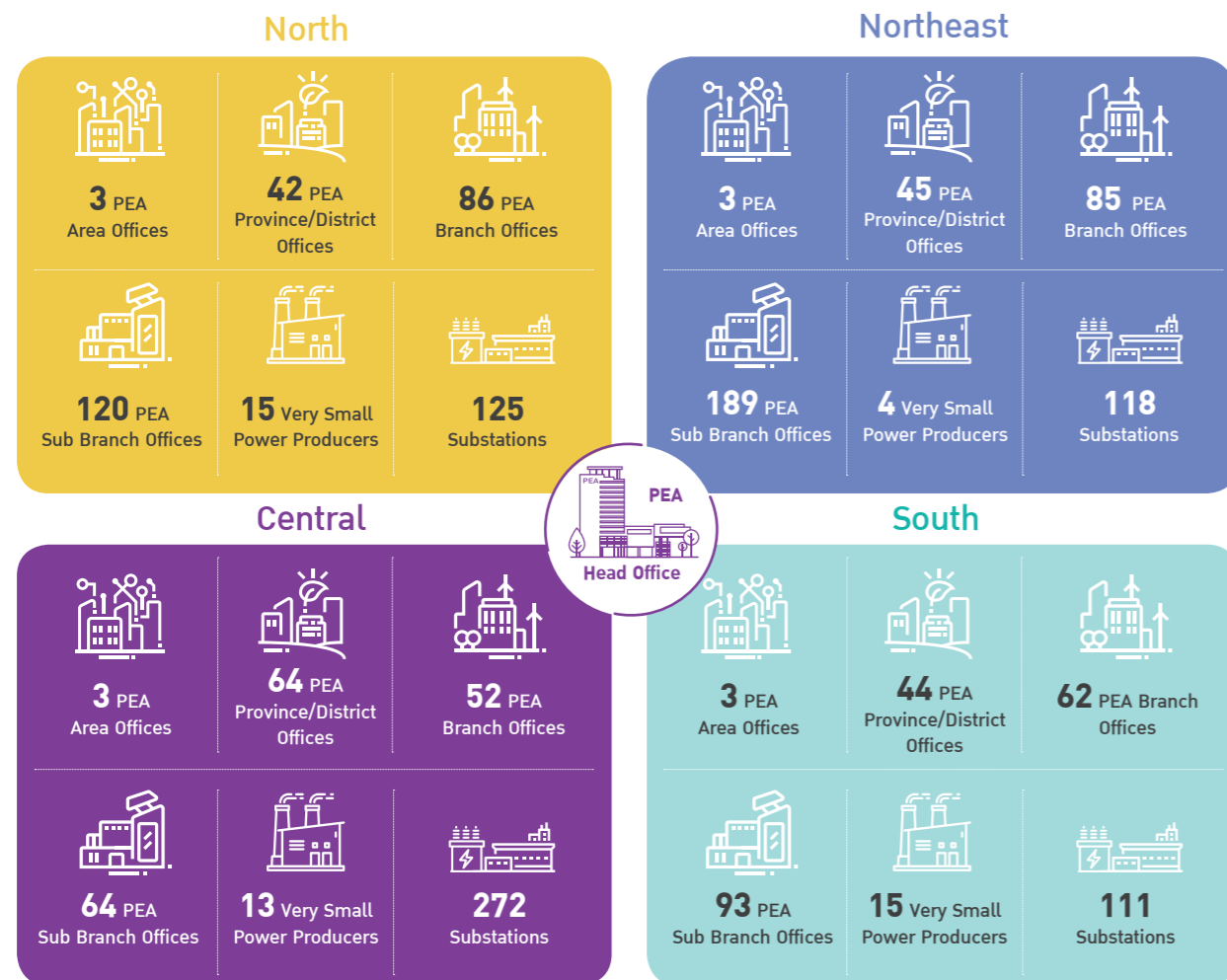
**Power Business Investment by Subsidiary [102-45]**

An investment in power business including renewable energy power plant and small commercial power producer firm operated by PEA ENCOM International co., Ltd. Or PEA ENCOM which invests in stocks of power business as minor shareholder. Its main responsibilities are setting strategy in investment, operational, and investment portfolio management. PEA ENCOM was founded by cabinet resolution dated 3rd June 2009 to invest in power supply and provide workshops on electric power system for public and private sectors both domestically and internationally. PEA was the sole shareholder with initial registered capital of 100,000,000 baht. At present, its registered capital is 1,891,283,750 baht.

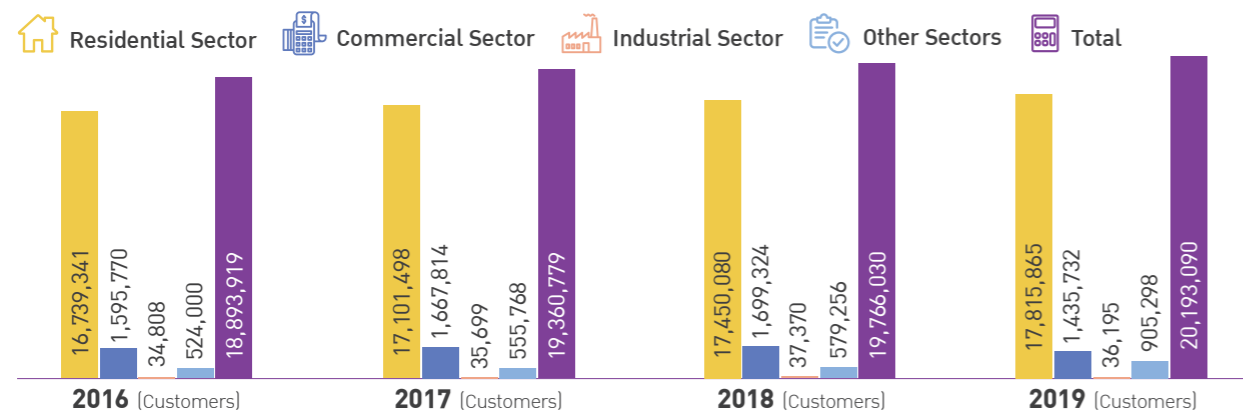
## Service Areas

PEA's head office is located on 200 Ngamwongwan Road, Ladyao, Jatujak, Bangkok 10220<sup>[102-3]</sup>. It is responsible for power distribution in 74 provinces in Thailand excluding Bangkok, Nonthaburi, and Samutprakarn. The service areas covered 99 percent of the country or about 510,000 square-kilometers<sup>[102-4]</sup>.

### Amount of Service Office<sup>[102-4] [102-6] [102-7] [102-10]</sup>



### Electric Power User Sectors<sup>[102-6]</sup>

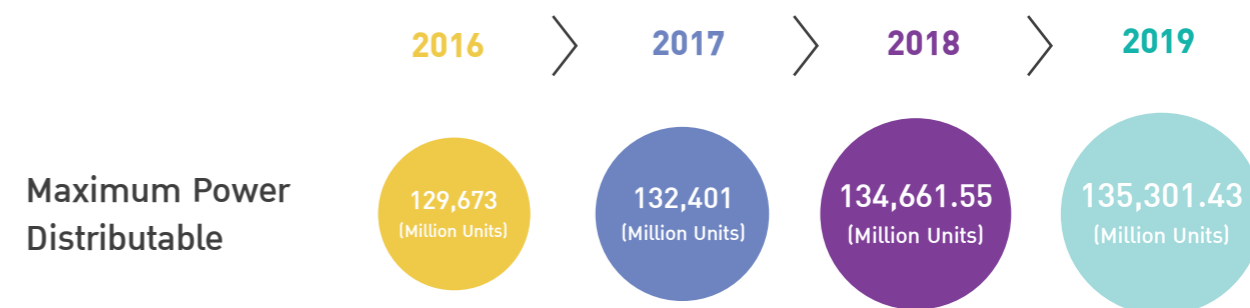


## Organization Data<sup>[102-7]</sup>

### Number of Employees and Workers

There were 29,084 PEA employees and 5,861 workers (as at 31<sup>st</sup> December 2019).

### Power Distribution Units



### Organizational Membership<sup>[102-12] [102-13]</sup>

PEA operates under the Provincial Electricity Authority Act B.E. 2503. It applies the set of regulations, rules, criteria, standards, and principles from domestic and international level to its operation to efficiently develop its organization. Some of those guidelines are the provisions of the State Enterprise Policy Office (SEPO), risk management principles of the Committee of Sponsoring Organizations of the Tread Way Commission-Enterprise Risk Management (COSO-ERM), Business Continuity Management standard (ISO/IEC 22301), Information Security Management System standard (ISO/IEC 27001), Social Responsibility Guidance standard (ISO 26000), Global Reporting Initiative (GRI Standards), and UN Sustainable Development Goals (UN SDGs).

Moreover, PEA participates as a member, or cooperates with various public and private sectors to efficiently perform its operation, as well as provide values to communities and society as follow:

**Main operation (power distribution)** such as Energy Policy and Planning office (EPPO), Energy Regulatory Commission (ERC), The Engineering Institute of Thailand Under H.M. The King's Patronage, Institute of Electrical and Electronics Engineers (IEEE Thailand), Electricity Supply Industry Association of Thailand (TESIA), Heads of ASEAN Power Utilities/Authorities (HAPUA), and Committee on Power System Reliability Improvement of 3 Electricity Agencies.

**Other operation** such as Thai Electrical and Mechanical Contractors Association, Personnel Management Association of Thailand (PMAT), Department of Skill Development (Ministry of Labour), and Department of Environmental Quality Promotion (Ministry of Natural Resources and Environment).





## Corporate Governance and Anti-Corruption to Create Value for Sustainability

PEA focuses on responding to customers need, by operating under the principles of good governance and responsibility to the community, society, and environment. Therefore, PEA sets the good corporate governance, as well as the prevention and suppression of corruption into the significant strategy: to operate under good corporate governance for PEA's sustainable growth promotion according to the international practice of UN SDGs, best practice of Dow Jones Sustainability Indices (DJSI), and strive to achieve the international standards of the Organisation for Economic Co-Operation and Development (OECD) in order to show transparent and corruption-free operation, ethics standards and professionalism. This is corresponding to organization's value of "Modernization, Good Service, Good Governance" which stipulates that all personnel in all levels always strictly conform to TRUST+E factor.

Moreover, PEA is determined to develop good governance principle, concept, and practice to the international level standard. Therefore, it announced policy on good governance and promoted transparency and prevented corruption<sup>[102-16]</sup> for executives and employees to follow as operation framework. This is to show the organization's determination in preventing all types of corruptions in order to improve its Corruption Perception Index (CPI) which is important to the overall development of the country. There is a committee on good corporate governance and social responsibility who regulates, sets policy, provides recommendation, and monitors the operation to ensure that it follows policy and operation plan on good governance and social responsibility concept effectively and efficiently<sup>[103-1]</sup>.

### Target<sup>[103-2]</sup>



Operate business according to governance principles for sustainable growth, has ethics standard and professionalism, without corruption, while corporate image is being widely accepted in the public viewpoint.

### Strategy<sup>[103-2]</sup>



- Uplift the intention in managing according to good governance principle.
- Strengthen knowledge, society, and culture in good governance.
- Develop good governance standard and proactive corruption prevention system.
- Create engagement in efficient processes and mechanisms for suppression, monitoring, assessment, and punishment.

### Management Approach<sup>[103-2]</sup>



- Announced "No Gift Policy" during 2019 new year festival.
- Announced the policy on good governance and transparency promotion and anti-corruption practices.
- Followed the principles and guidelines in good governance, ethics, and professionalism manual strictly.
- Monitored operation result according to good governance, corruption prevention and suppression master plan and action plan by reporting to the committee on good governance and social responsibility quarterly.
- Set activities that support morals, ethics, and transparency in operations (Soft Control).
- Appointed "Compliance Unit" working group to monitor the internal.
- Joined "Integrity and Transparency Assessment (ITA) in public organization operations" held by National Anti-Corruption Commission.
- Established PEA's electronics information center.
- Applied technology to information technology system for Corporate Governance (CG e-System) consisted of
  - 1) awareness evaluation system about the strengthening of good governance culture and values in honesty, virtue, ethics, transparency, and anti-corruption (CG Testing).
  - 2) reporting system for the conflict of interest between personal interest and corporate interest (COI Reporting).
  - 3) signing system acknowledging the good governance manual (CG Acknowledgement).
- "PEA's sustainable transparency" plan which focused on establishing PEA's transparent network both internally and externally.
- Integrity pact for projects worth 1 billion baht or more.

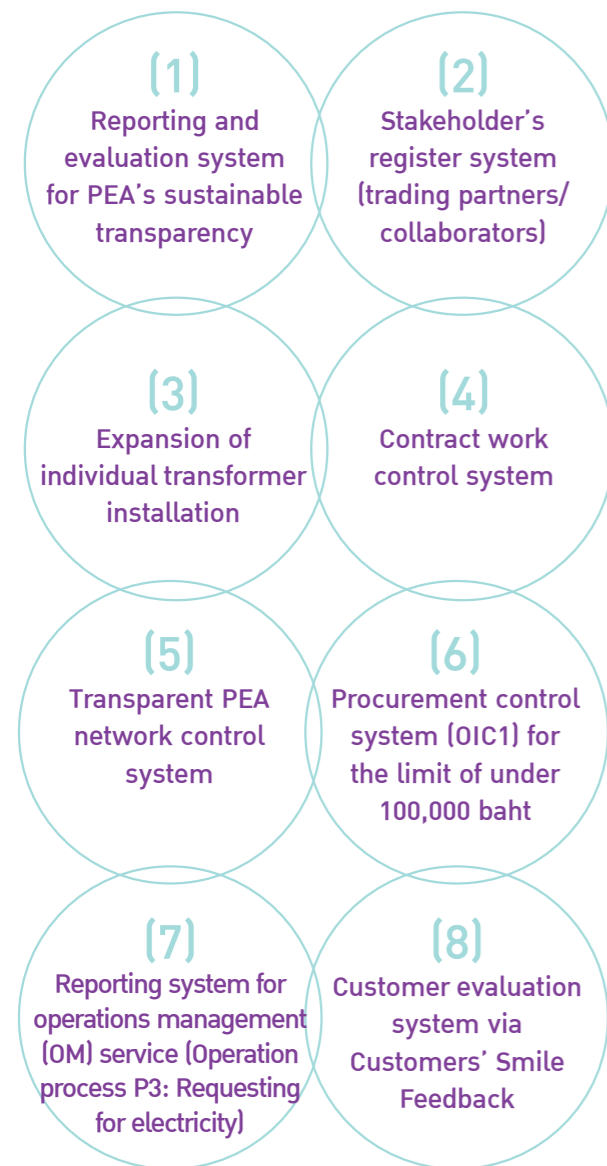
### 2019 Outstanding Performance<sup>[103-3]</sup>



- Evaluation result on Integrity and Transparency Assessment (ITA) of public organization operations of National Anti-Corruption Commission in 2019, PEA's result was 92.19% (rating score at A level).
- Evaluation result on awareness and good governance application (CG Testing) was 95.50%, increased from 90.85% in 2018.
- In the case of annual reporting, PEA's committees, executives, and employees reported on conflict of Interest (COI) between personal interest and corporate interest was 100%<sup>[102-25]</sup>.
- Evaluation result on signing in acknowledging the good governance manual (CG Acknowledgement) of executives and employees was 94.28%.
- Executives and employees participated in activities that support morals, ethics, and transparency in operations (Soft Control) totaled of 6,474 personnel (more than the target of 2,474 personnel). There were pre-test and post-test for the organizations that held soft control activities. Overall, the pre-test result was 63.44%, while post-test result was 85.47%.
- Amount of personnel who were subjected to disciplinary action (in case of serious misconduct) was 0.02% of all employees (decreased for 3 years consecutively).



Applied digital technology system to create monitoring and evaluation process to enhance PEA's operation efficiency in transparency, consisted of 8 important operation system as follow:



### Information of Committees, Employees, and Business Partners Informed about Anti-Corruption Policy and Measures <sup>[205-2]</sup>

Group	Number of People Informed About Anti-Corruption Policy and Measures	Percentage
Committees	14	100
<b>Employee by Regions</b>		
Head office	3,755	97.38
North	5,495	94.69
Northeast	6,344	93.27
Central	6,492	91.89
South	5,233	95.98
<b>Business Partners</b>		
Trading partners/ Collaborators	2,298	96.84

### Information of Committees and Employees Trained on Anti-Corruption Related Courses <sup>[205-2]</sup>

Group	Number of People Trained on Anti-Corruption Courses	Percentage
Committees	9	64.28
<b>Employee by Regions</b>		
Head office	2,302	59.70
North	917	15.80
Northeast	1,532	22.53
Central	1,031	14.59
South	692	12.69



### Corruption-related Incidents

In 2019, PEA faced no accusation on corruption and had no corruption incident that lead to contract termination or non-renewal from trading partner. However, there were 7 corruption incidents within the organization, which were 4 cases on document falsification and 3 cases on government property misappropriation. As a result, PEA applied disciplinary measure by firing 4 employees and dismissing 3 employees <sup>[205-3]</sup>.

In part of other legal cases or economic and social regulation, PEA had not been accused, fined, or penalized in any case. In addition, there was no dispute from non-compliance that needed to be settled <sup>[419-1]</sup>.

#### Improvement Plan for Future Operation <sup>[103-3]</sup>



- Analyze the result of PEA's Integrity and Transparency Assessment (ITA) of public organization operations and revise overall operation pattern that correspond with assessment criteria.
- Develop "CG e-System" to apply to the effectiveness and efficiency improvement of PEA's operation process in good governance, as well as setting up the realtime dashboard for concrete result.
- Improve corruption prevention operation.
- Evaluate the corruption risk and manage the risk.
- Follow the measures on morals and transparency promotion within the organization.
- Evaluate the overall system on good governance in the past 5 years to be consistent with the development of evaluation criteria for standards and indicators for domestic and international level.

## Complaint Management <sup>[103-2]</sup>

PEA had a systematic and fair complaint management process for all the stakeholders. With the development of the PEA-VOCs system for handling complaints, and with the process to listen to customer feedback in order to keep record, monitor, and report the results in the same database throughout the organization, PEA could achieve a speedy and efficient process of receiving complaints, as well as responding to and resolving complaints of the stakeholders within a specific time.

### Types of Complaints

#### Complaints of Services

This type of complaints could be classified into 6 categories

- electricity quality
- service
- electricity unit recording/billing
- employee behavior
- electricity cut-off
- others

#### Complaints of Corruption and Misconduct

This type of complaints could be classified into 5 categories

- procurement process
- human resource process
- service process
- financial process
- misconduct/code of conduct violation

### Protection of Persons Related to Complaints and Reports

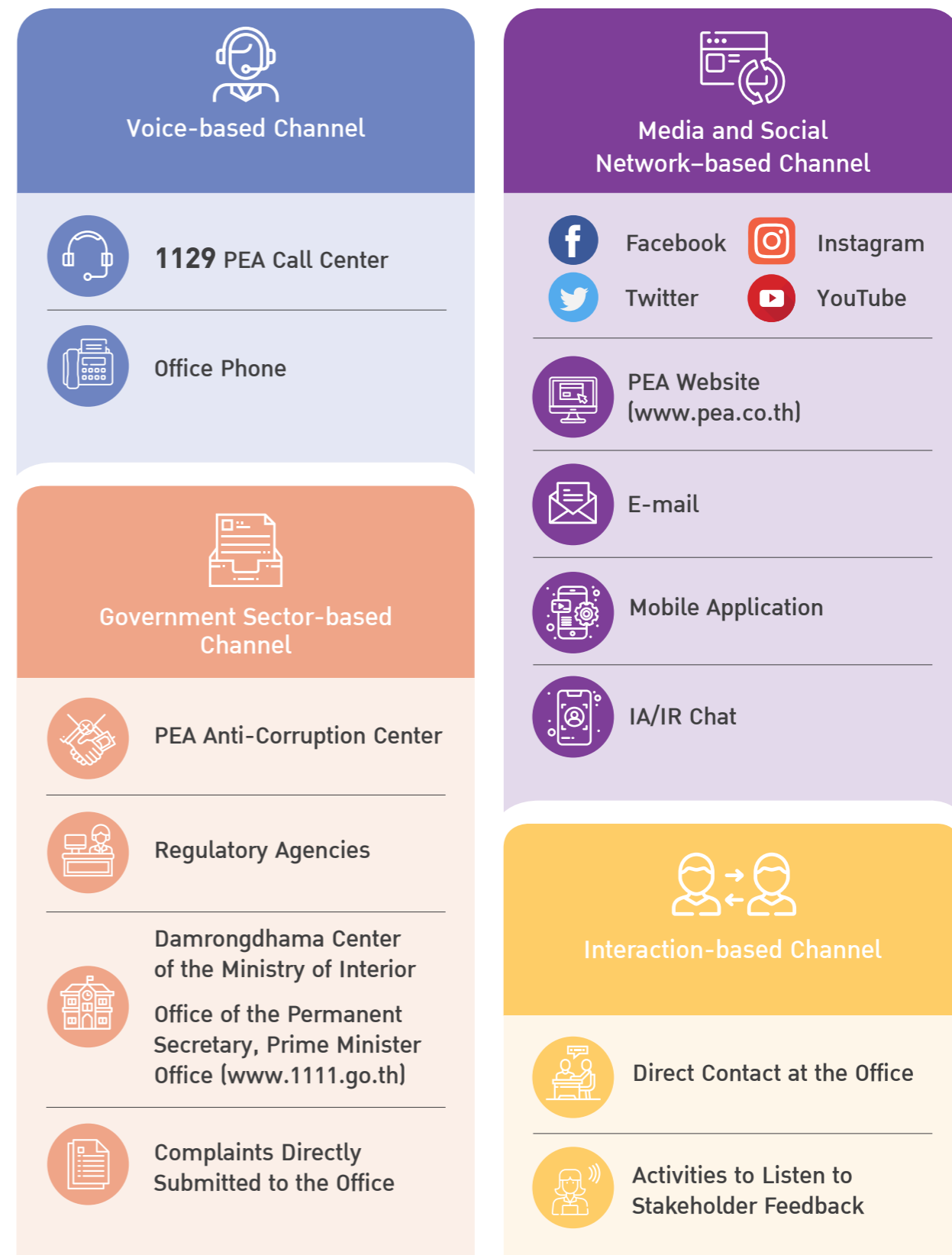
PEA clearly determined the criteria in PEA's Complaint Management Efficiency Enhancement Handbook, where it is stated that those in charge of handling complaints and reports shall keep confidential the information of the persons making complaints and reports from being disclosed to others, take into account security and damage issues, and use their own discretion as deemed appropriate to give orders to protect those making complaints and reports, as well as witnesses and people involved in inquiries and investigations from harm or injustice caused by making complaints, being witnesses, or giving such information.

### Complaint Management

#### Customer Complaints

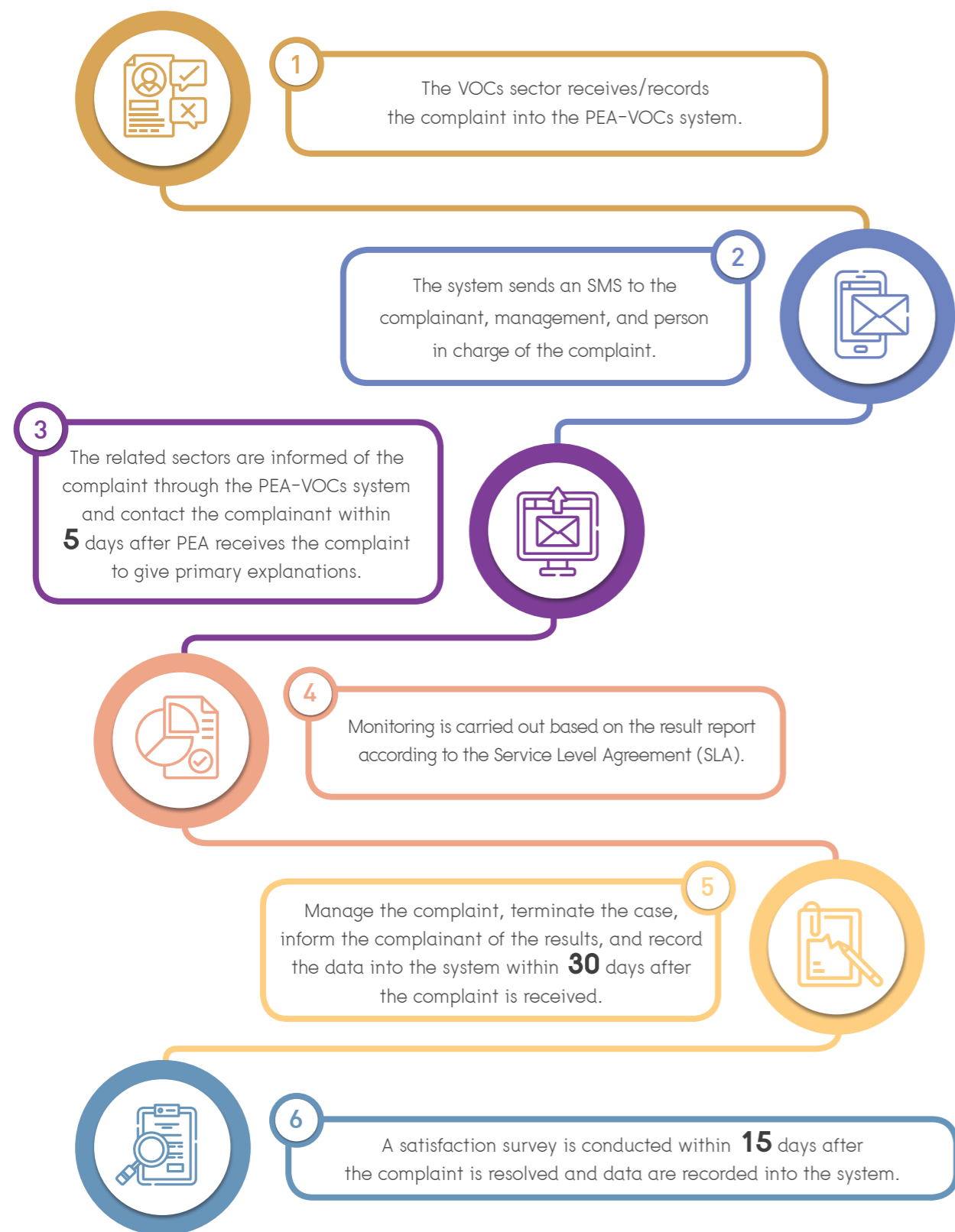
	2016	2017	2018	2019
Total number of customer complaints	1,966	3,689	4,246	5,036
Number of responses to customer complaints within 30 days	1,800	3,666	4,236	5,028
Percentage of customer complaints receiving responses within 30 days	91.56	99.38	99.76	99.84
Number of responses to customer complaints within 15 days	-	-	3,196	4,378
Percentage of customer complaints receiving responses within 15 days	-	-	75.27	86.93

## Channels of Receiving Complaints and Customer Feedback



## Overview of PEA's Complaint Management Process

### PEA's Management of Complaints of Services



## Management of Complaints of Corruption and Misconduct

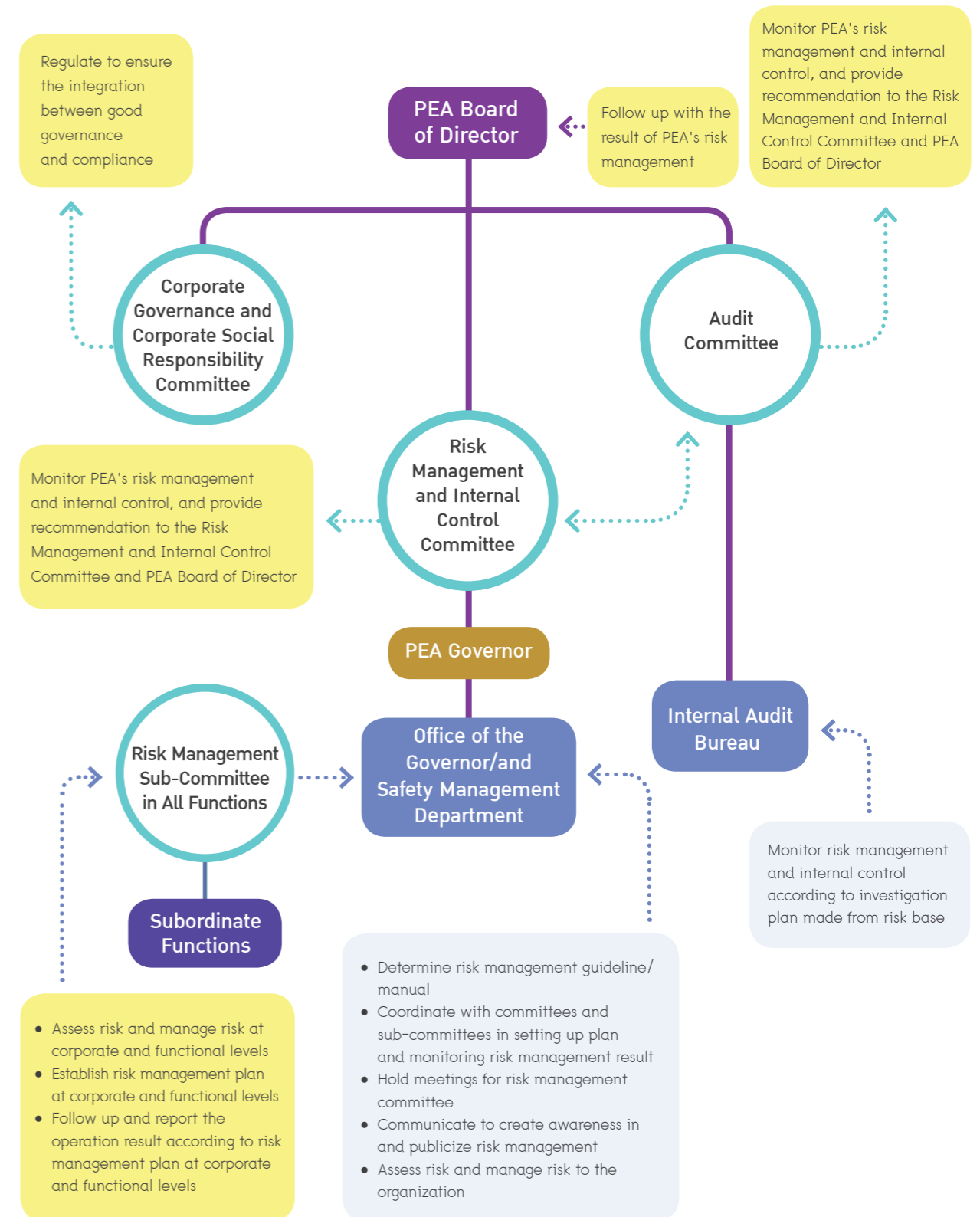


## Risk Managements and Strategic Challenges



PEA appointed Risk Management and Internal Control Committee to monitor, control, and apply risk management policy and framework to PEA's operation. Moreover, the committee also follow up the risk management and internal control processes to ensure that it is appropriate for important risk management and report the result to PEA's board of directors on quarterly basis<sup>[102-31]</sup>. The Risk and Safety Management Department is the main agency who monitor and coordinate with the Risk Management Sub-Committee in all functions, with Deputy Governors from all functions as chairman and risk owner to operate according to risk management policy and manual.

## Organization's Risk Management Structure <sup>[103-2]</sup>





## Trend and Direction on Business Change <sup>[102-15]</sup>



Currently, innovation and information technology, as well as customer demand for organization response via digital technology cause the rapid change in businesses and industries. Organizations need to adjust themselves in both product innovation and process innovation in order to support the policy driving. Moreover, this is to prepare the public sectors to become digital government according to digital government development plan, which results in efficient development and prompt respond to rapid change.

From the trend of change in industry's structure caused by technology advancement, consumers are likely to become prosumer and produce electricity

to trade with nearby agencies (peers-to-peers). Moreover, government's renewable energy and alternative energy development plan specifies target in producing electricity more from renewable energy. This will cause the decrease in PEA's power distribution unit in the near future.

The factors mentioned above are the real challenges for PEA, causing PEA to develop strategy together with risk evaluation processes. PEA focuses on adapting digital technology to be used in operation, customer service, and other innovation in order to develop operation process, and respond to stakeholder's expectation, as well as to prepare its personnel to be ready for the change.

PEA is aware of the change in economics, social, and environmental factors that might affect the organization sustainability. Moreover, the emerging of new technology that develop rapidly leads to severe change in energy business (Disruptive Innovation). It also acknowledges that the cost and energy price are two factors that determine the success in business operation.

Therefore, PEA focuses on corporate risk management by managing factors, and controlling activities and operation processes in order to prevent or alleviate the severity and reduce the causes that might damage the organization. This is to show that PEA would promptly adapt itself for the change and sustainable business operation. <sup>[103-1]</sup>

### Target <sup>[103-2]</sup>



- Decrease the chance and impact that might damage the organization.
- Create value added to the organization.

### Strategy <sup>[103-2]</sup>



- Manage the risk according to COSO ERM criteria to create balance and sustainable growth.
- Support the environment and culture that encourage continuous risk management throughout the organization.

### Management Approach <sup>[103-2]</sup>



- PEA applies COSO ERM standard, the State Enterprise Policy Office (SEPO) risk management guideline, and ISO 22301 standard to its risk management principle, and develop the operations in all levels of the organization. PEA sets risk management policy and internal control policy <sup>[102-16]</sup> as directions for committees, executives, and employees in all levels to follow.
- Communicate to make understanding and awareness for all employees to participate in risk management.

### Performance <sup>[103-3]</sup>



PEA manages various types of risks within organization according to COSO guideline, which covers strategic, operational, financial, and compliance risks. This enables PEA to assess and manage the risk appropriately and efficiently. The overall result of risk management shows that it can follow planned Risk Appetite and Risk Tolerance.



## Economic Risk Issue <sup>[102-15]</sup>

Risk Mitigation Measure <sup>[103-2]</sup>	2019 Outstanding Performance <sup>[103-3]</sup>	Improvement Plan for Future Operation <sup>[103-3]</sup>
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### Overall power losses management

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>• Have clear control plan for power losses issue for both Technical Loss and Non-Technical Loss.</li> <li>• Use U_CUBE program in analyzing target in meter investigation for small-scale electricity consumers, and use AMR Monitoring System in analyzing target in meter investigation for large-scale electricity consumers.</li> </ul> | <ul style="list-style-type: none"> <li>• Total power losses result was 5.37%, lower than Risk Tolerance (RT) at 0.09%.</li> </ul> | <ul style="list-style-type: none"> <li>• Sometimes, power losses issues occur because of error in reading power units. Currently, PEA started long-term project in installing electronic meter.</li> </ul> |
|--|---|--|

### Asset management for maximum benefit

- |   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li>• Set guideline for asset efficiency improvement for power distribution transformer.</li> <li>• Set predictive maintenance strategy for power transformer according to its condition.</li> </ul> | <ul style="list-style-type: none"> <li>• The ratio of return on assets (ROA) was 3.17%.</li> <li>• Success from following Asset Management Roadmap plan was 100%.</li> </ul> | <ul style="list-style-type: none"> <li>• Set up data of complete power system for the whole life cycle to use in managing asset efficiently.</li> </ul> |
|---|--|---|

## Social and Environmental Risk Issue <sup>[102-15]</sup>

Risk Mitigation Measure <sup>[103-2]</sup>	2019 Outstanding Performance <sup>[103-3]</sup>	Improvement Plan for Future Operation <sup>[103-3]</sup>
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### Digital technology application to strengthen organization potential

- |   |  |  |
|---|--|--|
| <ul style="list-style-type: none"> <li>• Create awareness and understanding to personnel in applying digital technology.</li> <li>• Integrate digital technology development process with operation process of related agencies.</li> </ul> | <ul style="list-style-type: none"> <li>• The process of applying digital technology to the operations could decrease operation expense and reduce work hours, or, in the other hand, could save the operation cost from 6 processes up to 40,124,760. Baht.</li> </ul> | <ul style="list-style-type: none"> <li>• To increase efficiency and create business opportunity, innovation and knowledge are required to apply to the organization. Therefore, it is necessary to develop knowledge management, innovation management, and continuously build on innovation.</li> </ul> |
|---|--|--|

## New Risk Issue <sup>[102-15]</sup>

Risk Mitigation Measure <sup>[103-2]</sup>	2019 Outstanding Performance <sup>[103-3]</sup>	Improvement Plan for Future Operation <sup>[103-3]</sup>
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### Cyber security

- |  |   |   |
|--|---|---|
| <ul style="list-style-type: none"> <li>• Set guideline, management structure, and monitoring process for PEA's concrete adjustment to Digital Utility.</li> <li>• Prepare for the international standard acknowledgement ISO/IEC 27001: 2013, and surveillance audit for head office and PEA area offices.</li> <li>• Set controlling measures for outside intrusions.</li> <li>• Coordinate, recommend, and provide preventive and corrective guidelines in case of information technology threat.</li> <li>• Appoint working group, set practice, and organize training for operation guideline according to ISO 27032 standard for relevant parties.</li> </ul> | <ul style="list-style-type: none"> <li>• Appointed committee on PEA adjustment to digital organization, and digital transformation executive was responsible for monitoring operation result regularly.</li> <li>• Bureau Veritus Certification (Thailand) Limited, an outside auditor, conducted surveillance audit on information technology security system of head office and 4 PEA area offices. PEA was certified on cyber security management system according to ISO/IEC 27001: 2013 international standard.</li> <li>• Conducted inspection for operation system vulnerability in 54 operation systems and inspect server vulnerability by using Nexpose Rapid7 twice and report the result to system developer to fix the program.</li> </ul> | <ul style="list-style-type: none"> <li>• Focus on creating cyber security and confidence in digital technology operation to all relevant stakeholders.</li> <li>• Promote and develop digital technology management according to international standard in operation, management, and service.</li> </ul> |
|--|---|---|

### Develop personnel's potential to accommodate digital business operation

- |  |  |   |
|--|--|---|
| <ul style="list-style-type: none"> <li>• Create personnel development plan for necessary positions that consistent with organization strategy.</li> <li>• Prepare personnel readiness analysis plan to support the business development direction and analyze future competency in order to determine organization competitive ability.</li> </ul> | <ul style="list-style-type: none"> <li>• Held a meeting for Digital Competency Model review that consistent with digital action plan and organization strategy.</li> <li>• Reviewed tools and templates for Digital Competency Based Development, as well as analyzed competency for target group according to Digital Competency Based Assessment Model. The result showed that there was the average of 77.6% of personnel with digital competency in the organization.</li> <li>• The result of satisfaction and commitment survey on high level executive roles was 4.16, higher than 4.11 in 2018.</li> </ul> | <ul style="list-style-type: none"> <li>• Speed up on the knowledge management operation and preparing for successors to be ready to further conduct business operation.</li> <li>• Develop various skills for personnel, such as business, marketing, business digital mindset, and digital technology.</li> <li>• Create organization culture that support PEA's transformation to digital utility.</li> </ul> |
|--|--|---|

## Business Continuity Management and Emergency Management [former EU21]

PEA manages business continuity and emergency according to ISO 22301 international standard to be prepared for disaster or emergency that might occur to operation systems and office sites. There are systematic analysis, planning, practice/testing, and process efficiency evaluation, as well as continuous process adjustment. This is to ensure that PEA is capable of efficient disaster or emergency response and can alleviate the impact from unexpected situation. PEA can prevent and be prepared to mitigate the impact and return to its normal operation within acceptable timeframe <sup>[103-1]</sup>.

### Target <sup>[103-2]</sup>



- Number of agencies with BCMS system according to ISO 22301 standard and ERP/BCP test plan.
- ERP/BCP test duration is according to the plan.
- Recovery time objective (RTO) is according to plan.

### Strategy <sup>[103-2]</sup>



- Operate and provide electric power service continuously.
- Quickly return to normal operation in case of emergency.

### Management Approach <sup>[103-2]</sup>



- PEA's business continuity management is as follow:
  - 1) **Prevention and preparedness.** All PEA agencies should analyze disaster or emergency data from the past until present and assess the chance of those incidents and its impacts. If the risk is medium to high, agencies should prepare Emergency Response Plan (ERP), and additional controlling measures to manage the risk and reduce the impact to acceptable level (low).
  - 2) **Crisis management.** All PEA agencies should prepare Business Continuity Plan (BCP) to recover the important operation process to its normal and uninterrupted stage within acceptable timeframe (Recovery Time Objective: RTO). **In case of severe incidents (including pandemic situation that could spread across borders) and widely affect electric power users,** PEA has set up administration center for unusual cases to operate according to ERP, CBP, and Business Resumption Procedure. It will notify relevant agencies to adjust their operation plans to be consistent with the situation, and monitor and analyze operation result, and continuously report to high-level executives.
  - 3) **Rehabilitation and reconstruction.** When the situation is back to normal, BCM working groups in each agency will consider the damage that occurred and set guidelines/procedures in rapidly restoring work sites or distribution systems to their normal conditions.

### 2019 Outstanding Performance <sup>[103-3]</sup>



- All agencies set BCMS system according to ISO 22301 standard and organized ERP/BCP tests.
- ERP/BCP tests duration was 240 minutes (as planned).
- Recovery Time Objective (RTO) was 60 minutes.
- Recovery Point Objective (RPO) of information technology system was 0 minute without data loss.

### Improvement Plan for Future Operation <sup>[103-3]</sup>



- Expand ISO 22301 standard certification to provincial regions.
- Improve Business Impact Analysis (BIA) process to set scope in ISO 22301 standard certification to cover electricity distribution service, which is PEA's main service.

## PEA's COVID-19 Response Measures



Not allowing the employees to attend training, seminars, or study trips in countries at risk, and not inviting personnel from overseas to Thailand.



Not organizing large gathering events, but conducting meetings through video conferencing instead.



Establishing a war room to handle extraordinary situations, having the PEA Governor as the director.



Requiring those returning from or visiting countries at risk to stop working for 14 days, which will not be counted as a leave of absence.



Establishing work-from-home guidelines.



Installing thermoscan thermometers at the head office entrances and exits, and implementing social distancing measures.



Creating and implementing an Emergency Response Plan (ERP) and a Business Continuity Plan (BCP) in response to the COVID-19 pandemic.





# Sustainable Development

**“PEA”** has upgraded our organization to become a modern utility service provider with digital technology and innovations. We have also continued to move towards excellence in our electric power system and to explore alternative electric power sources in order to meet the future demands and to play an integral part in driving the country’s economy.


# Stakeholder Engagement

PEA identified stakeholders through stakeholder mapping to select people with 3 major characteristics: expertise, willingness, and influence <sup>[102-42]</sup>. PEA stakeholders can be classified into regulatory agencies; employees and workers; suppliers; trading partners and collaborators; customers/users; communities, society, and environment <sup>[102-40]</sup>.

To enhance stakeholder engagement, PEA clearly determined responsible agencies, methods, frequency of implementation, and collection of major demands/expectations of the stakeholders both in organizational strategies or department work plans.

Stakeholder <sup>[102-40]</sup>	Guideline for stakeholder engagement and frequency <sup>[102-43]</sup>	Demand/expectation of stakeholder <sup>[102-44]</sup>	Operation in response to the demand/expectation of stakeholder	2019 major performance
 <p><b>Regulatory Agencies</b> <sup>[102-40]</sup></p>	<ul style="list-style-type: none"> <li>Interview (public) regulatory agencies, for example, the Ministry of Energy, Ministry of Finance, and Ministry of Interior.</li> <li>Survey the satisfaction of regulatory agencies.</li> </ul>	<ul style="list-style-type: none"> <li>Focus on providing power distribution services to people nationwide continually and inclusively.</li> <li>Focus on investments in infrastructure under joint integration of 3 electricity authority entities to reduce redundant and inconsistent investments.</li> <li>Determine indicators of operational efficiency, such as Return on Capital Employed (ROCE), which reflects investment spending efficiency, or Full Time Equivalent (FTE), which reflects employee's performance, etc.</li> <li>Focus on customers' changing needs and determine customer strategies, which are flexible and consistent with the changing technology and customer behavior, for instance, energy trade management, energy storage management, etc.</li> <li>Focus on cost accounting for non-regulated related business.</li> </ul>	<ul style="list-style-type: none"> <li>Prepare a work plan to upgrade response to stakeholder demands (public sector).</li> <li>Create a PEA strategic plan in response to energy development/promotion policies/strategies or plans of regulatory agencies.</li> </ul>	<ul style="list-style-type: none"> <li>The regulatory agencies' attitude and satisfaction score was at the highest level of 4.53 points, with an increase from 2018, where the satisfaction level was at 4.33 out of 5.</li> </ul>
 <p><b>Employees and Workers</b> <sup>[102-40]</sup></p>	<ul style="list-style-type: none"> <li>Organize meetings between executives and operators (through meetings, visits/activities).</li> <li>Communicate important information for executives' decisions.</li> <li>Communicate information via Line@PEAfriends.</li> <li>Broadcast "PEA Governor Meets Employees" Program.</li> <li>Publish operating performance through the organization's internal media.</li> <li>Organize meetings among high-level executives with each work function.</li> <li>Announce PEA Governor's management and development policy.</li> <li>Organize a seminar to explain the annual strategic plans by high-level executives.</li> <li>Organize meetings to introduce strategic plans/review action plans of each work function.</li> </ul>	<ul style="list-style-type: none"> <li>Executives' good visions and management</li> <li>Career advancement opportunities</li> <li>Good quality of life at work</li> <li>Satisfactory pay and welfare from PEA</li> </ul>	<ul style="list-style-type: none"> <li>Communicate management direction for the employees to be aware of changes and provide cooperation to develop the organization.</li> <li>Create a career development plan, and develop a promotion readiness screening and development system based on competence.</li> <li>Manage personnel perception of compensation.</li> <li>Develop the work environment to facilitate good hygiene, safety, and job happiness.</li> </ul>	<ul style="list-style-type: none"> <li>The overall employee satisfaction level was 4.40</li> <li>The average employee attachment was 4.51 out of 5; the average employee wellbeing was 4.43; the average employee pride of being part of the organization was 4.53; the average employee work dedication was 4.56</li> </ul>



Stakeholder <sup>[102-40]</sup>	Guideline for stakeholder engagement and frequency <sup>[102-43]</sup>	Demand/expectation of stakeholder <sup>[102-44]</sup>	Operation in response to the demand/expectation of stakeholder	2019 major performance
 <p><b>Suppliers, Trading Partners, and Collaborator</b> <sup>[102-40]</sup></p>	<ul style="list-style-type: none"> <li>Communicate important information for executives' decisions or which can impact the stakeholders and PEA.</li> <li>Communicate information through newsletters/journals/news and scoops on radio, television, newspapers, and magazines.</li> <li>Communicate information via Line Official Account.</li> <li>Organize joint activities with suppliers, trading partners, and collaborators.</li> <li>Organize public hearing to listen to opinions on PEA strategic plans.</li> </ul>	<ul style="list-style-type: none"> <li>Transparency in joint business operations.</li> <li>Compliance with agreed upon terms and conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Encourage executives and employees of all levels to perform work with transparency, equitability, and accountability, as well as be fair to both internal and external stakeholders.</li> <li>Ensure no collection, acceptance, or payment of any illegal benefits to suppliers, trading partners, and collaborators. In case there was information on collection, acceptance, or payment of any illegal benefits, it had to be disclosed to suppliers, trading partners, and collaborators to seek joint solutions in a fair and timely manner.</li> <li>Strictly follow the agreed upon conditions. In case of failures to follow any condition, notifications had to be made in advance to seek joint solutions.</li> </ul>	<ul style="list-style-type: none"> <li>The result of integrity and transparency assessment (ITA) by the Office of the National Anti-Corruption Commission for 2019 was 92.19% (A-Level Rating Score).</li> </ul>
 <p><b>Customers/ Users</b> <sup>[102-40]</sup></p>	<ul style="list-style-type: none"> <li>Communicate important information for executives' decisions or which can impact the stakeholders and PEA.</li> <li>Communicate information through newsletters/journals/news and scoops on radio, television, newspapers, and magazines.</li> <li>Communicate information via Line Official Account.</li> <li>Communicate information via Line@PEAfriends.</li> <li>Communicate information via PEA Smart Plus Application.</li> <li>Visit small power users/organize seminars among large power users to analyze complaints, behavior, demands/expectations.</li> <li>Organize public hearing to listen to opinions on PEA strategic plans.</li> <li>Survey customer satisfaction and loyalty.</li> </ul>	<ul style="list-style-type: none"> <li>Standard and safety electric power systems</li> <li>Sufficient and continuous electric power for consumption</li> <li>Convenient, fast, easy-to-access support services</li> <li>Transparent and fair services</li> </ul>	<ul style="list-style-type: none"> <li>Maintain electric power systems to be available for efficient use, reduce power losses, and safely fix power outages to resume power distribution according to the requirements.</li> <li>Facilitate fast access to services for the public, for example, electric power availability in remote communities, provision of services via mobile applications, which can support operating systems (smart phones), One Touch Service, etc.</li> <li>Consistently improve and maintain service quality, and provide fair services to all customers/users using the same standard.</li> </ul>	<ul style="list-style-type: none"> <li>The System Average Interruption Frequency Index (SAIFI) was 3.10 times/customer/year while the target was 3.17 times/customer/year.</li> <li>The System Average Interruption Duration Index (SAIDI) was 73.82 minutes/customer/year while the target was 75.78 minutes/customer/year.</li> <li>The distribution loss was 5.37% while the target was 5.20%.</li> <li>The satisfaction in PEA product quality was 4.50 while the target was 4.37.</li> <li>The PEA power system non-security score per account in 2019 was 0.0067, equivalent to Level 5.</li> </ul>
 <p><b>Communities, Society, and Environment</b> <sup>[102-40]</sup></p>	<ul style="list-style-type: none"> <li>Communicate important information for executives' decisions or which can impact the stakeholders and PEA.</li> <li>Communicate information through newsletters/journals/news and scoops on radio, television, newspapers, and magazines.</li> <li>Communicate information via Line Official Account.</li> <li>Communicate information via Line@PEAfriends.</li> <li>Communicate information via PEA Smart Plus Application.</li> <li>Organize public hearing to listen to opinions on demands/expectations of communities.</li> <li>Organize public hearing to listen to opinions on PEA strategic plans.</li> </ul>	<ul style="list-style-type: none"> <li>Safe electric power systems.</li> <li>No adverse impacts on communities, society, and environment from PEA operations.</li> <li>PEA's support for organizing sustainable social and environmental activities.</li> </ul>	<ul style="list-style-type: none"> <li>Regularly organize activities/promotion to pass on knowledge about safety in electric power use.</li> <li>Monitor the work on corporate social responsibility by high-level executives in accordance with the ISO 26000 standard, and encourage personnel of all levels to have knowledge and understanding about the principles and practice of corporate social responsibility (CRS in process) to tangibly and successfully reduce negative social impacts.</li> </ul>	<ul style="list-style-type: none"> <li>The stakeholder satisfaction in corporate social responsibility operations was 4.42 (high level) with a decrease of 0.08 points compared with 2018.</li> </ul>

**Remarks:** Different font colors represent different implementation frequencies

- Regularly/consistently/every month
- Quarterly
- Yearly

# Corporate Strategies

PEA reviewed the PEA Strategic Plan for 2014–2023 (fifth-time review in 2019) and set a 10-year long-term goal aimed at adjusting the business to a new landscape and transforming the organization into a digital utility covering all major areas, including distribution systems, creation of an appropriate business model, and operations based on the principles of good governance and responsibilities for communities, society, and environment. By doing this, it was expected that PEA would be able to continuously respond to the demands of its customers, be ready to support future operations, and become a leading electric utility business both at national and regional levels<sup>[103-1]</sup>.

PEA systematically determined its strategies by analyzing both internal and external sustainability-related factors in economic, social, and environmental dimensions. The strategies derived from this thorough analysis would then be introduced to personnel for practice, with the involvement of the board of directors and high-level executives in every process<sup>[103-2]</sup>.

Goal <sup>[103-2]</sup>	Related UN SDGs <sup>[103-2]</sup>	Strategy <sup>[103-2]</sup>	Operation Guidelines <sup>[103-2]</sup>	2019 Outstanding Performance <sup>[103-3]</sup>
<p><b>Business operations based on the principles of good governance for sustainable growth</b></p>		<ul style="list-style-type: none"> <li>Promoting sustainable growth of the organization based on the SDGs framework, and promoting good practice based on the DJSI framework.</li> <li>Placing great importance on and responding to the demands of stakeholders.</li> </ul>	<ul style="list-style-type: none"> <li>Steer and develop the organization towards sustainability, with an emphasis on analyzing and defining driving factors to determine work plans, as well as attaching great importance on good corporate governance based on the principles of good governance.</li> <li>Focus on and respond to the demands of stakeholders both inside and outside the organization.</li> <li>Encourage the efficient use of energy in response to the government policy to encourage service users or electricity users to increase efficiency of electrical use and save energy in all sectors.</li> </ul>	<ul style="list-style-type: none"> <li>The assessment score of ITA was 92.19 while the target was 80–100.</li> <li>The Disabling Injury Index <math>\sqrt{DI}</math> was 0.1200 while the target was 0.1029.</li> <li>The result of the survey on satisfaction in PEA operations in response to the expectations of the public sector, trading partners, employees, and customers was 4.44 while the target was 4.00.</li> <li>The number of accumulated electric power saving units (kWh) was 67.98 million while the target was 60 million units.</li> </ul>
<p><b>Determination to excel in electrical distribution by improving the efficiency of all operation systems</b></p>		<ul style="list-style-type: none"> <li>Being a leading operator of quality electricity distribution in the region.</li> <li>Asset management and establishment of financial stability.</li> <li>Organizational restructuring to enhance flexibility and consistency with the business needs through the cooperation from allied partners.</li> </ul>	<ul style="list-style-type: none"> <li>Increase efficiency and reliability of electrical distribution systems.</li> <li>Enhance the capacity of electrical distribution systems through smart grids.</li> <li>Increase asset management efficiency.</li> <li>Enhance operation process efficiency throughout the supply chain.</li> </ul>	<ul style="list-style-type: none"> <li>The System Average Interruption Frequency Index (SAIFI) was 3.10 times/customer/year, while the target was 3.17 times/customer/year.</li> <li>The System Average Interruption Duration Index (SAIDI) was 73.82 minutes/customer/year while the target was 75.78 minutes/customer/year.</li> <li>The percentage of loss was 5.37% while the target was 5.20%.</li> <li>The satisfaction in PEA's product quality was 4.50 while the target was 4.37.</li> <li>The success of the smart grid plan was 98%, while the target was 100%.</li> <li>The total Return on Assets (ROA) was 3.17%, while the target was 2.96%.</li> </ul>

Goal [103-2]

Determination to respond to the demands of all groups of customers

Adding business value of the organization to increase competitiveness

Modernizing the organization with human resources, digital technology, and innovations

Related UN SDGs [103-2]



Strategy [103-2]

- Building relationships with customers.
- Maintaining high-value customer bases.

- Seeking opportunities in investing in related businesses.

- Upgrading management and potential of human resources.
- Promote and develop capability with digital technology to efficiently steer the organization.
- Promoting security and stability of digital technology.
- Developing the Corporate Innovation System (CIS).

Operation Guidelines [103-2]

- Upgrade standards of products and services for customers by using digital technology to plan product and service development, improve work systems, and create new business opportunities.
- Build long-term relationships with customers and maintain key customers, including prosumers, who need to be equipped with specialized knowledge and skills, such as in generating and installing solar rooftops, etc.

- Promote investments and cooperation to develop related businesses.
- Enhance operating performance and create brand images of affiliated companies.
- Perform change management to reduce impacts, make adjustment, and build new potential in response to changes to meet the set target.
- Revise laws, rules, and regulations to support operations in related businesses, as well as monitor operations of the Company to ensure working synergy.

- Promote human resource management (HRM).
- Focus on human resource development (HRD).
- Develop digital technology capability for efficiency of spending management and operation process.
- Develop cyber security capability and digital technology management towards international standards.
- Develop innovation structures and processes to facilitate systematic organizational innovation management, coordination between organizations and supply chain.

2019 Outstanding Performance [103-3]

- The satisfaction level by customer group was 4.50 while the target was 4.37.
- The satisfaction level of key accounts and high-value customers was 4.47 while the target was 4.36.

- The success of the work plan for operating related businesses was 97% while the target was 100%.
- The revenue of related businesses was 6,282.65 million baht while the target was 6,406.25 million baht.

- The success of the work plan to upgrade human resource management was 100% while the target was 100%.
- A decrease in spending on improving operation process to 40.10 million baht, while the target was 16.50 million baht.
- The Consumer Price Index (CPI-X) was 28,093.35 million baht while the target was 28,440 million baht.



## Sustainability Management

Aiming to achieve its strategic goals for operating the business based on the principles of corporate governance to promote sustainable growth, PEA adopted the guidelines according to the ISO 26000 standards and Sustainable Development Goals (SDGs) for determining the corporate social responsibility policy to drive the organization towards sustainable development and creating the sustainability development master plan. In the process of master plan development, PEA focused on analyzing both internal and external relevant sustainability issues and allowed the stakeholders to express their opinions, which would be taken into consideration for determining sustainability development strategies as a guideline for operational staff practice, with the involvement of the board of directors and high-level executives in every process<sup>[103-2]</sup> according to the management structure.

## PEA Social and Environmental Responsibility Policy

The Provincial Electricity Authority (PEA) realized the significance of being a sustainable corporation that retained social and environmental responsibility while completing our missions. To comply with this ideology, PEA aims to improve its Corporation Social Responsibility (CSR) in alignment with the Sustainable Development Goals (SDGs), on the standard principles equivalent to the International Organization for Standardization or ISO 26000. The social and environmental responsibility policies include the following:



Develop the operational practices to match international standards in order bring economic prosperity to the country while abiding with good governance, human rights, labor practices, environment, fair practice code as well as community engagement and development;



Encourage building relationships and participation among network associates to develop the society and local communities in PEA service areas, using knowledge, experiences and special expertise as well as appropriate technology and innovation to improve quality of life and to ensure that the society and communities can independently progress in economic, social, and environmental aspects;



Inspire executives and employees of the organization to have the knowledge and understanding of society and environment responsibility (CSR in Mind) and capability of incorporating CSR in to their work process and daily life with the purpose of instilling values and building corporate culture to become a model organization;



Focus on engaging, preventing and reducing negative social and environmental effects, especially by reducing greenhouse gas emission, which is the primary cause of climate change and global warming;

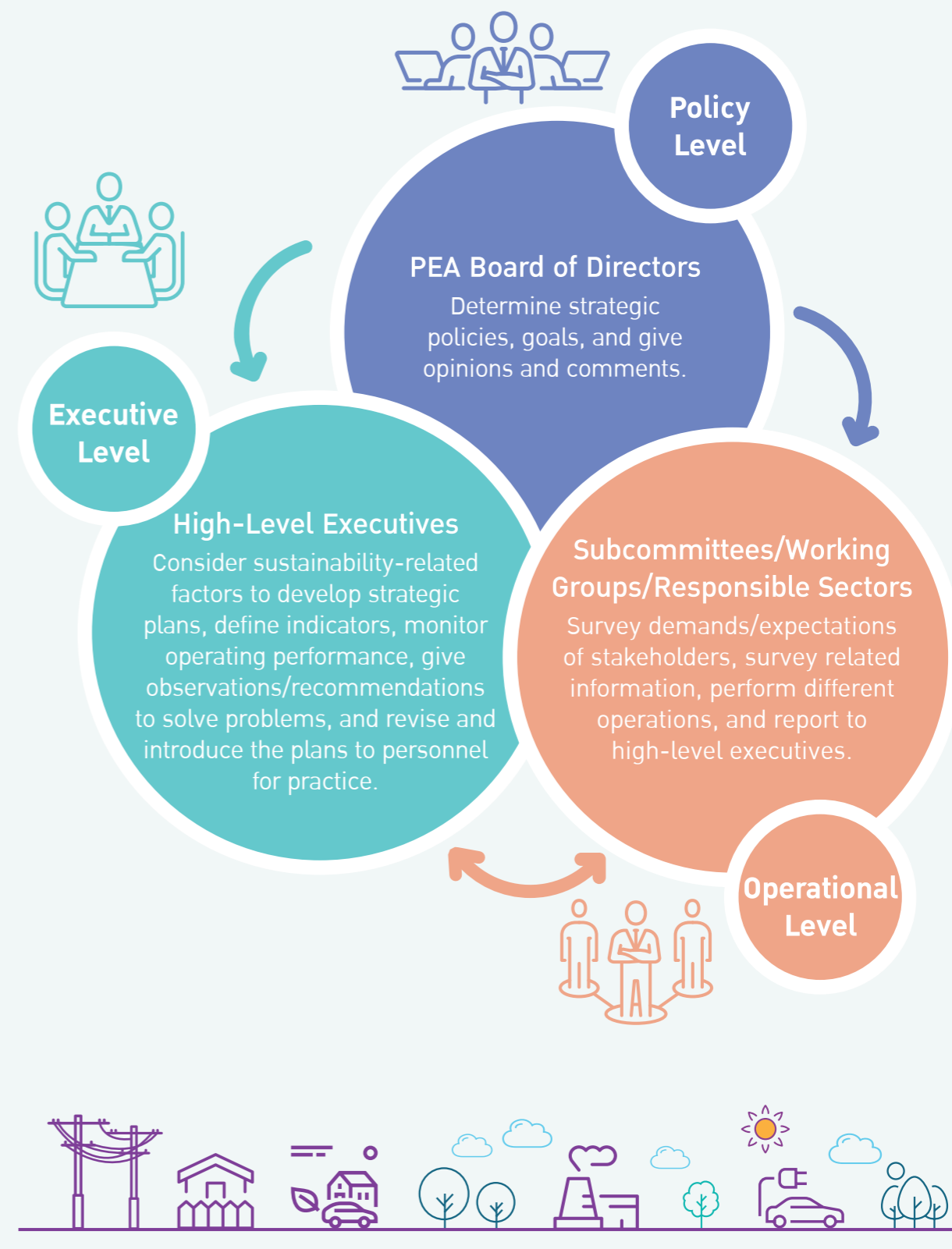


Modernize products, services, and operations in the supply chain through technology and innovation to comply with Thailand 4.0 policy while incorporating CSR in work process (CSR in Process) to promote effective and sustainable growth of the organization, whilst preserving energy, natural resources and the environment;



Enhancing CSR activities through Creating Shared Values (CSV) between PEA, stakeholders, and society in order to enable simultaneous and sustainable growth.

## Sustainability Management Structure [102-19] [102-26]



# Assessment of Material Sustainable Development Topics of PEA



## Identification of Sustainable Development Topics

PEA considered significant information from both internal and external factors, as well as the scope of both positive and negative impacts, which might have an influence on sustainability of the organization, and analyzed such significant information based on the stakeholder inclusiveness and sustainability context principles covering economic, social, and environmental dimensions as follows:

- **Significant information from internal factors:** Organizational goals and strategic plans, short-term and long-term business threats and opportunities.
- **Significant information from external factors:** Major or urgent demands/expectations of the stakeholders, National Economic and Social Development Plan, tendency of changes in the energy business, Sustainable Development Goals (SDGs), and the Dow Jones Sustainability Indices (DJSI).

### 01



## Prioritization of Sustainable Development Topics

PEA compared the derived sustainable development topics with the GRI topic-specific standard. After that, such topics were prioritized based on the materiality principle, which took into account organization's significant of economic, environmental, and social impacts (horizontal axis), and influence on the stakeholder assessment and decisions (vertical axis) through a workshop attended by relevant department representatives.

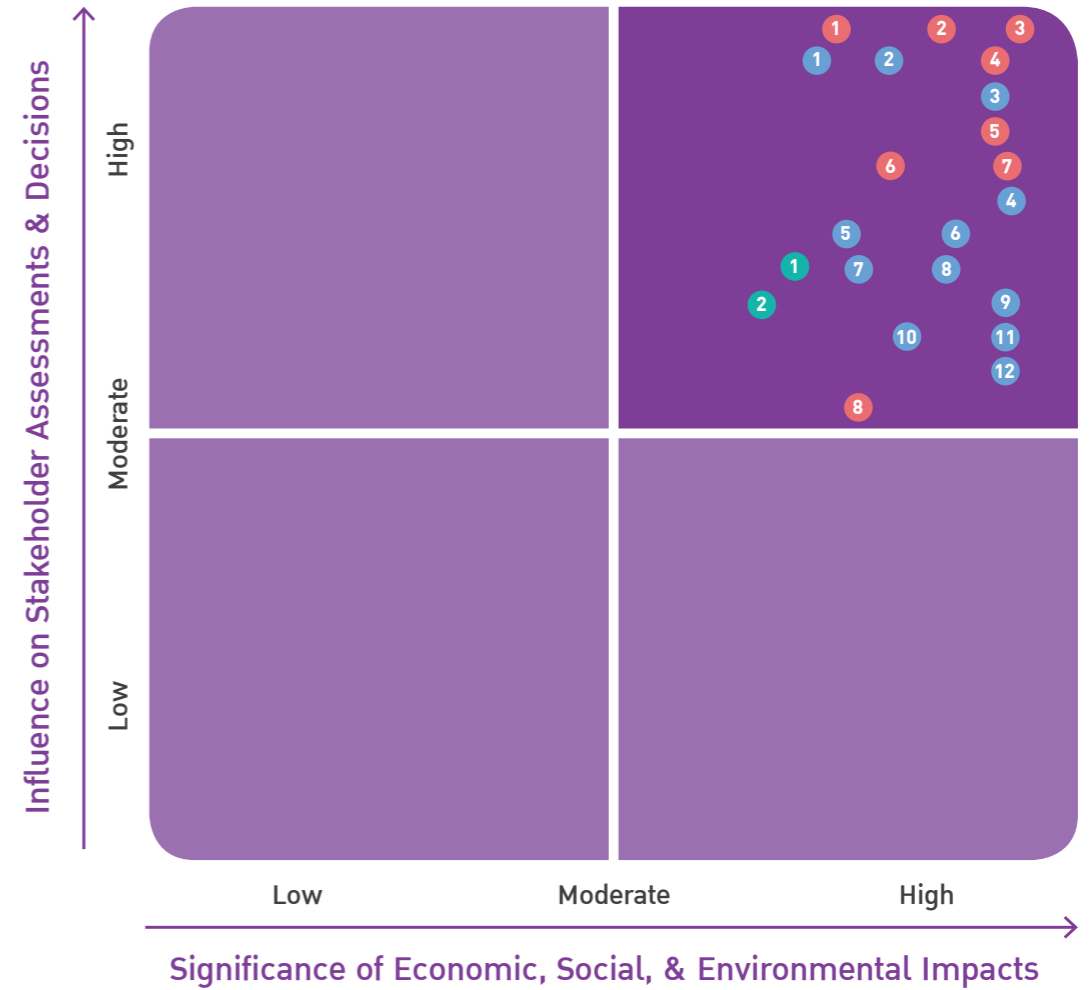
### 02



## Validation of PEA Material Sustainable Development Topics

The sustainable development topics derived from the prioritization were considered and approved by the Good Corporate Governance and Corporate Social Responsibility Committee <sup>[102-32]</sup> based on the completeness principle to ensure that they were correct, complete, and consistent with the demands/expectations of the internal and external stakeholders. Finally, 22 material sustainable development topics of PEA were obtained <sup>[102-49]</sup>.

### 03



### Performance <sup>(102-47)</sup>

- 1 Economic Performance
- 2 Indirect Economic Impacts
- 3 Anti-corruption
- 4 Procurement Practices
- 5 Demand-side Management
- 6 Availability and Reliability
- 7 System Efficiency
- 8 Research and Development

### People <sup>(102-47)</sup>

- 1 Employment
- 2 Occupational Health and Safety
- 3 Customer Health Safety
- 4 Training and Education
- 5 Local Communities
- 6 Disaster/Emergency Planning and Response
- 7 Provision of Information
- 8 Socioeconomic Compliance
- 9 Access
- 10 Cyber Security
- 11 Customer Privacy
- 12 Non-discrimination

### Planet <sup>(102-47)</sup>

- 1 Materials
- 2 Supplier Environmental Assessment

## PEA Sustainability Strategies <sup>(103-2)</sup>

With the goal of being a sustainable organization in mind, PEA was determined to drive the organization towards economic, social, and environmental balance, and take care of the stakeholders in line with PEA's vision

to become the leader in electric utility and relevant businesses to sustainably improve people's quality of life, economy, and society, and to build public confidence in PEA's excellent services under the CARE sustainable development strategies.



Focusing on maintaining stability and reliability in inclusive electric utility services for the public

Focusing on social improvement both inside and outside the organization, and developing communities and society towards a better quality of life

Focusing on developing the practice guidelines on sustainable development in order to ensure equal value proposition to all groups of stakeholders

Focusing on management of the main missions to promote resource conservation and reduction of environmental impacts

### Sustainable Development Issues <sup>(102-47)</sup>

- Anti-corruption
- Economic Performance
- Indirect Economic Impacts
- Procurement Practices
- Availability and Reliability
- Demand-side Management
- System Efficiency
- Research and Development

### Sustainable Development Issues <sup>(102-47)</sup>

- Socioeconomic Compliance
- Disaster/Emergency Planning and Response
- Employment
- Training and Education
- Occupational Health and Safety
- Customer Health Safety

### Sustainable Development Issues <sup>(102-47)</sup>

- Non-discrimination
- Access
- Provision of Information
- Cyber Security
- Customer Privacy
- Local Communities

### Sustainable Development Issues <sup>(102-47)</sup>

- Materials
- Supplier Environmental Assessment



## Performance

### Anti-corruption

#### Scope of Material Topic <sup>[102-46]</sup>

- Regulatory agencies
- Employees and workers
- Suppliers, trading partners, and collaborators
- Customers/users
- Communities, society, and environment



#### Management Approach <sup>[103-2]</sup>

- Promulgating the no gift policy to reject accepting gifts during New Year 2019.
- Promulgating the corporate governance policy and the transparency promotion and anti-corruption guidelines (7 measures 20 guidelines).
- Participating in "the Integrity and Transparency Assessment Project" run by the National Anti-Corruption Commission (NACC).
- Applying technology in the corporate governance information system (CG e-System).

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- The result of the Integrity and Transparency Assessment (ITA) by NACC in 2019 was **92.19 points**.
- The result of the assessment of awareness and application of corporate governance, ethics, integrity, and transparency in the work operation of executives and employees (CG Testing) was **90.85%**.
- **100%** of PEA directors, executives, and employees performed an annual assessment of conflicts of personal and PEA interests.
- **94.28%** of executives and employees signed to acknowledge and observe the Corporate Governance Handbook (CG acknowledgement).
- **6,474 executives and employees** participated in the activity to promote integrity and transparency in operations (soft control).



### Economic Performance

#### Scope of Material Topic <sup>[102-46]</sup>

- Regulatory agencies
- Employees and workers
- Communities, society, and environment



#### Management Approach <sup>[103-2]</sup>

- Managing assets and continuously following up the results.
- Developing the organization's database system for electric power systems.
- Investing in businesses through the operation mechanisms of PEA and affiliated companies.
- Promoting investments and cooperating with allies in operating relevant businesses.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- The organization was rated **AAA** by TRIS Rating
- The ratio of the return on assets (ROA) was **3.17**.
- The profit margin was **2.64**.
- Total asset turnover was **1.26**.
- The current ratio was **1.40**.



### Indirect Economic Impacts

#### Scope of Material Topic <sup>[102-46]</sup>

- Regulatory agencies
- Employees and workers
- Customers/users
- Communities, society, and environment



#### Management Approach <sup>[103-2]</sup>

- Investing in the Distribution System Extension for Agricultural Areas Project, 2<sup>nd</sup> Stage from 2008 onwards.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- **28,083 households** of farmers participated in the project.



### Procurement Practices

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers
- Suppliers, trading partners, and collaborators



#### Management Approach <sup>[103-2]</sup>

- Giving the first priority to procurement of supplies for electric power distribution from domestic manufacturers.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- **80.79%** of the procurement of major supplies came from domestic manufacturers.





## Performance

### Availability and Reliability

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers
- Customers/users
- Communities, society, and environment



#### Management Approach <sup>[103-2]</sup>

- Implementing the project to increase electric power system reliability, 3<sup>rd</sup> Stage.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- The success of the smart grid plan was **93.33%**.



### Demand-side Management

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers
- Customers/users
- Communities, society, and environment



#### Management Approach <sup>[103-2]</sup>

- Creating a plan to improve power transmission and distribution to be modern and be able to support the future electric power system technology.
- Improving electric power systems to support smart grids.
- Creating a work plan to promote efficient use of energy.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- The number of accumulated electric power saving units was **67.98 GWh (million units)** while the target was 60 GWh (million units).



### System Efficiency

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers
- Customers/users
- Communities, society, and environment



#### Management Approach <sup>[103-2]</sup>

- Creating a plan to improve power transmission and distribution to be modern and be able to support future electric power system technology.
- Improving electric power systems to support smart grids.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

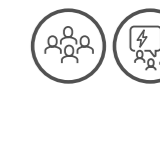
- The System Average Interruption Frequency Index (SAIFI) was **3.10 times/customer/year**.
- The System Average Interruption Duration Index (SAIDI) was **73.82 minutes/customer/year**.
- The System Average Interruption Frequency Index (SAIFI) was **1.036 times/customer/year** in 12 large cities.
- The distribution system loss was **5.37%**.



### Research and Development

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers
- Customers/users



#### Management Approach <sup>[103-2]</sup>

- Assessing the work to find out about business feasibility for future commercial benefits.
- Supporting budgets to research sectors both inside and outside the organization.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- The success of the corporate innovation system work plan was at **Level 3**.





## People

### Socioeconomic Compliance

#### Scope of Material Topic <sup>[102-46]</sup>

- Regulatory agencies
- Employees and workers
- Suppliers, trading partners, and collaborators
- Customers/users
- Communities, society, and environment



#### Management Approach <sup>[103-2]</sup>

- Promulgating the corporate governance policy and the transparency promotion and anti-corruption guidelines (7 measures 20 guidelines).
- Strictly observing the principles and guidelines according to the Corporate Governance Handbook, and codes of ethics.
- Monitoring the operational results according to the master plan and action plan on corporate governance and anti-corruption every quarter.
- Appointing a working group to be responsible for a compliance unit to monitor and analyze rules and regulations to ensure consistent operations between within and outside the organization.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- There was **0 case** of suits, fines, or other penalties against PEA.
- There was **0 dispute** requiring PEA to proceed with the dispute resolution mechanism, resulted from noncompliance with laws in economic and social dimensions.



### Disaster/Emergency Planning and Response

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers
- Customers/users
- Communities, society, and environment



#### Management Approach <sup>[103-2]</sup>

- Establishing additional control measures to enhance risk management and reduce threats at an acceptable level.
- Creating a Business Continuity Plan to restore the major work process to resume operations within a specific time.
- Determining guidelines/methods for restoring the workplace or damaged distribution systems to resume normal operations as soon as possible.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- **100%** of the organization established the Business Continuity Management System (BCMS) according to ISO 22301, and implemented an Emergency Response Plan/Business Continuity Plan (ERP/BCP).
- The period of ERP/BCP was **240 minutes**.
- The period of system restoration was **60 minutes**.
- The highest acceptable interruption period of the information technology system was **0 minute**.



### Employment

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers



#### Management Approach <sup>[103-2]</sup>

- Creating a clear career path-based succession plan.
- Performing management according to the principles of good governance, with an emphasis on the rule of law, integrity, transparency, participation, and responsibility.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- The satisfaction in the personnel recruitment and selection process was **4.65**.
- The employee turnover rate was **0.21**.
- The average employee commitment was **4.51**.
- The average employee well-being was **4.43**.
- The average sense of belonging was **4.53**.
- The average willingness to do the best for work was **4.56**.



### Non-discrimination

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers
- Customers/users



#### Management Approach <sup>[103-2]</sup>

- Giving a fair employment opportunity.
- Promotion based on qualifications.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- There was **0 complaint** of unfair treatment and discrimination in recruitment and selection of personnel.





## People

### Training and Education

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers



#### Management Approach <sup>[103-2]</sup>

- Determining clear competency by position
- Encouraging knowledge management throughout the organization.
- Assigning personnel of all levels to create an individual development plan (IDP).

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- There were **28,789 employees** receiving a functional competency assessment.
- **100%** of the employees received an assessment on performance and career development.



### Occupational Health and Safety

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers



#### Management Approach <sup>[103-2]</sup>

- Having a PEA Safety Management System (PEA-SMS), a system to monitor and audit performance according to Thai law and international framework, an occupational health and safety management system (TIS 18001/BS OHSAS 18001) and ISO 45001 for management.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- The Disabling Injury Index ( $\sqrt{DI}$ ) was **0.1200**.
- The number of fatalities caused by accidents declined from 2018.



### Access

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers
- Customers/users
- Communities, society, and environment



#### Management Approach <sup>[103-2]</sup>

- Implementing the New Rural Household Electrification Project and Remote Rural Household Electrification Project continually.
- Creating a renewable energy (RE) or micro-grid utilization plan for generating electricity for households in restricted areas or remote islands.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- Electrification was done for **137,232 new rural households**.
- Electrification was done for **12,465 remote rural households**.



### Provision of Information

#### Scope of Material Topic <sup>[102-46]</sup>

- Regulatory agencies
- Employees and workers
- Suppliers, trading partners, and collaborators
- Customers/users
- Communities, society, and environment



#### Management Approach <sup>[103-2]</sup>

- Increasing services of the 1129 PEA Call Center by adding languages like Burmese, Cambodian, and Malay.
- Publishing electric service information, such as request for meter installation, information on how to save electricity and how to use electricity safely, with 24 hours availability through various channels, such as PEA Smart Plus Application, Website www.pea.co.th, and social media.
- Improving the website format to support access of all types of users, as well as the visually impaired and the deaf to facilitate fair and inclusive access to information.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- The customer overall satisfaction in products and services was **4.4962 points**.





## People

### Customer Health and Safety

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers
- Customers/users



#### Management Approach <sup>[103-2]</sup>

- Assessing points at risk with the tendency to affect electric power users, which was found that the operations with high risks to the trading partners and electricity users were those close to the power lines.
- Requiring all electricity authorities to inspect the spacing between power lines and buildings or structures in accordance with the standards on safe spacing for construction of power lines, and requiring all electricity authorities to be strict and always inspect the electrical systems in their responsible areas.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- Power lines close to buildings or structures of **87 places** were fixed and improved.
- The impact from PEA electric power system insecurity on electric power users was **0.0067**.



### Cyber Security

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers
- Customers/users



#### Management Approach <sup>[103-2]</sup>

- Organizing the cyber security management structure both at the head office and PEA area offices.
- Establishing a log system and security information and event management (SIEM) system.
- Creating and publishing 3 sets of VDO clips under the theme "Ignoring" to educate employees and raise their awareness of information system security.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- **5 PEA sectors** were certified with ISO/IEC 27001.



### Customer Privacy

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers
- Customers/users



#### Management Approach <sup>[103-2]</sup>

- Carrying out operations under the Work Management and Public Services through Digital Systems Act, B.E. 2562 (2019), and the Personal Data Protection Act, B.E. 2562 (2019), and appointing a working group to provide information services and pilot management of data in the customer management and support system.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- There was **0 complaint** of customer privacy violation and loss of customer data.



### Local Communities

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers
- Communities, society, and environment



#### Management Approach <sup>[103-2]</sup>

- Promoting and developing stakeholder engagement with communities and giving knowledge and consultation to communities regarding utilization of alternative energy and enhancement of electric power system efficiency.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- **1,378 households** benefited from the Alternative Energy Promotion for Community Enterprises Project.
- **1,675 households** gained skill development for jobs from the 1 Tambon 1 Electric Technician Project.







## Planet

### Materials

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers
- Suppliers, trading partners, and collaborators
- Communities, society, and environment



#### Management Approach <sup>[103-2]</sup>

- Determining success factors to upgrade PEA eco-efficiency.
- Setting a 3-year intermediate-range guideline and work plan for assessing eco-efficiency (2019-2021) to minimize environmental impacts caused by consumption of resources or raw materials for production and services.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- PEA changed the method of sending electricity bills to electricity users via e-mail, so-called E-Tax system to reduce printing and sending electricity tax invoices to electricity users.



### Supplier Environmental Assessment

#### Scope of Material Topic <sup>[102-46]</sup>

- Employees and workers
- Suppliers, trading partners, and collaborators
- Communities, society, and environment



#### Management Approach <sup>[103-2]</sup>

- Determining the criteria for using price and other criteria in PEA procurement and setting products with "Green Label" certification or products from ISO 14001 certified factories as part of the performance criteria consideration.

#### 2019 Outstanding Performance <sup>[103-3]</sup>

- There were **26 new suppliers** selected based on the environmental criteria.





# Materiality Disclosures

**“PEA”** provides access to comprehensive services in order to spread happiness across the country. Not only do we unify the customer databases under the PEA DX direction, but we also deliver fast services to meet the demand of today's digital lifestyle. We are, therefore, proud to be able to improve the quality of life of people in the local communities and society.

# Performance



## Economic Performance

The rapid changing technology enables electric power users to become power producers for their own uses. This trend might affect PEA's power distribution which is its main source of revenue. In order to adjust itself to the change and maintain continuous business operation, PEA applies conservative financial policy and prepare itself to expand to new business outside its core business. PEA sets target to become service provider for digital utility services within the year 2022, to distribute economic values to all stakeholders and create sustainable values to community and society <sup>(103-1)</sup>.

### Target <sup>[103-2]</sup>



- Increase rate of return from operation.
- Decrease operating expense.

### Strategy <sup>[103-2]</sup>



- Increase efficiency of asset utilization and operating expense, by applying efficient asset management.
- Mitigate loss in electric power system.

## Management Approach <sup>[103-2]</sup>



- Created and operated according to Asset Management Roadmap, which clearly identified policy framework, objectives, strategies, and guidelines in corporate asset management operation, from acquiring process, application, maintenance, to distribution to keep the expenses in the appropriate level.
- Set assessment for corporate asset management to create the right solution for any asset management issue and invest in the revenue-generated asset for PEA.
- Developed corporate electric power database (IT/OT Integration) for management decision making, as well as application readiness assessment or asset health assessment in order to plan the appropriate maintenance system.
- Set policies for potential portfolio strategies investment and design in managing overall business investment through PEA's and affiliates' operations to create maximum value for the organization and sustainable business development.
- Promoted investment and created cooperation among partners in operating related businesses that benefits PEA.

## 2019 Outstanding Performance <sup>[103-3]</sup>



- Got corporate credit rating at AAA level with stable outlook from Tris Rating.
- The ratio of the return on assets (ROA) was 3.17.
- Profit margin was 2.64.
- Total asset turnover was 1.26.
- Current Ratio was 1.40.
- Due to process adjustment, operating expense reduced to 40.10 million baht.
- Loss percentage was 5.37.
- Revenue from related business was 6,282.65 million baht.

## Improvement Plan for Future Operation <sup>[103-3]</sup>



- Improve efficiency and capability in creating revenue from asset, by setting target to get certification on Asset Management Standard (ISO 55000) in year 2022.
- Integrate database and customer support system (Fully Completed CRM) to provide customer service, marketing, customer data analysis, and other services that respond to customer demand/expectation in the future, to create revenue for PEA.

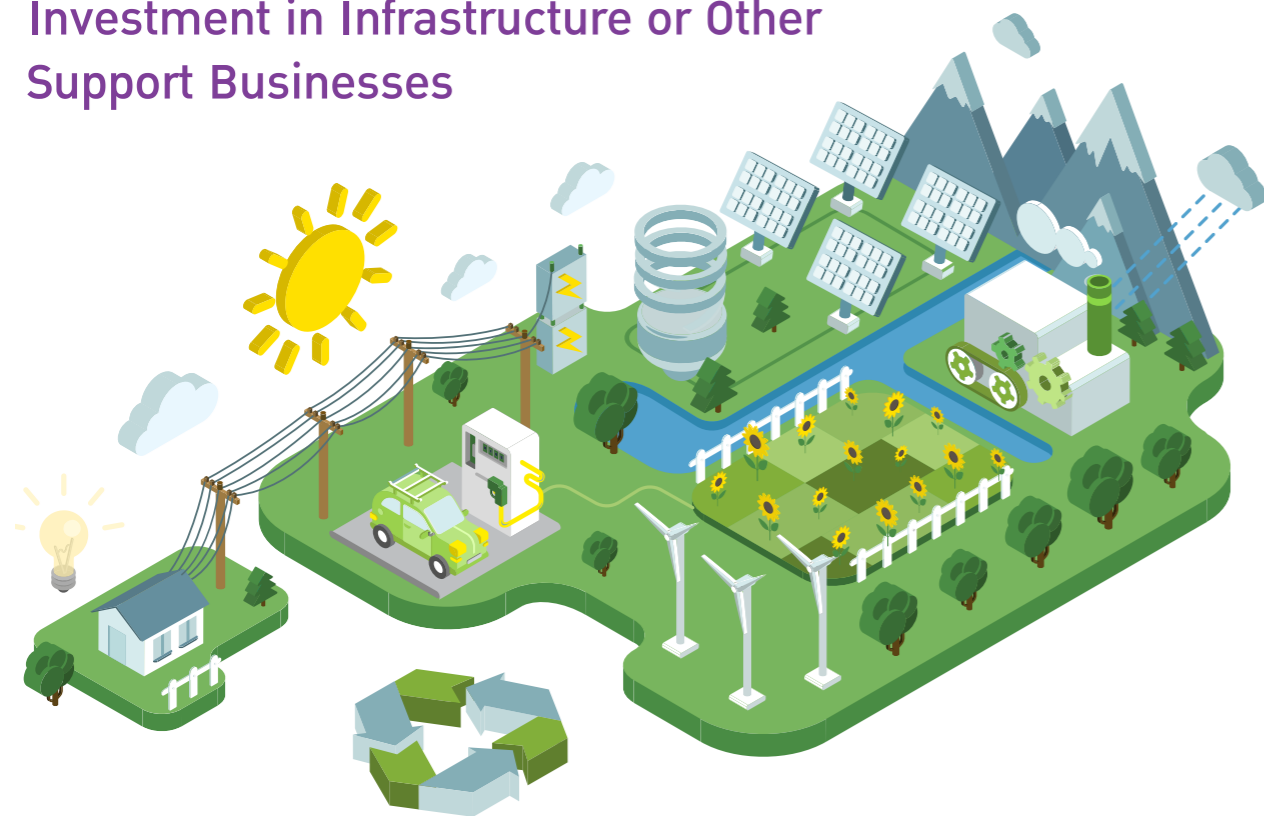
## Economic Value <sup>[102-7] [201-1]</sup>

Direct Economic Value Generated and Distributed

### (1) Direct Economic Value Generated

	2017 (Million Baht)	2018 (Million Baht)	2019 (Million Baht)
Revenues	482,963.42	499,253.86	519,767.94
<b>(2) Economic Value Distributed</b>			
Operating Costs	428,118.63	451,684.60	475,679.05
Employee Wages and Benefits	24,662.89	23,849.55	27,397.41
Payments to Providers of Capital	3,056.45	2,903.44	2,657.44
Payments to Government	13,857.00	13,350.00	10,803.35
Community Investment	294.54	262.09	739.36
<b>(1) - (2) Economic Value Retained</b>	<b>12,973.91</b>	<b>7,204.18</b>	<b>2,491.33</b>

## Investment in Infrastructure or Other Support Businesses



Besides PEA's core mission of investment in infrastructure to supply and provide electric power service, PEA expands its investment in infrastructure to support agricultural sector which is extremely important to Thai economy and society. The target is to reduce farmer's agricultural cost which tends to increase continuously, as well as support the access to agricultural input, which will result in increasing demand for electric power in rural area. This will result in sustainable economic and social development in the future <sup>(103-1)</sup>.

### Target <sup>[103-2]</sup>



- Decrease farmer's agricultural cost.
- Promote sufficiency economic development.
- Support access to agricultural input (water source) of farmers.

### Strategy <sup>[103-2]</sup>



- Provide electric power service to agricultural area, which supports farmers in doing agriculture.



### Management Approach <sup>[103-2]</sup>



- PEA operated project for "Distribution system extension for agricultural areas, 2<sup>nd</sup> stage" which promoted collaborative farming, supported agricultural input supply, as well as developed necessary infrastructure for agriculture which consistent with sustainable agriculture development concept under the 3<sup>rd</sup> strategy (Strategy for Strengthening the Economy, and Underpinning Sustainable Competitiveness) of The 12<sup>th</sup> National Economic and Social Development Plan (2017-2021). This project had operation budget of 1,655 million baht, for the duration of 5 years. It covered agricultural areas under the responsibility of 12 PEA area offices, with the estimation of 30,000 farmers participated in the project, and benefit areas of 293,547 rais <sup>[203-1] [203-2]</sup>.
- This project encouraged cooperation within communities. Its selection criteria for farmers who would like to participate in the project was clearly stated that farmers with adjoining areas or in the same areas had to collaborate with each other to send a request through local administrative organization for PEA to extend electricity to agricultural areas <sup>[203-1]</sup>.

### 2019 Outstanding Performance <sup>[103-3]</sup>



- PEA completed the extension of distribution system for agricultural areas for 28,083 households.
- Other benefits were <sup>[203-2]</sup>
  - Reduced expense and cost for farmers who used electric pump for agriculture instead of diesel or benzine engine.
  - Decreased workforce, installation time, and maintenance expense for diesel or benzine engine, resulted in more free time for farmers in caring for the agricultural produces.
  - Supported local production and employment in the areas that could do dry-season or off-season farming, which decreased workforce migration rate into the city area, increased the rate of community expansion and settlement in rural area. This resulted in more electric power demand in households, agriculture sector, and other businesses and services, which led to economic and social development in rural area.
  - Reduced noise pollution, air pollution, and pollution from oil slick and residual caused by diesel or benzine engine.

### Improvement Plan for Future Operation <sup>[103-3]</sup>



- PEA plans to extend the areas for "Distribution system extension for agricultural areas project, 2nd stage" by increasing participated farmers to 40,600 households within the year 2020, so that more farmers could benefit from farmland with electricity.





### Management Approach <sup>[103-2]</sup>



- PEA promoted domestic procurement of supplies by prescribing the condition to give priority to domestic manufacturers first, except for non-conforming supplies, such as those not meeting the Thai Industrial Standard (TIS), or no bidders for domestically manufactured supplies, in which case PEA would consider procurement from overseas manufacturers instead.

### 2019 Outstanding Performance <sup>[103-3]</sup>



- PEA procured major supplies from manufacturers in Thailand, including insulators, power transformers, meters, cables, drop-out fuse cutouts, ground wires, capacitors at the amount of 9,778.66 million baht, accounting for 80.79% of the 2019 procurement of major supplies <sup>[204-1]</sup>.

## Domestic Procurement Promotion

PEA placed great importance on distribution of revenues to the local communities by supporting operators manufacturing and distributing goods domestically in order to encourage Thai operators to improve the electric power industry products to meet the market demands in terms of quality and standard, which would generate revenues for local communities and lead to sustainable country development <sup>[103-1]</sup>.



### Target <sup>[103-2]</sup>



- Reducing procurement of supplies from overseas manufacturers.

### Strategy <sup>[103-2]</sup>



- Promoting procurement of supplies from domestic manufacturers.

### Improvement Plan for Future Operation <sup>[103-3]</sup>



- PEA planned to review the list of equipment and supplies significant to power distribution stability and to survey domestic manufacturers on a yearly basis so as to increase types of supplies (as current supplies significant to power distribution stability came from fewer than 3 domestic manufacturers), and to increase the number of domestic manufacturers continuously.

## Improving Electric Power System to be Excellent by Using Digital Technology <sup>[former EU6] [EU10] [EU12]</sup>



PEA focuses on continuous development of its regional-acknowledged distribution system standard, by developing Smart Grid using digital technology. It helps in supporting the efficient utilization of electric power, connecting all electric industry activities together, and supporting the changing structure of utility and industry in the future. The purpose of this development is to provide stable, safe, reliable, and sufficient electricity to present users and potential users in the future. The development of PEA's distribution system in 2019 was conducted according to electric power system development plan under the 12<sup>th</sup> National Economic and Social Development Plan (2017-2021) <sup>[103-1]</sup>.

### Target <sup>[103-2]</sup>

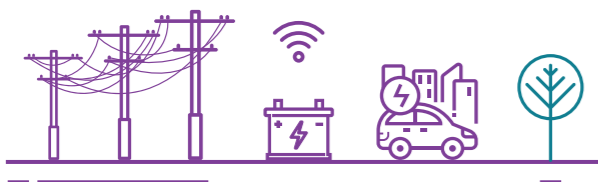


- Stable, safe, reliable electric power system.
- Quality and sufficient electric power system for the demand of present users and potential users in the future.
- Continuously distributed and efficient electric power system.

### Strategy <sup>[103-2]</sup>



- Increase efficiency and reliability of distribution system.
- Improve and connect distribution system in business area, industrial area, industrial estates, and other important areas to cope with the expansion of economic area and strategic area of the country.
- Develop Smart Grid infrastructure to support renewable energy and energy management technology that will happen in the future.
- Set policies/measures to mitigate stability impact and loss in distribution system.



### Management Approach <sup>[103-2]</sup>



- PEA operated "Distribution system reliability improvement project, 3<sup>rd</sup> stage" by installing higher quality and higher standard electrical equipment in business area, industrial area, industrial estates, and other important areas to increase stability and reliability of transmission and distribution system.
- Created Grid Impact Assessment & Grid Condition Code by studying and creating Grid Modernization of Transmission and Distribution plan to assess the impact on electric power system from the new technology and studied Grid Code from other countries and applied to PEA's system.
- Piloted the electric power system development plan for Smart Grid system in 3 areas as follow:
  - Smart grid development project in Pattaya, Chonburi Province
  - Micro grid development project at Mae Sariang District, Mae Hong Son Province
  - Installment plan for Micro Grid system in 3 Southern border Provinces, and 4 Districts in Songkhla Province. This was done by studying technology, as well as testing the design and application of Smart Grid in various aspects to support the development of Smart Grid in other areas in the future. This aimed to increase efficiency and stability of the distribution system, increase efficiency in connecting with the small power production source, and reduce problem and expense in the operation.
- The project on underground cable construction for big cities aimed to improve distribution system by changing from the electricity poles to using underground cable in big cities area. This was to increase electric power system stability, as well as to preserve environment and beautiful city landscape.
- The efficient use of electric power plan focused on promoting all parties, both internal and external, to utilize electric power more efficiently.

### 2019 Outstanding Performance <sup>[103-3]</sup>



- System Average Interruption Frequency Index (SAIFI) was 3.10 times/customer/year, from the target of 3.17 times/customer/year.
- System Average Interruption Duration Index (SAIDI) was 73.82 minutes/customer/year, from the target of 75.78 minutes/customer/year.
- System Average Interruption Frequency Index (SAIFI) in 12 major cities was 1.036 times/customer/year, from the target of 1.174 times/customer/year.
- System Average Interruption Duration Index (SAIDI) in 12 major cities was 13.364 minutes/customer/year, from the target of 14.853 minutes/customer/year.
- Percentage of loss in distribution system was 5.37%.
- The success of Smart Grid project was 98%.
- PEA supported efficient electric power utilization in all organizations, which resulted in energy saving accumulated to 67.98 GWh (million units) from the target of 60 GWh (million units).

### Improvement Plan for Future Operation <sup>[103-3]</sup>



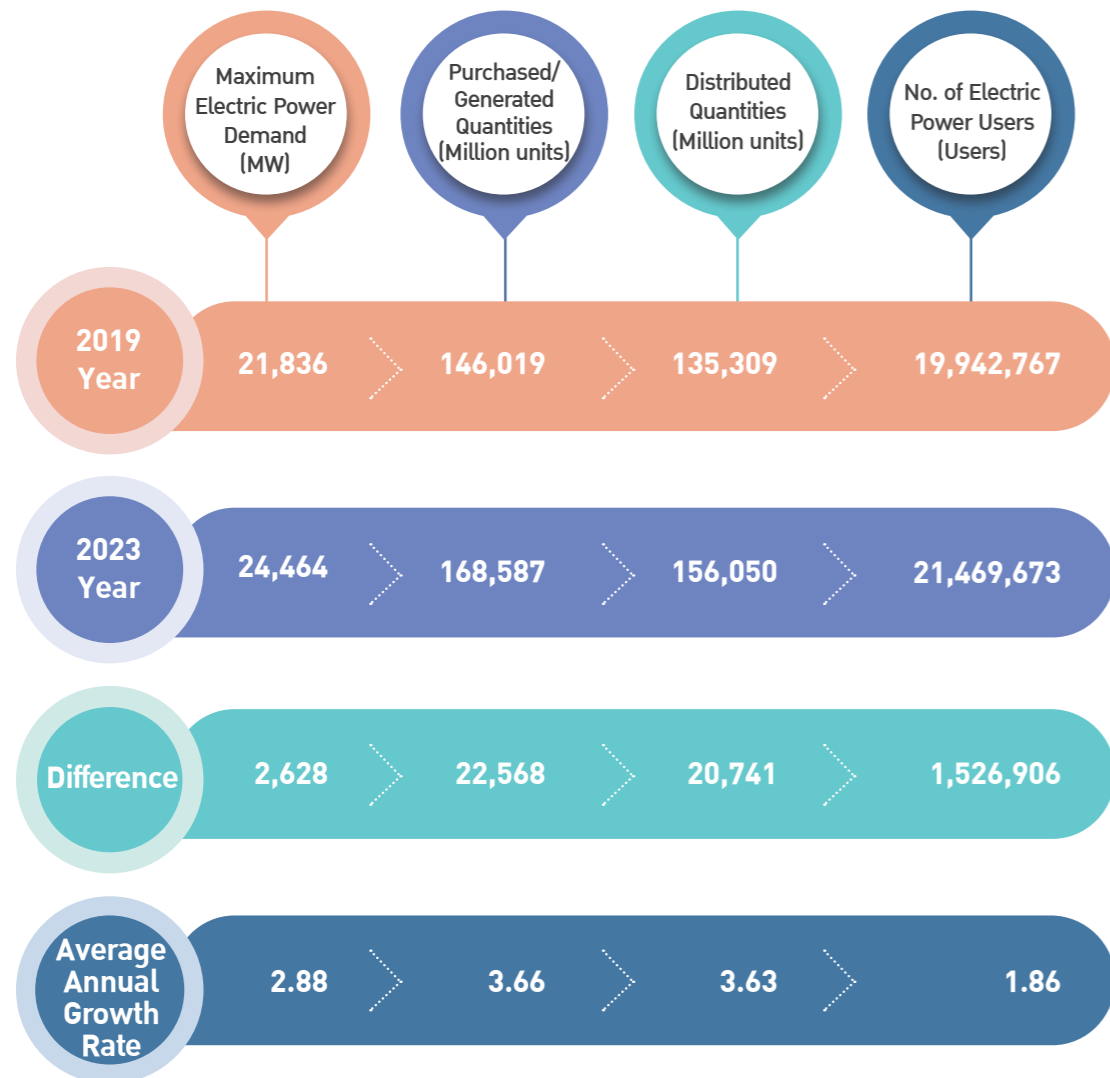
- Plan for Grid Modernization of Transmission and Distribution system to support future electric power system technology.
- Prepare long-term plan for underground cable construction in 2019-2022, to increase electric power system stability.
- Prepare the plan for promoting efficient use of electric power by targeting the accumulated electric power save at 80 GWh (million units) within the year 2020.



### Samples of investment plans that consistent with the National Development Plan. These plans take into consideration the continuous demand for electricity in the future and financial status of PEA [former EU6]

Ongoing Projects	Objectives	Operation Details	Investment Budget (Million Baht)	Targets	Operation Results
Transmission and Distribution System Development Project, 1 <sup>st</sup> Stage	<ul style="list-style-type: none"> <li>To develop electric power system to efficiently distribute power supply and serve increasing demand.</li> </ul>	<ul style="list-style-type: none"> <li>Construct transmission lines system</li> <li>Construct loop lines</li> <li>Construct 22 kV high-voltage distribution system</li> <li>Construct 33 kV high-voltage distribution system</li> <li>Construct low-voltage distribution system</li> </ul>	62,678.71	<ul style="list-style-type: none"> <li>PEA operates in 4 regions, each region divides into 3 area offices, with the total of 12 PEA area offices. Each PEA area office has its PEA province offices under its responsibility.</li> </ul>	<ul style="list-style-type: none"> <li>Construct 115 kV transmission lines system for 1,309 circuit-kilometers.</li> <li>Construct loop lines for 289 circuit-kilometers.</li> <li>Construct 22 kV high-voltage distribution system for 16,067 circuit-kilometers.</li> <li>Construct 33 kV high-voltage distribution system for 4,565 circuit-kilometers.</li> <li>Construct low-voltage distribution system for 12,134 circuit-kilometers.</li> </ul>
Micro Grid System Development Contract at Betong, Yala Province	<ol style="list-style-type: none"> <li>Improve electric power generation and distribution system in the area to be efficient, stable, and reliable. Decrease power interruption problem to support model cities link development plan (Economic growth triangle project).</li> <li>Promote power generation by using renewable energy, to create efficient renewable energy distribution which is correspond to the government's Economic growth triangle policy.</li> </ol>	<p>Operating area: Betong District, Yala Province Amount of work:</p> <ol style="list-style-type: none"> <li>Install 1 micro grid control system.</li> <li>Install a battery energy storage system (4MW/4MWh).</li> <li>Install a switch in distribution system.</li> <li>Install and improve a protective relay system.</li> <li>Install a communication system (Fiber Optic)</li> <li>Install a solar energy power generation source (20kW)</li> <li>Install a data link system</li> </ol>	390.00	<ol style="list-style-type: none"> <li>This project corresponded to national energy stability plan, benefited people's way of life, and brought security for people's assets.</li> <li>Efficient, stable, and reliable electric power generation and distribution systems, which help reduce power interruption problem, and increase customers' satisfaction level in quality and service.</li> <li>Promoted electric power generation by using renewable energy, supported power distributed by renewable energy to be more efficient, reduced greenhouse gas emission and its impact on environment.</li> <li>Lessened operation and maintenance problems, mitigated loss in transmission and distribution system.</li> <li>Developed and improved electric power system in the area by using Micro Grid that could be technologically upgraded to Smart Grid at Betong District, Yala Province.</li> </ol>	<ul style="list-style-type: none"> <li>Appoint committee to draft scope or detailed qualification and set reference price for Micro Grid System Development Contract at Betong District, Yala Province.</li> <li>Deputy governor on electric power system planning and development approved on 13<sup>th</sup> December 2019 about the change in Micro Grid employment contract at Betong District, Yala Province.</li> </ul>
Total budget for ongoing projects			63,068.71 Million Baht		
Planned Initiatives in the Next 3 Years	Objectives	Operation Details	Investment Budget (Million Baht)	Targets	Operation Results
Transmission and Distribution System Development Project, 2 <sup>nd</sup> Stage	<ul style="list-style-type: none"> <li>To develop electric power system to efficiently distribute power supply and serve increasing demand.</li> </ul>	<ul style="list-style-type: none"> <li>Construct transmission lines system</li> <li>Construct loop lines</li> <li>Construct 22 kV high-voltage distribution system</li> <li>Construct 33 kV high-voltage distribution system</li> <li>Construct low-voltage distribution system</li> </ul>	77,334.00	<ul style="list-style-type: none"> <li>PEA operates in 4 regions, each region divides into 3 area offices, with the total of 12 PEA area offices. Each PEA area office has its PEA province offices under its responsibility.</li> </ul>	<ul style="list-style-type: none"> <li>Proposing to the cabinet for approval</li> </ul>
Micro Grid Development Project at Paluay Island, Suratthani Province	<ol style="list-style-type: none"> <li>To be able to distribute electric power to people on Paluay island, who had no electricity.</li> <li>Efficiently manage the electric power system.</li> <li>Encourage electricity generation that use renewable energy and energy storage system.</li> <li>Reduce diesel utilization in generating electricity</li> </ol>	<p>Operating area: Paluay Island, Suratthani Province Amount of work:</p> <ol style="list-style-type: none"> <li>1,000 kWp Solar energy</li> <li>600 kW Diesel power generation system</li> <li>500 kW/1,500 kWh Energy storage system</li> <li>Control building with Micro Grid system installed</li> <li>Micro Grid control system</li> <li>Install circuit breaker and communication system in distribution system.                             <ul style="list-style-type: none"> <li>high-voltage (50 SAC) 3.7 circuit-kilometers</li> <li>low-voltage (50 AW) 2.5 circuit-kilometers</li> </ul> </li> <li>400 kVA distribution transformer</li> </ol>	172.00	<ul style="list-style-type: none"> <li>To increase stability on island, reduce power generation that use diesel engine, and support economic expansion.</li> </ul>	<ul style="list-style-type: none"> <li>PEA committee approved the Micro Grid project at Paluay Island, Suratthani Province on 27<sup>th</sup> February 2019.</li> </ul>
Total budget for planned initiatives in the next 3 years			77,506.00 Million Baht		

## Demand Forecast for Electric Power [EU10]



## Electric Power Users Number Forecast, Categorized by User Types [EU10]

User Type	Existing Values		Forecasted Values (Users)		
	2019	2020	2021	2022	2023
Residences	17,816,406 Increase/(Decrease) Percentage: 2.10	18,146,554 Increase/(Decrease) Percentage: 1.85	18,486,282 Increase/(Decrease) Percentage: 1.87	18,826,463 Increase/(Decrease) Percentage: 1.84	19,173,787 Increase/(Decrease) Percentage: 1.84
Small Businesses	1,665,138 Increase/(Decrease) Percentage: 1.57	1,685,770 Increase/(Decrease) Percentage: 1.24	1,703,442 Increase/(Decrease) Percentage: 1.05	1,730,915 Increase/(Decrease) Percentage: 1.61	1,756,094 Increase/(Decrease) Percentage: 1.45
Medium Businesses	80,928 Increase/(Decrease) Percentage: 4.71	83,413 Increase/(Decrease) Percentage: 3.07	85,634 Increase/(Decrease) Percentage: 2.66	87,908 Increase/(Decrease) Percentage: 2.66	90,255 Increase/(Decrease) Percentage: 2.67
Large Businesses	7,142 Increase/(Decrease) Percentage: 3.54	7,328 Increase/(Decrease) Percentage: 2.61	7,518 Increase/(Decrease) Percentage: 2.60	7,693 Increase/(Decrease) Percentage: 2.33	7,853 Increase/(Decrease) Percentage: 2.08
Specific Businesses	14,152 Increase/(Decrease) Percentage: 9.74	14,301 Increase/(Decrease) Percentage: 1.05	14,674 Increase/(Decrease) Percentage: 2.61	15,210 Increase/(Decrease) Percentage: 3.65	15,789 Increase/(Decrease) Percentage: 3.80
Non-Profit Organizations	1,076 Increase/(Decrease) Percentage: -4.86	1,097 Increase/(Decrease) Percentage: 1.98	1,148 Increase/(Decrease) Percentage: 4.58	1,203 Increase/(Decrease) Percentage: 4.86	1,262 Increase/(Decrease) Percentage: 4.88
Water Pumps for Agriculture	5,879 Increase/(Decrease) Percentage: 7.20	5,916 Increase/(Decrease) Percentage: 0.63	6,042 Increase/(Decrease) Percentage: 2.12	6,562 Increase/(Decrease) Percentage: 8.62	7,024 Increase/(Decrease) Percentage: 7.04
Temporary Electric Power	352,046 Increase/(Decrease) Percentage: 6.07	366,692 Increase/(Decrease) Percentage: 4.16	379,749 Increase/(Decrease) Percentage: 3.56	397,897 Increase/(Decrease) Percentage: 4.78	417,610 Increase/(Decrease) Percentage: 4.95
<b>Total</b>	<b>19,942,767</b> Increase/(Decrease) Percentage: 2.14	<b>20,311,071</b> Increase/(Decrease) Percentage: 1.85	<b>20,684,488</b> Increase/(Decrease) Percentage: 1.84	<b>21,073,852</b> Increase/(Decrease) Percentage: 1.88	<b>21,469,673</b> Increase/(Decrease) Percentage: 1.88

Remark: The forecast of all electric power users does not include free user types such as street and public lights.



### Power Units Sold Forecast, Categorized by User Type <sup>[EU10]</sup>

	Existing Values		Forecasted Values (GWh)		
	2019	2020	2021	2022	2023
<b>Residences</b>	34,906 Increase/(Decrease) Percentage 8.81	36,597 Increase/(Decrease) Percentage 4.85	38,110 Increase/(Decrease) Percentage 4.13	39,722 Increase/(Decrease) Percentage 4.23	41,401 Increase/(Decrease) Percentage 4.23
<b>Small Businesses</b>	14,075 Increase/(Decrease) Percentage 5.45	14,591 Increase/(Decrease) Percentage 3.67	15,190 Increase/(Decrease) Percentage 4.11	15,813 Increase/(Decrease) Percentage 4.10	16,459 Increase/(Decrease) Percentage 4.09
<b>Medium Businesses</b>	22,409 Increase/(Decrease) Percentage 3.00	23,427 Increase/(Decrease) Percentage 4.54	24,221 Increase/(Decrease) Percentage 3.39	25,047 Increase/(Decrease) Percentage 3.41	25,889 Increase/(Decrease) Percentage 3.36
<b>Large Businesses</b>	57,867 Increase/(Decrease) Percentage -2.03	60,492 Increase/(Decrease) Percentage 4.54	61,880 Increase/(Decrease) Percentage 2.29	63,476 Increase/(Decrease) Percentage 2.58	65,013 Increase/(Decrease) Percentage 2.42
<b>Specific Businesses</b>	4,533 Increase/(Decrease) Percentage 5.19	4,787 Increase/(Decrease) Percentage 5.61	5,020 Increase/(Decrease) Percentage 4.87	5,264 Increase/(Decrease) Percentage 4.85	5,517 Increase/(Decrease) Percentage 4.81
<b>Non-Profit Organizations</b>	77 Increase/(Decrease) Percentage 8.35	77 Increase/(Decrease) Percentage 0.05	79 Increase/(Decrease) Percentage 3.21	82 Increase/(Decrease) Percentage 3.24	84 Increase/(Decrease) Percentage 3.27
<b>Water Pumps for Agriculture</b>	468 Increase/(Decrease) Percentage 28.17	483 Increase/(Decrease) Percentage 3.30	547 Increase/(Decrease) Percentage 13.21	605 Increase/(Decrease) Percentage 10.51	663 Increase/(Decrease) Percentage 9.67
<b>Temporary Electric Power</b>	976 Increase/(Decrease) Percentage 3.63	994 Increase/(Decrease) Percentage 1.87	1,003 Increase/(Decrease) Percentage 0.93	1,013 Increase/(Decrease) Percentage 0.98	1,024 Increase/(Decrease) Percentage 1.01
<b>Total (Excluded free electric power use)</b>	135,309 Increase/(Decrease) Percentage 2.56	141,448 Increase/(Decrease) Percentage 4.54	146,050 Increase/(Decrease) Percentage 3.25	151,022 Increase/(Decrease) Percentage 3.40	156,050 Increase/(Decrease) Percentage 3.33
<b>Free Electric Power</b>	2,869 Increase/(Decrease) Percentage 4.75	3,039 Increase/(Decrease) Percentage 5.90	3,188 Increase/(Decrease) Percentage 4.90	3,337 Increase/(Decrease) Percentage 4.68	3,486 Increase/(Decrease) Percentage 4.47

### Purchased Units Forecast <sup>[EU10]</sup>

	Existing Values		Forecasted Values		
	2019	2020	2021	2022	2023
<b>Purchased Quantities from EGAT</b>					
Electric Energy (GWh)	134,605	139,057	142,608	146,679	151,024
Maximum Electric Power (MW)	20,952	21,249	21,855	22,531	23,246
<b>Purchased Quantities from Department of Alternative Energy Development and Efficiency</b>					
Electric Energy (GWh)	73	108	108	108	108
Maximum Electric Power (MW)	5	12	12	12	12
<b>Quantities Generated by PEA</b>					
Electric Energy (GWh)	85	105	105	105	105
Maximum Electric Power (MW)	6	12	12	12	12
<b>Purchased Quantities from VSPPs</b>					
Electric Energy (GWh)	11,256	10,839	11,146	11,299	11,378
Maximum Electric Power (MW)	872	836	874	891	900
<b>Total</b>					
Electric Energy (GWh)	146,019	150,109	153,967	158,190	162,614
Increase/(Decrease) Percentage	2.62	2.51	2.57	2.74	2.80
Maximum Electric Power (MW)	21,836	22,110	22,753	23,446	24,170
Increase/(Decrease) Percentage	7.68	1.47	2.91	3.05	3.09

### PEA Power Losses <sup>[EU12]</sup>

	Percentage of Power Losses in the Transmission and Distribution Systems			
	2016	2017	2018	2019
<b>Power Loss</b>				
Total Target Loss	5.36	5.40	5.18	5.20
Total Loss	5.40	5.12	5.36	5.37

## Demand-Side Management [former EU7]

Approach/Measure on DSM (Demand Side Management)	Target Groups Operated in 2019	Technology/Improvement Guideline	Verification Method	Result in 2019 (GWh)
Counseling services for power management in business and industrial sectors	Phitsanulok Vareethep Co., Ltd.	1. Selected high-efficiency ice maker first. 2. Adjusted belt tension of machine's motor.	IPMVP Option B	0.339
	Kampai Ice Co., Ltd.			0.070
	Thavee Wattana Top Ice Co., Ltd.			0.073
	Nam Yom Limited Partnership	1. Decrease water temperature before entering tube ice maker machine 2. Adjusted belt tension of machine's motor	IPMVP Option B	0.022
	Saithip Spareparts Co., Ltd.	1. Cancelled the use of low-efficiency air compressor 2. Set strict standard for using air conduit to blow the smoke 3. Reduced the temperature before entering air compressor 4. Turned off the air compressor during lunch break and shift break at night	IPMVP Option A	0.297
	Siam Makro Public Co., Ltd., Hua Taley Branch	Variable speed drive (VSD) usage measure for water cooled chiller system	IPMVP Option A	0.209
	Siam Global House Public Co., Ltd., Chokchai Branch	Changed air curtain connecting warehouse door with shops	IPMVP Option D	0.124
	Boonchuay Industrial Co., Ltd.	Adjust compressed air supply hose to use screw air compressor instead of piston air compressor	IPMVP Option B	0.072
	Capital Tricot Co., Ltd.	1. Installed utilization management system for all 3 chillers 2. Adjusted compressed air supply hose to use piston air compressor as a supplement to screw air compressor	IPMVP Option B	0.221
	Panjawattana Plastic Public Co., Ltd.	Reduced pressure of produced compressed air and improved compressed air system	IPMVP Option B	0.224
T.A.K. Packaging Co., Ltd.	Improved air compressor by installing Variable Speed Drive (VSD)	IPMVP Option B	0.342	
TPBI Public Co., Ltd.	1. Installed Variable Speed Drive (VSD) to reduce the amount of cool water at chiller's water pump 2. Improved air compressor by installing Variable Speed Drive (VSD)	IPMVP Option B	0.166	

Approach/Measure on DSM (Demand Side Management)	Target Groups Operated in 2019	Technology/Improvement Guideline	Verification Method	Result in 2019 (GWh)
	The Rain Tree Hotel Co., Ltd.	1. Increased cool water set point of chiller 2. Reduced the utilization of cool water pump	IPMVP Option A	0.376
<b>Total</b>				<b>2.535</b>
Government sector's energy conservation promotion	Energy saving management project in Ramkhamhaeng University, phase 3	Changed to high-efficiency water cooled chiller system for 15 units	IPMVP Option B	- Under the processing of TOR and referenced price setting
	Energy saving management project in Walailak University	1. Changed to LED bulbs 2. Changed to split type air conditioning	IPMVP Option A and B	1.429
	Energy saving management project in Business Organization of the Office of The Welfare Promotion Commission for Teachers and Educational Personnel	Changed to split type air conditioning for 649 units	IPMVP Option B	2.030
	Energy efficiency enhancement project in Khon Kaen University (Funded by Energy Conservation Fund)	1. Changed to high-efficiency chiller 2. Changed to high-efficiency cooling tower 3. Changed to LED bulbs 4. Changed to high-efficiency motor	IPMVP Option A and B	1.187
	Energy efficiency enhancement project in Provincial Waterworks Authority (Funded by Energy Conservation Fund)	1. Changed to LED bulbs 2. Changed to split type air conditioning	IPMVP Option A	0.403
	Provincial Electricity Authority	1. Improved chiller efficiency	IPMVP Option B	0.130
<b>Total</b>				<b>5.179</b>
<b>Grand Total</b>				<b>7.714</b>

**Remarks:**

- Information from Pilot Projects Operation Final Report on Energy Efficiency Resource Standards (EERS) Promotion Measures in 2019
- Utilized verification method by measuring energy usage before and after equipment improvement, following Measurement and Verification method by Department of Alternative Energy Development and Efficiency, which referred to the International Performance Measurement and Verification Protocol (IPMVP) developed by EVO (Efficiency Valuation Organization) used to encouraged investment in energy conservation projects. There are options as follow:
  - Option A (Retrofit Isolation-Measure key parameters): Measure key parameters that have effects on savings. It can be measured short-term or continuously, depends on whether the variables are constant or not. Parameters not selected for measurement are estimated from historical data, manufacturer's data, or recommendations, but there should be sources and rationality, and uncertainty analysis.
  - Option B (Retrofit Isolation-Measure all parameters): Measure all parameters short-term or continuously, depends on the change of that variable and reporting period.
  - Option C (Whole Facility): Energy consumption are measured for the whole facility from utility bills and measured continuously for the entire reporting period. Baseline is adjusted according to the changing independent variables.
  - Option D (Calibrated Simulation): Savings are determined by using simulation. The simulation is calibrated to ensure its accuracy.

## Research and Development for Innovation in Electric Power Distribution System

PEA focuses on using research and innovation as an important driving force in conducting its core and related businesses. The research and innovation are being utilized to enhance efficiency for products, services, and business operation. The research result should be able to commercialize and comply with organization change, new business model, and the changing electric power industry structure <sup>[103-1]</sup>.

### Target <sup>[103-2]</sup>



- Improve the roles of research and innovation to operation process development and commercialization.

### 2019 Outstanding Performance <sup>[103-3]</sup>



- Success of the Corporate Innovation System Plan was at level 3.

### Strategy <sup>[103-2]</sup>



- Develop research and innovation that enhance security, excellent standard, modernization, and sustainable growth for PEA.

### Improvement Plan for Future Operation <sup>[103-3]</sup>



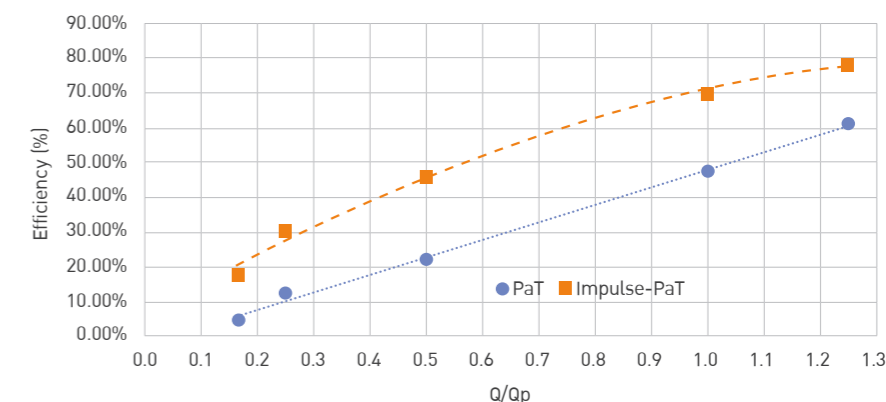
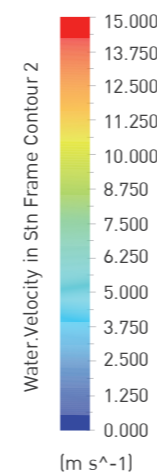
- Improve Corporate Innovation System Plan that leads to new product and service creation, as well as new business model within 2020.

### Management Approach <sup>[103-2]</sup>

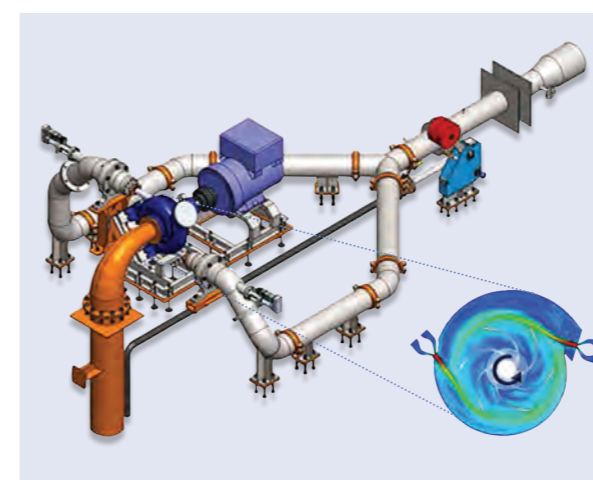


- Researchers and innovators join in creating research work that benefits overall society. There should be business feasibility study for commercialization in the future, as well as intellectual property protection and management plan.
- Allocate budget of 3 percent of net revenue, or annual average at 100–130 million baht to support research development and innovation fund.
- Support research fund to domestic research organizations or academic research institutes in 4 types as follow:
  - Full fund
  - Co-research
  - Co-funding
  - Other agree-upon format
- Support research fund to PEA's internal research unit, by providing fund of not exceeding 300,000 baht per project.
- Support fund to startup (startup is enterprise that uses technology or innovation as an important part in business operation or as required by law) for commercialization. There are 3 phases as follow:
  - 1<sup>st</sup> Phase: develop concept and conduct feasibility study of the research work for commercialization, for the duration not exceeding 6 months, funding within 10,000,000 baht.
  - 2<sup>nd</sup> Phase: develop research prototype, for the duration not exceeding 12 months, with no funding limit.
  - 3<sup>rd</sup> Phase: develop research prototype and expand its scope to be used throughout the organization or to production test stage at industry or commercial level, for the duration not exceeding 12 months, with no funding limit.

## Samples of research and development project in 2019 (Renewable Energy Technologies) <sup>[former EU8]</sup>



Comparison chart of the efficiency of PaT and PaIT from case study number IV



### Project for Efficiency Development and Pump as Impulse Turbine Application For PEA's Small Hydropower

PEA installed and collected data of a type of small hydropower system called Pump as Impulse Turbine (PaIT). It used generator, transformer, and could distribute electricity by on-grid or island-mode methods. PEA would like to assess the efficiency of turbine operation at Mae Toey hydropower plant in Om Koy District, Chiang Mai Province, to study, develop, and improve PaIT's efficiency to be on par with water turbine from abroad.

The PaIT application proved to be as highly efficient as small water turbine for electricity generation that could be found in the market. At the same time, the electricity generated was controllable, depending on the amount of water input into the turbine, which was better than applying water pump to be used as turbine (Pump as Turbine: PaT). Besides the controllable electricity generated, with the suitable turbine control system, it could apply islanding mode as well.

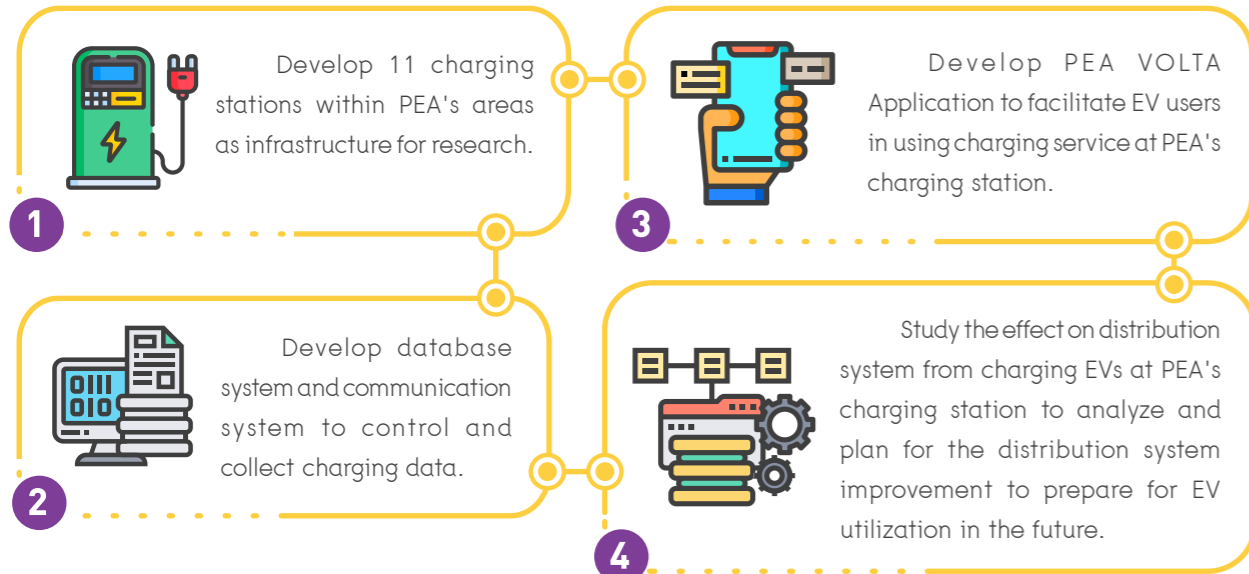
This research compared between Turgo, turbine without automatic control system from abroad, and PaIT, turbine with automatic control system. The study showed that PaIT had Economic Internal Rate of Return (EIRR) at 68.58%, Benefit Cost Ratio (B/C Ratio) at 5.66, and Payback period (PB) at 1.45 years, which is shorter than Turgo for 1.77 years.

The higher economic benefits of PaIT was because there was no need to hire a staff to control the turbine, the pump price was lower, and the procurement time was shorter than that of the imported turbine.

## Digital Platform Development

### Electric Vehicles and Charging Station Project PEA VOLTA Platform

PEA researches and develops PEA VOLTA Platform to prepare infrastructure for charging electric vehicles (EVs), and to systematically facilitate service provision for EV users. Moreover, PEA analyzes and manages charging data to plan and develop PEA's network to prepare for the increasing EV utilization in the future. The details are as follows.



PEA VOLTA Platform is an innovation that promote electric vehicle utilization, which uses clean energy, reduces air pollution. Moreover, PEA VOLTA Platform innovation facilitates all related parties, which are EV users, charging station operators, and electric power providers. They use data and service from PEA VOLTA Application for effective service, business operation, and related operations, details as follows.



#### 1 EV Users:

This platform and application facilitates EV users in using charging service at the network's charging station to be more convenient because it informs about the station's location, types of fuel pump, and status which helps in efficiently planning the trip.



#### 2 Charging Station Operators:

This platform increases opportunities in providing charging service, has data collecting system for utilization statistics, effectively analyzes and plans business operation, and creates business opportunities for products and services entrepreneurs around charging stations.

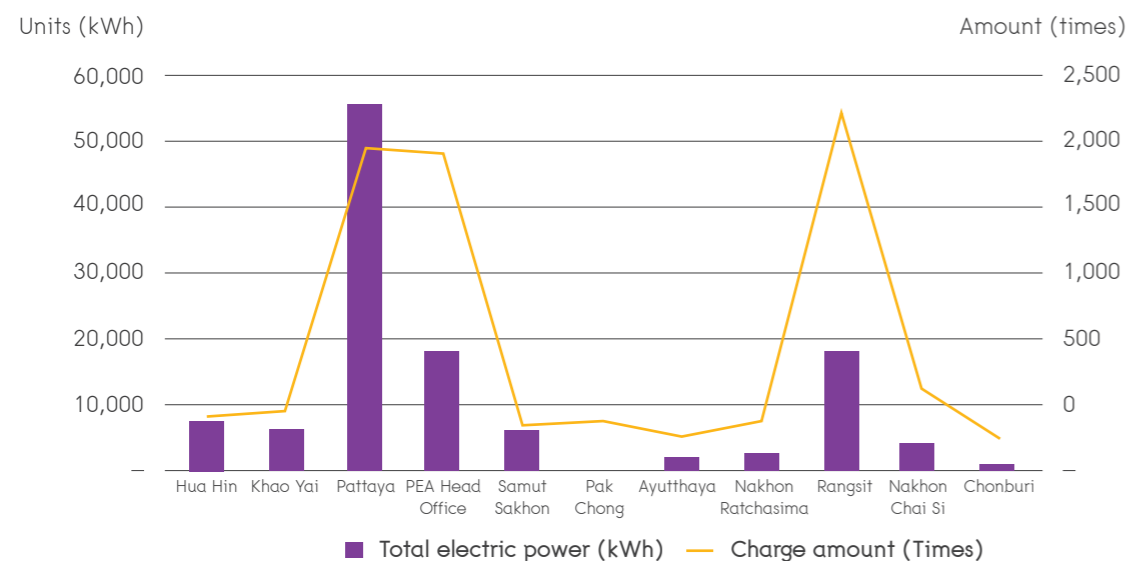


#### 3 Electric Power Providers (PEA, MEA, EGAT, and/or regulatory agencies in energy business):

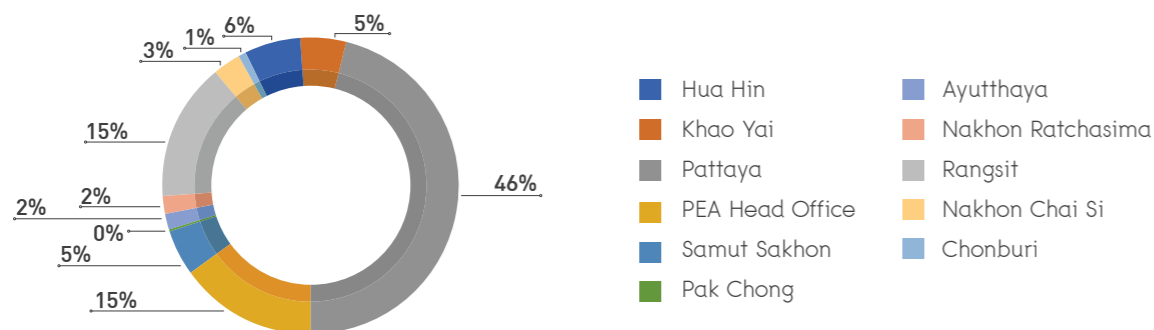
These agencies can monitor the amount of electric power utilization at the charging station in terms of EV user's energy utilization behavior and other EV's technical information. This help electric power providers to analyze, plan, and manage electric power service provision continuously, reduce the effect on electricity quality in distribution system that may affect charging station operators and other electric power users in nearby areas. Moreover, the agencies will have information that could help them promptly solve technical problems in electric power system, which ensures safety for life and properties of operators and other people in the neighborhood.



### Utilization Statistics for Charging Stations in PEA's Network from PEA VOLTA Platform



### Charging Stations Utilization Proportion



Remarks: Utilization statistics for charging stations in PEA's network since 2018 until present.

### Advanced Patrolling System Application (APSA) Project

PEA develops an innovation called Advanced Patrolling System Application (APSA) to solve power outage problems that focuses on proactive maintenance and effectively respond to electric power users' demands. APSA collects data from officers who manually monitor any flaw in the electrical system and input data via smart phones, and then assesses the data according to the following process.

1. Officers monitor and take pictures of the flaws in electrical system via APSA and choose equipment group that has problem according to Maintenance Policy.

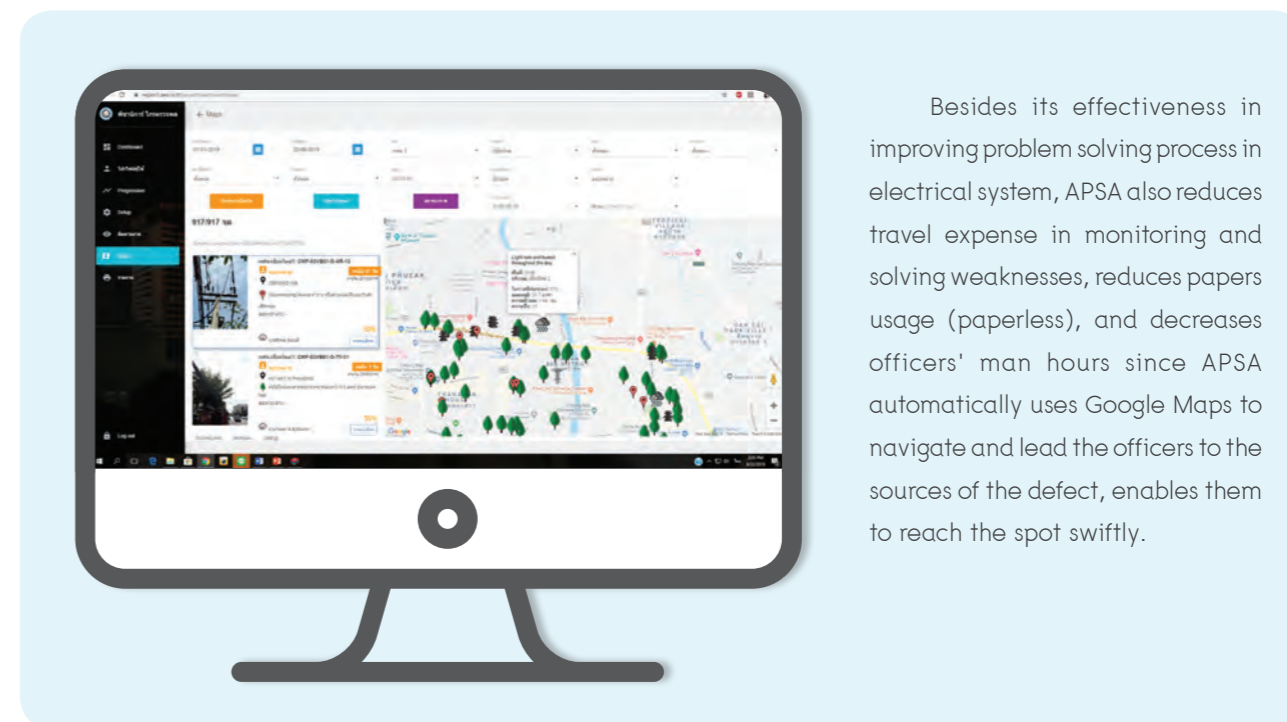
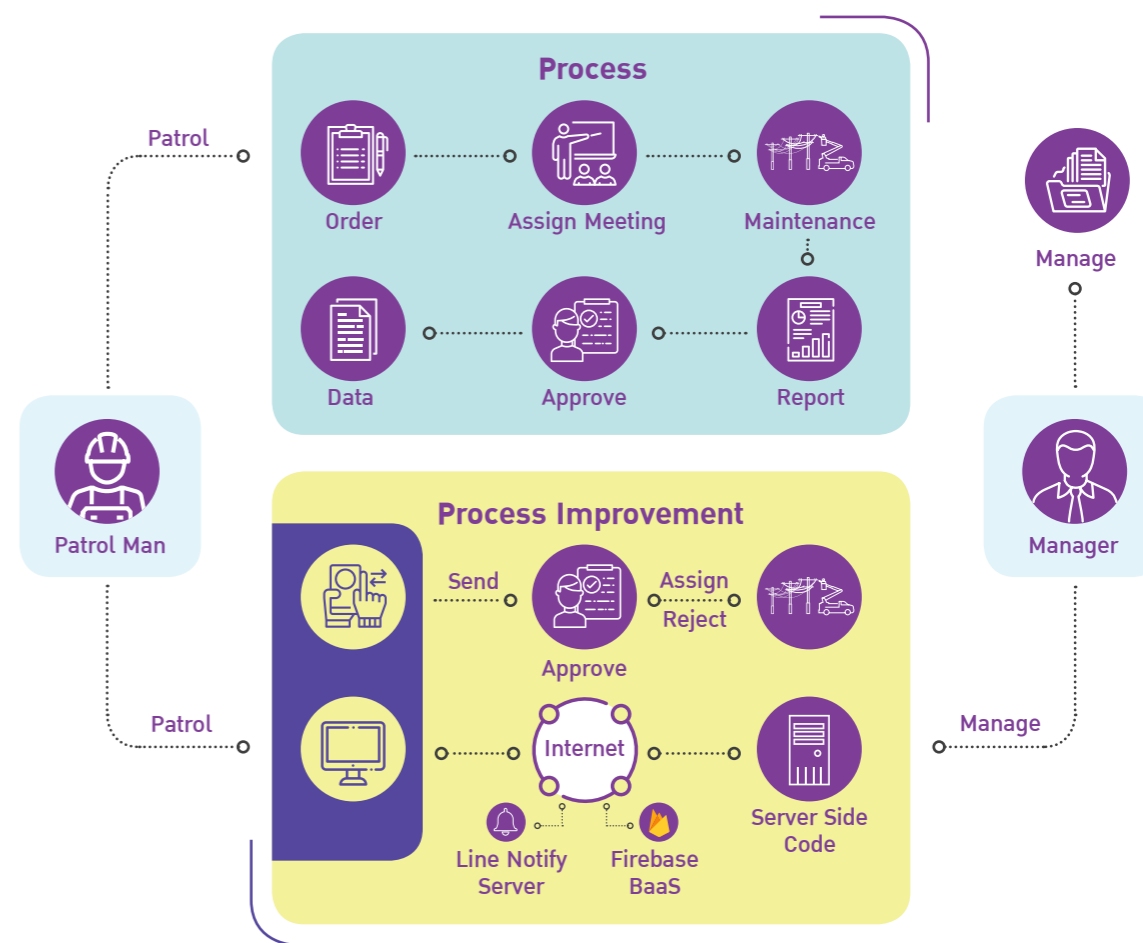
2. APSA sets timeframe for solving problems according to Maintenance Policy and informs supervisors to assign the work.

3. APSA alerts the assigned officers via line group chat to proceed. If there is a need for power outage during the operation, APSA could display the overall electrical system in the area so that the officers could effectively plan the maintenance process.

4. When the job is done, APSA will report to the supervisors to close the job.

APSA has weather forecast function so the operators could systematically and effectively plan for the maintenance work that might be a problem if there is a storm.

### Ideas into Action



Besides its effectiveness in improving problem solving process in electrical system, APSA also reduces travel expense in monitoring and solving weaknesses, reduces papers usage (paperless), and decreases officers' man hours since APSA automatically uses Google Maps to navigate and lead the officers to the sources of the defect, enables them to reach the spot swiftly.

# People



## Our Personnel Employee Care

Employees were very important for steering the organization's operations. PEA treated its employees fairly without discrimination, and attached great importance on manpower planning and recruitment, compensation management, employee retention, career path management, and safe environment to promote employees' good quality of life and work morale until their retirement in response to the demands/expectations of all the employees for their job happiness, resulting in their commitment to the organization and sustainable growth and development<sup>[103-1]</sup>.

### Target<sup>[103-2]</sup>



- Having personnel with knowledge, abilities, and determination to work for PEA.
- Reducing complaints of the personnel recruitment and selection process.
- Reducing the employee turnover rate.
- Promoting employees' sense of belonging and commitment to the organization.

### Strategy<sup>[103-2]</sup>



- Developing the recruitment and selection criteria in response to the needs across various groups of personnel and in line with the organization strategies.
- Improving the criteria for employee annual promotion to ensure fairness and consistency with individual performance.
- Developing the system to give rewards, which were valuable, diverse, and consistent with the organization goals.
- Promoting employee career development.

## Management Approach<sup>[103-2]</sup>



- Allowing opportunities for fair employment, with a transparent recruitment process based on knowledge, abilities, and qualifications as required by the organization.
- Giving the disabled opportunities to work under various operation policies and guidelines, and giving them fair employment, rights, and welfare similar to general employees to promote the disabled's better quality of life.
- Promoting employees based on qualifications, free from decisions based on race, complexion, sex, religion, or other restrictions.
- Creating a succession plan for employees to acknowledge their career path and for promoting more learning.
- Performing management according to the principles of good governance, with an emphasis on the rule of law, integrity, transparency, participation, responsibility, and cost-effectiveness in development and improvement of relevant regulations or practices.
- Carrying out supervision, training, notification, and communication to ensure the same human resource management standards throughout the organization.
- Allowing opportunities for employees to gather and organize the Labor Unity of PEA to act as a representative for the employees to negotiate with the employers so as to protect their welfare and benefits, and to provide advice to the members who were not treated fairly, with 100% of employees under care of the Labor Unity of PEA according to the agreement<sup>[102-41]</sup>.



## 2019 Outstanding Performance<sup>[103-3]</sup>



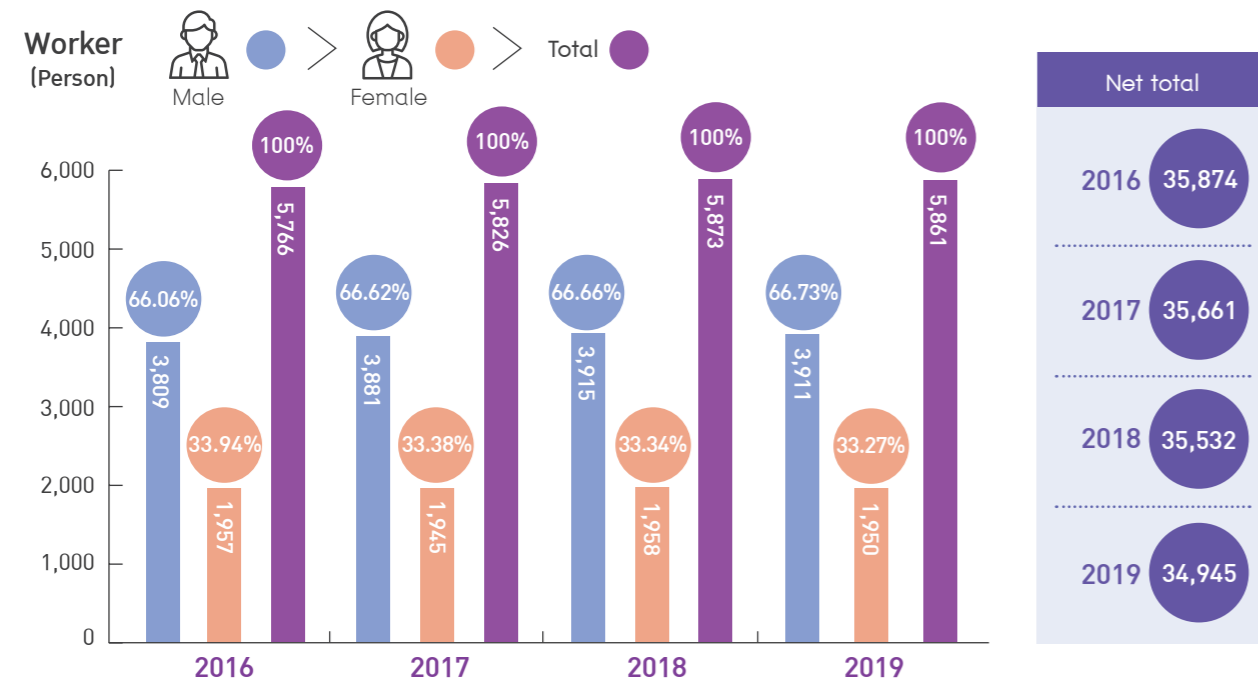
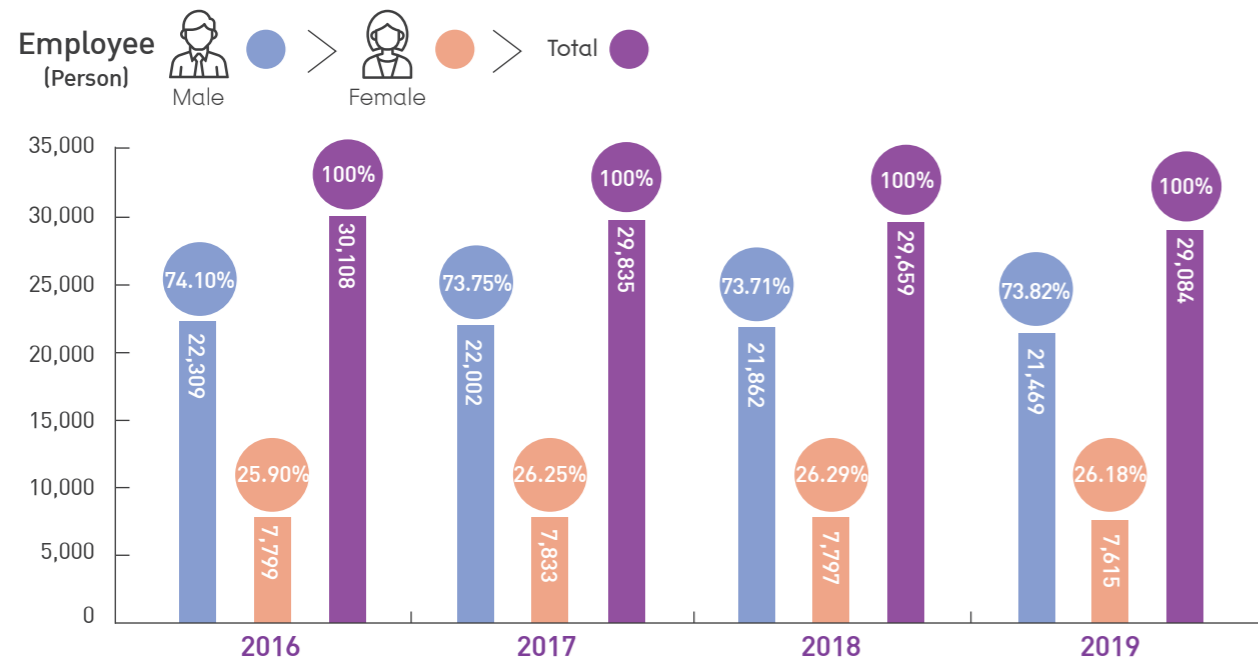
- There were no complaints of unfair personnel recruitment and selection nor discrimination<sup>[406-1]</sup>.
- The level of satisfaction in the personnel recruitment and selection process was 4.65 out of 5 points, with an increase of 0.08 points from 2018.
- The employee turnover rate accounted for 0.21%, with a decrease from 0.20% in 2018.
- The level of satisfaction in the use of the salary consideration system software was 3.95 out of 5 points, which increased by 0.22 points from the previous year and was at a moderate to high level.
- The satisfaction in the gifts from PEA to employees working at the organization for 20, 25, 30, 35, and 40 years, and to retired employees at the age of 60 was at a high level.
- The overall employee satisfaction was 4.40 points.
- The average of employee commitment was 4.51 out of 5 points, with the average well-being of 4.43 points, sense of belonging of 4.53 points, and willingness to do the best for work of 4.56 points.

## Improvement Plan for Future Operation<sup>[103-3]</sup>



- Upgrading PEA as one of the employers of choice in the job market.
- Upgrading employment in response to the needs of the organization to become a digital utility business.
- Adopting digital technology to enhance work efficiency.
- Improving the resignation process by having a process or channel for supervisors and employees to talk before taking resignation decisions and by allowing collection of resignation information for analysis and solutions.

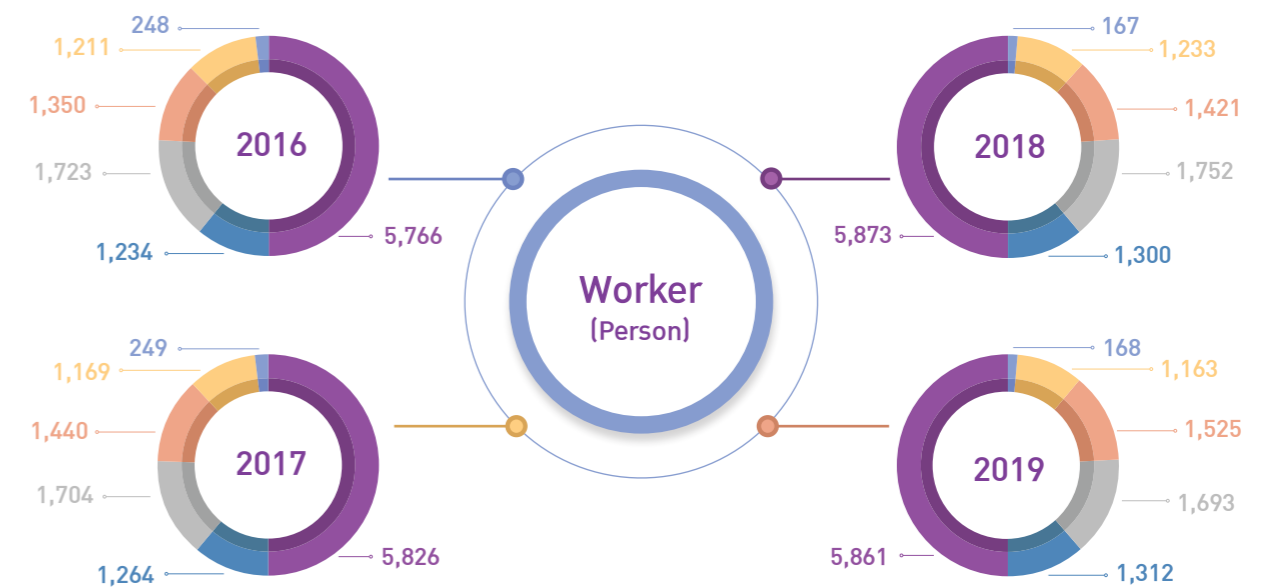
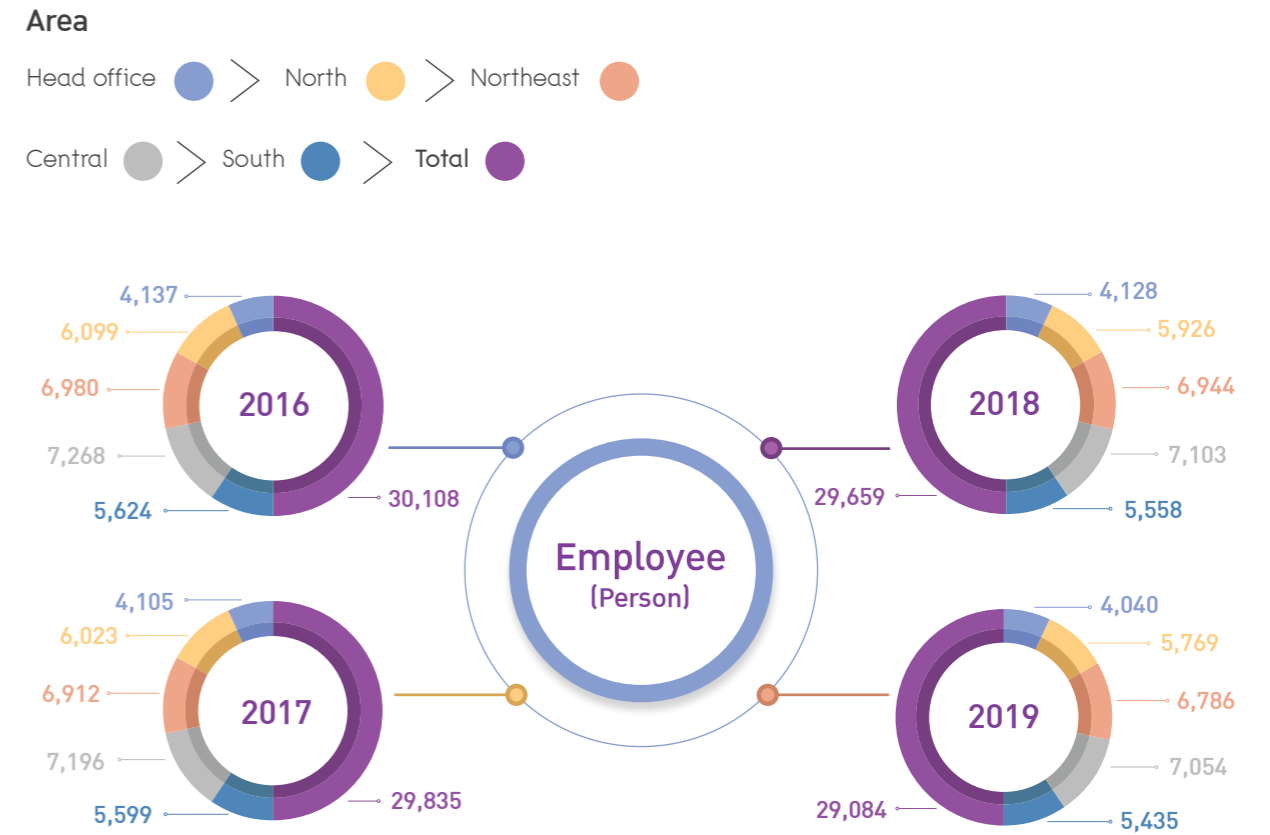
### Total Number of Personnel by Gender [102-8]



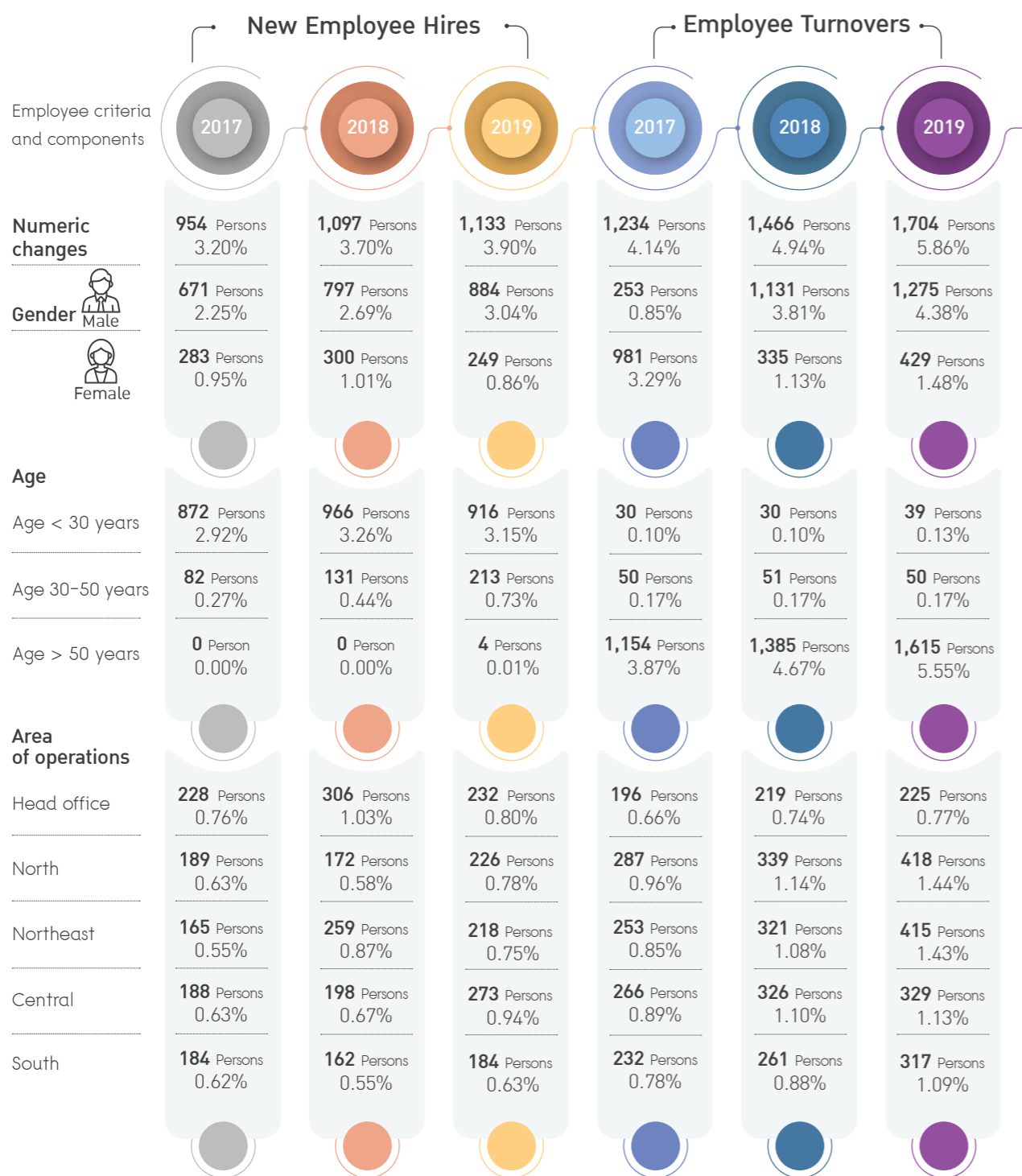
**Remark:** - Employees refer to (1) Groups of Directors such as PEA Deputy Governor, Assistant Governor/Executive Director of PEA Area/Executive Director of Internal Audit Bureau/Executive Director of Legal Office/Executive Director of Office of the Governor, Director of Department/Senior Manager attached to PEA Area/Manager of PEA Grade 1, Deputy Director of Department, Manager of Division, Director of Center, Manager of PEA Electric Vocational School, Manager of PEA Grade 2-3 or those in equivalent positions, Deputy/Assistant Manager of Division, Deputy/Assistant Director of Center, Deputy/Assistant to PEA Electric Vocational School Directors, PEA Deputy Managers Grade 1-2, Manager of PEA Branch, Assistant Manager of PEA Grade 3, Chief of Section, Manager of PEA Sub-branch, Assistant Chief of Section (2) Groups of Specialists such as Expert Level 12-13, Professional Officer Level 9-11, Specialists Level 9, Specialists Level 8, Professional Officer Level 7-8, Technical Officer Level 7, and (3) Operational Staff including Professional Officer/Technical Officer Level 4-6, Technical Officer Level 2-3.

- Workers refer to monthly workers, or those contracted to work for employers in order to receive monthly salaries. Their recruitment is based on manpower plans, covering those hired to work for the offices of Governor, Deputy Governor, and Assistant to Governor. They include drivers and maids [403-1].

### Total Number of Personnel by Area [102-8]

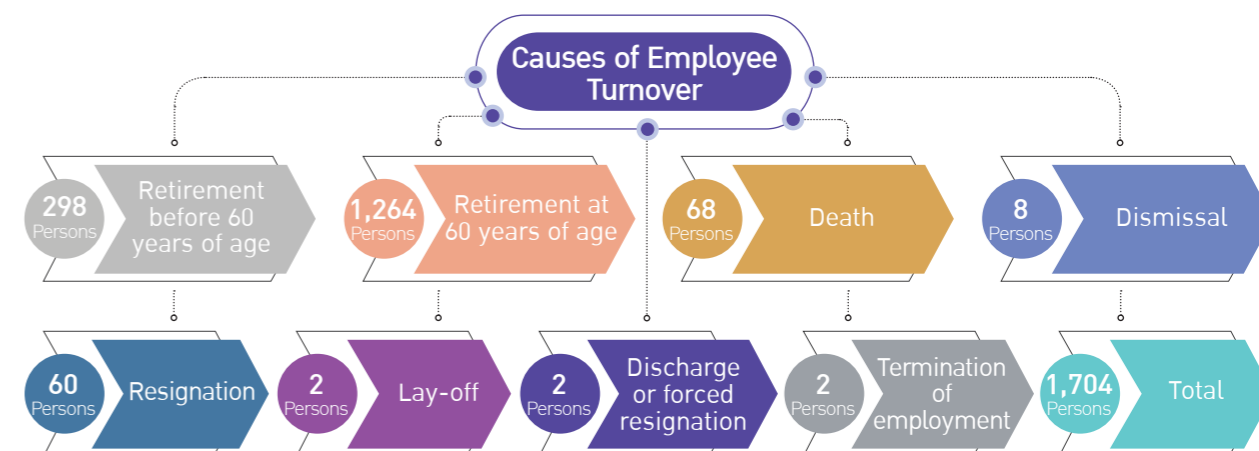


## Number of New Employee Hires and Turnovers [401-1]

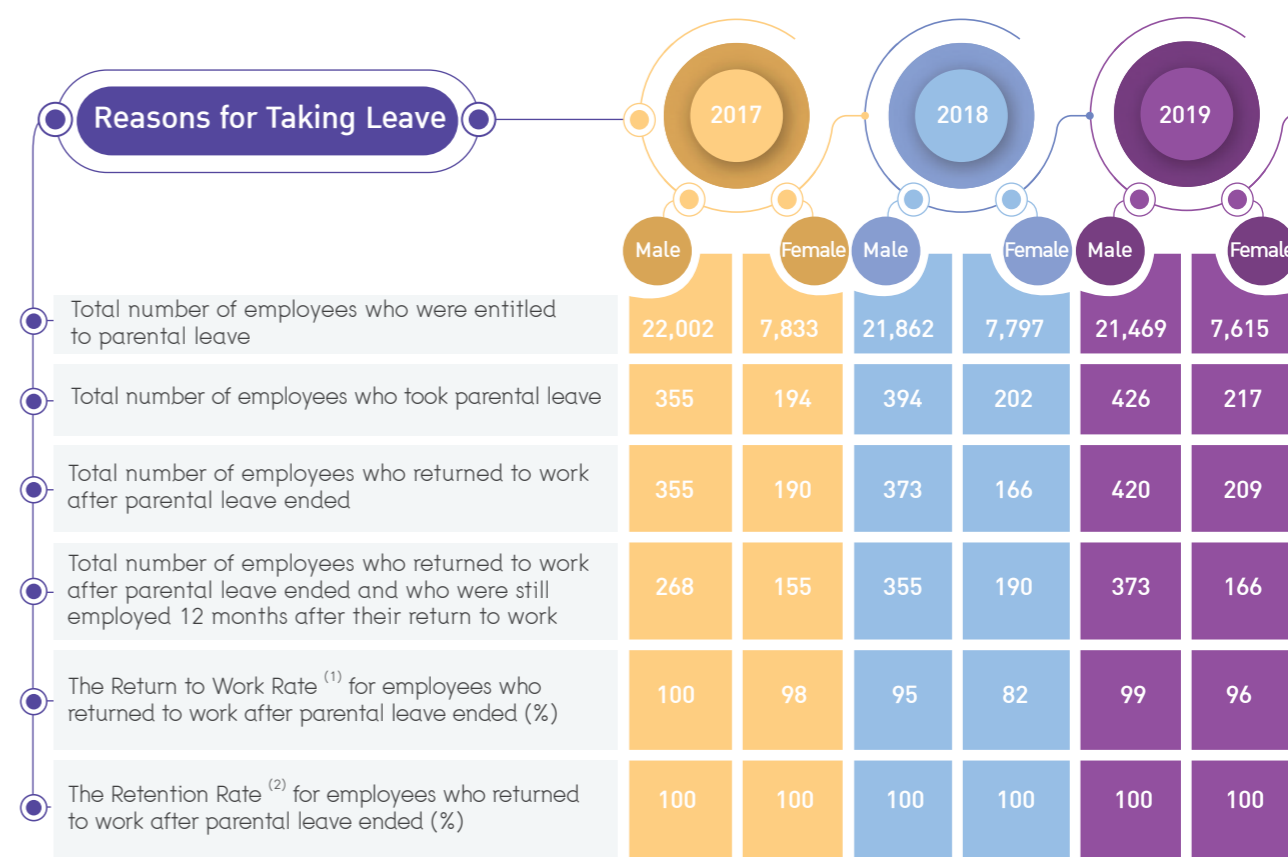


**Remark:** The percentage outlined in the table was calculated in comparison to the total number of employees in each year (total numbers of employees in 2017, 2018, and 2019 were 29,835 persons, 29,659 persons, and 29,084 persons, respectively.)

## Number of Employee Turnovers [401-1]



## Parental leave [401-3]



**Remark:** (1) Return to Work Rate = (number of employees returning to work after parental leave ended/number of employees, by gender, that used their entitlement for parental leave) × 100

(2) Retention Rate = (number of employees who returned to work after parental leave ended and were still employed 12 months after their return to work/number of employees who returned to work after parental leave ended in the previous reporting cycle) × 100



## Obligations on Benefit Plans and Other Retirement Plans <sup>[201-3]</sup>

Benefits and Other Retirement Plans	Benefit Conditions and Criteria	Estimated Obligation Value
Severance pay upon retirement	Retirement benefits received by the personnel were in accordance with the criteria and conditions prescribed under the State Enterprise Labour Relations Act, B.E. 2543 (2000).	16,546.38 million baht (as of 31 <sup>st</sup> December 2019)
Retirement gifts		532.42 million baht (as of 31 <sup>st</sup> December 2019)
Leave days upon retirement		1,245.78 million baht (as of 31 <sup>st</sup> December 2019)
PEA Provident Fund	PEA established the PEA Provident Fund according to the Provident Fund Act, B.E. 2530 (1987) on 30 October 1996 as part of its welfare for retiring employees. Member employees could choose to make payment towards the fund at the rate of 3-15% of the salary while new members had to pay not less than 5% but not exceeding 15% of the salary in the first month, and could change the rate of payment to not less than 3% but not exceeding 15% of the salary in following months, effective from 1 <sup>st</sup> March 2020, while PEA contributed an additional portion of 9-11% of the employees' salary.	The Net Asset Value (NAV) of the Provident Fund as of 31 <sup>st</sup> December 2019 was 34,609,142,449.13 million baht, and in 2019, the net payment to 1,264 retiring employees was 4,742,010,839.17 million baht.

## Producing Personnel of the Future

PEA aimed to develop and increase personnel's capabilities by promoting development for innovations, new businesses, and excellent services to enable all the employees to work effectively in consistent with the organization goals in becoming an organization with high competency and ready to handle business changes. In 2019, PEA created a personnel development plan to cover 3 groups of competency, which were core competency, management competency, and functional competency to support strategies and be consistent with the required capacity of the organization in the future <sup>[103-1]</sup>.

### Target <sup>[103-2]</sup>

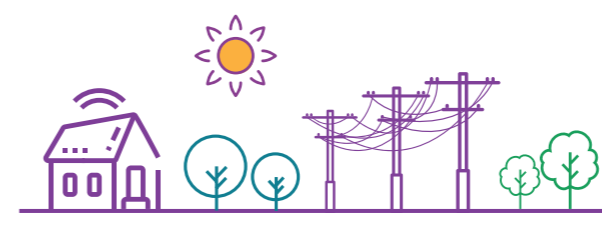


- Ensuring employees of all levels were prepared to support the operations of major businesses of the organization and relevant businesses in the future.

### Strategy <sup>[103-2]</sup>



- Developing the competency system to be in line with the organization strategies for personnel development.
- Increasing capabilities of talents to possess skills as expected by the organization.



### Management Approach <sup>[103-2]</sup>



- Determining clear competency by position to identify strengths-weaknesses of employees in each position and to use such data for training and succession planning, with an emphasis on reviewing digital competency based on the Digital Competency Based Assessment Model and developing target personnel based on their digital competency.
- Encouraging knowledge management (KM) throughout the process to increase operation efficiency and support innovation development .
- Assigning personnel of all levels to create an individual development plan (IDP) through a digital system under the 70:20:10 learning model and taking action according to ISO 10015: Quality Management-Guidelines for Training and Personnel Development.
- Performing talent management by grouping those receiving scholarships and talents to work together in the PEA Innovation Hub under the design thinking concept.
- Developing the PEA Certification Center for Solar Rooftop Design and Installation for developing personnel to be ready for a one-stop-service solar roof business.
- Establishing a technical cooperation project between PEA and educational institutions and giving study scholarships to PEA employees to further their studies in master and doctorate degrees in the fields necessary for operations to handle changing technology and to produce personnel for future jobs, such as Computer Science, Digitalization and Smart Grids Engineering, Data Analytics, etc.

### 2019 Outstanding Performance <sup>[103-3]</sup>



- The success of the plan to upgrade human resource development was 100%.
- The success of the project under the knowledge management work plan to support business operations was 100%.
- All the employees created an individual development plan (IDP).
- There were 28,789 employees receiving a functional competency assessment, which accounted for 99.69%, with top 5 functional competencies passing the expected value as follows:
  - Vehicle and machine usage at 96.86%
  - Outage maintenance at 96.76%
  - Basic electrical knowledge at 95.66%
  - Customer relationship management at 95.02%
  - Electrical equipment at 94.92%
- From the information above, it was found that the functional competencies with the highest scores were those necessary for running major businesses at present. However, it was found that there were only 66% of the employees passing the expected value for marketing knowledge.
- 100% of the employees were evaluated for their performance and career development according to the performance assessment criteria, for instance, success of work according to policy, assignment by supervisors, responsibilities, creativity, and behavior based on the work-related value <sup>[404-3]</sup>.

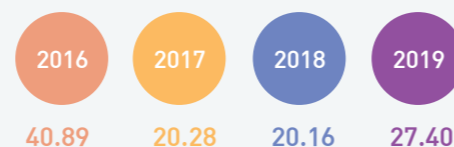
### Improvement Plan for Future Operation <sup>[103-3]</sup>



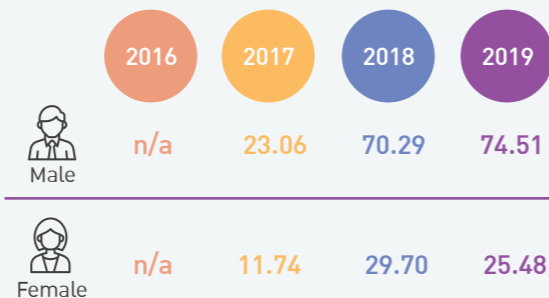
- Extending knowledge gained from on-the-job training to the key sectors in charge of management in order to carry out a systematic development of personnel who were under their responsibilities.
- Extending the operational results/organizational innovations/knowledge, and developing a learning system from PEA Pro & PEA Guru and KM systems for employees by creating a KM Master Plan to ensure coherence and continuity of the knowledge management process.
- Quickly improving employees' knowledge and abilities in marketing to enable them to expand the business for new opportunities and be able to compete in the market.

### Hours of Employee Training <sup>[404-1]</sup>

Average hours of employee training (hrs./person/year)



Average hours of employee training, by gender (hrs./person/year)



### Personnel Development Courses

PEA developed all of the personnel in the organization according to the HRD Blueprint. In 2019, there were courses promoting learning systems and development of personnel and organization leaders in line with 5 dimensions of development based on the HRD Blueprint as follows:

### Personnel Development Courses, by Employee Group <sup>[404-2]</sup>

#### Professional Development



Personnel development towards professionalism (Technical Competency)

- Training on executive development, such as individual development plan (IDP)
- Training on knowledge management, such as PEA Pro & PEA Guru
- Training on logistics & supply chain
- Training on accounting, finance, and budgets
- Training on smart grids, such as smart substation design
- Training on electric power quality, such as reduction of total unit losses in the power system
- Training on hotline technicians, such as connecting high-voltage power lines (22-33 kV) using the hot stick technique

#### People Management



Personnel development towards leadership & management competency

- Executive Educations Program
- Smart Executives
- Smart Directors
- Smart Managers
- Smart Supervisors

#### Potential Enhancement



Personnel capability building (Career Development-Successor Plan-Talent Management)

- Orientation for new employees
- Talent management development
- Engineer potential development
- Succession plan
- Giving scholarships

#### Passion Driven



Personnel development for physical, mental, and spiritual balance (Quality of Work Life)

- Training on improvement of quality of life, such as Happy Workplace
- Security officer training
- Training on PEA safety excellence
- Sport & recreation
- PEA Club activities

#### Planet Concern



Personnel development towards CSR & CG

- Training on enhancing integrity in operations
- Training on CSR
- Training on good governance for PEA sustainability
- Training on solar rooftop installation



## Employee Safety

Employee safety was important and employees of all levels needed to provide cooperation for their own and others' safety. Therefore, PEA determined clear standards and guidelines for occupational health and safety, leading to a decrease in causes of insecurity both from health and surroundings affecting lives and properties of employees, customers, and people in general <sup>[103-1]</sup>.

### Target <sup>[103-2]</sup>



- Reducing the number of fatalities caused by accidents compared with the previous year.
- Reducing the number of accidents causing absence from work in 2019 to 0.1114 and by at least 5% each year.
- Continuously reducing work-related rates of sicknesses and diseases every year.

### Strategy <sup>[103-2]</sup>



- Developing digital technology as a tool to conveniently and quickly monitor the operations to reduce risks of accidents <sup>[403-7]</sup>.

### Management Approach <sup>[103-2]</sup>

- Ensuring use of the tools to audit efficiency in terms of safety according to PEA's requirements continuously, observing the legal requirements, and adopting the occupational health and safety framework for management of PEA employees and workers, for example, Occupational Safety, Health, and Environment Act, B.E. 2554 (2011), Occupational Health and Safety Management Systems (TIS 18001/BS OHSAS 18001) and ISO 45001, and PEA Safety Management System (PEA-SMS) <sup>[403-1][403-2][403-7]</sup>.
- Appointing 223 Occupational Safety, Health, and Environment Committees to cover all areas of operations, with the employer representatives of 50% and employee representative of 50%, whose major roles and responsibilities were to consider policies, work plans, training projects or plans, regulations, handbooks, and standards on occupational safety, review statistics of hazards at least once a month, monitor and assess the operational results, and recommend ways for improvement or solving problems according to the law and occupational safety standards to executives <sup>[403-4]</sup>.
- Conducting training and developing courses to promote safety, as well as monitoring and performing assessment for continued improvement of training, for instance, conducting training according to the annual training plan and promoting participation in safety-related activities, such as Zero Accident Campaign 2018 and Outstanding Establishment in terms of Safety 2019, etc <sup>[403-5]</sup>.
- Requiring identification of hazards and risk assessment based on the guidelines and criteria specified in the PEA-SMS, Standard 6, in order to



- prioritize risks for choosing major emergency incidents and creating emergency response plans <sup>[403-2]</sup>.
- Reporting work-related hazards and incidents of hazards in two forms as follows:
  - (1) FM-SOH4-S05-6103 Form, which was used for reporting insecurities and complaints of occupational safety, health, and environment (enabling the authority to follow up with the complainant).
  - (2) FM-SOH4-S05-6104 Form, which was used in case employees, workers, or outsiders had recommendations/complaints of occupational safety, health, and environment, and the complainant could choose whether to specify his/her identity and put the complaint in the complaint box <sup>[403-2]</sup>.
- Providing occupational health services to employees and workers at the clinic of PEA head office, or allowing the use of medical services in government sanatoriums/hospitals, and other health services and benefits, such as workout, yoga, fitness room, and recreational activities, as well as having message boxes for sending complaints/recommendations on occupational health services to the Occupational Safety, Health, and Environment Committee <sup>[403-3][403-6]</sup>.
- Giving knowledge about occupational health and safety through various channels, such as Facebook of the Medical Division, website of the Safety Division, books, handbooks, brochures, posters, and videos to avoid and minimize work-related accidents and diseases, and major health risks not related to work <sup>[403-3][403-4][403-6]</sup>.

### 2019 Outstanding Performance <sup>[103-3]</sup>

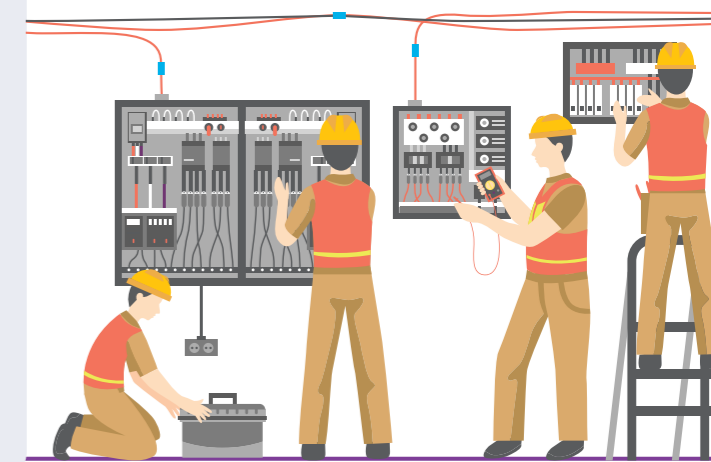


- The number of fatalities caused by accidents declined compared with 2018.
- The Disabling Injury Index ( $\sqrt{DI}$ ) was 0.1200 while the target was 0.1029.
- The number of employees/workers and workers who were not employees (contract workers) covered by the occupational health and safety management system undergoing an internal audit was 100%, and certification by external parties according to the ISO 18001 Standard was 0.85% <sup>[403-8]</sup>.

### Improvement Plan for Future Operation <sup>[103-3]</sup>



- Upgrading the occupational health and safety process towards ISO 45001 Standard in 2022
- Proceeding with applications for ISO 18001 certification for 12 additional PEA offices in 2020 <sup>[403-8]</sup>.



## Work-Related Hazards Causing High-Consequence Injuries <sup>[403-9]</sup>

The criteria used for risk assessment was based on the basis of consideration on severity and possibility of occurrence. It was found that work-related hazards causing high-consequence injuries came from electric shock, vehicles, falling, and being hit by fallen objects, which could occur from related works, such as flashbacks by electric power users\*, distribution system improvement with various operation units, and

distribution system repair. Operation guidelines were determined to eliminate hazards and reduce risks by using hierarchy of controls, from appointing the Incident Investigation Committee, creating/improving measures/standards for operations, studying and seeking equipment to reduce accident severity, and randomly inspecting operations based on the checklist.

**Remark:** \*Flashback causes hazards to the electric power users who produce electricity on their own without electric equipment certification from PEA.

## Work-Related Injuries <sup>[403-9]</sup>

Rates of fatalities and injuries of employees and workers who were not employees but whose work and/or workplace was controlled by the organization	Number of the injured by type of injury (person)							Total (person)	Work hours	Rates of fatalities/injuries (calculated based on 200,000 work hours)
	Burns	Loss of fingers	Foot/ankle/calf/knee/leg/hip injuries	Electric shock	Vehicles	Falling	Being hit by objects			
<b>Fatalities and injuries of employees and workers</b>										
Work-related fatalities and injuries	-	-	-	-	-	-	-	-	65,499,980	-
Work-related high-consequence injuries (excluding fatalities)*	4	-	-	3	1	2	1	11		0.0336
Recordable work-related injuries (including fatalities)	4	-	-	4	2	3	2	15		0.0458
<b>Fatalities and injuries of workers who were not employees but whose work and/or workplace was controlled by the organization (contracted workers)</b>										
Work-related fatalities and injuries	-	-	-	4	3	3	1	11	38,664,080	0.0569
Work-related high-consequence injuries (excluding fatalities)*	-	-	-	13	3	7	4	27		0.1397
Recordable work-related injuries (including fatalities)	-	-	-	19	6	11	7	43		0.2224

**Remarks:** The calculation was based on the International Labour Organization (ILO) Standard: ILO-OSH 2001.  
\* Shows the number of work-related injuries that have a high impact on the body up to the stage of absence.

## Our Customers

### Inclusiveness of Electric Power Services

PEA took into account equality and inclusiveness of all people in accessing basic utilities like electric power systems. Therefore, it focused on allocating electric power systems to general public continuously to support growth of the business and industry sectors, upgrade the quality of life of Thai people, especially in remote rural areas, and pave the way for country development <sup>[103-1] [former EU23]</sup>.

#### Target <sup>[103-2]</sup>



- Expanding power distribution systems to cover every household.

#### Strategy <sup>[103-2]</sup>



- Expanding power distribution systems in all areas to meet the public demands.
- Enhancing the distribution system capacity by using smart grids.

#### Management Approach <sup>[103-2]</sup>



- Implementing the New Rural Household Electrification Project and Remote Rural Household Electrification Project continually to allow access to electricity for all households without electricity and in remote areas.
- Creating a renewable energy (RE) or micro-grid utilization plan to generate electricity for households in restricted areas or remote islands, where general pole installation and conductor stringing could not be applied.

#### 2019 Outstanding Performance <sup>[103-3]</sup>



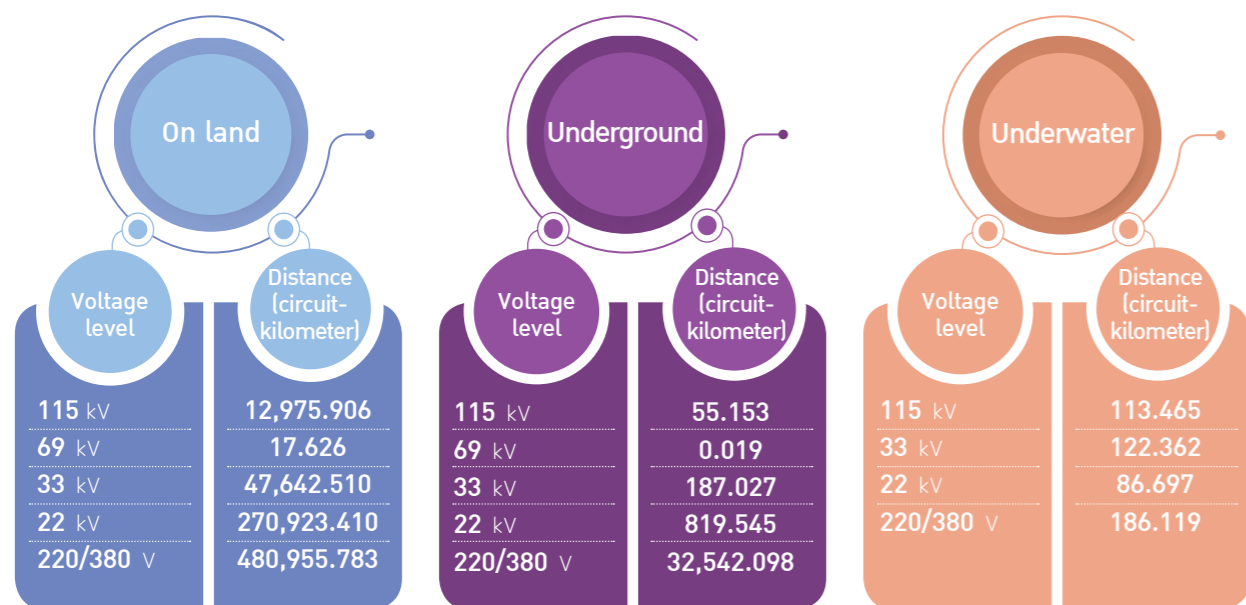
- Electrification was done for 137,232 new rural households, while the target was 131,629 households within 2020.
- Electrification was done for 12,465 remote rural households, while the target was 11,600 households within 2020.
- Electrification was done for 61 islands (there were 700 islands according to the survey, 61 of which consisted of residents).

#### Improvement Plan for Future Operation <sup>[103-3]</sup>

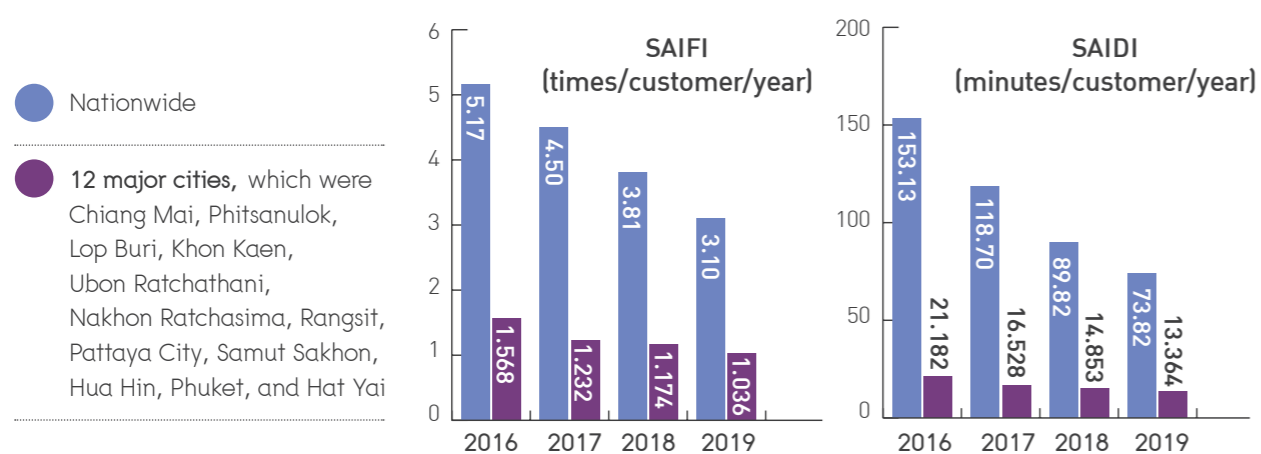


- Running the Micro Grid project on Phaluai Island, Surat Thani Province to increase capabilities and stability in electric power distribution in response to the increasing demands in the future as it is an important tourist attraction with a high rate of economic growth.

## Distribution System Information

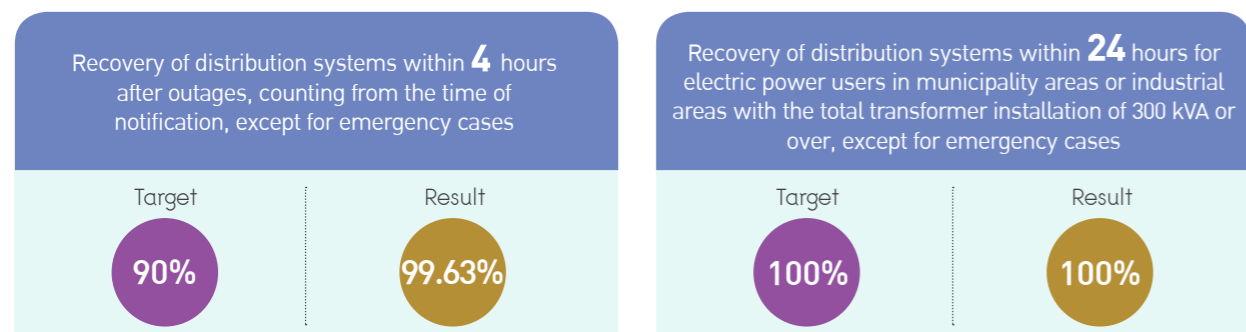


## Number [EU28] and Period of Outages [EU29]

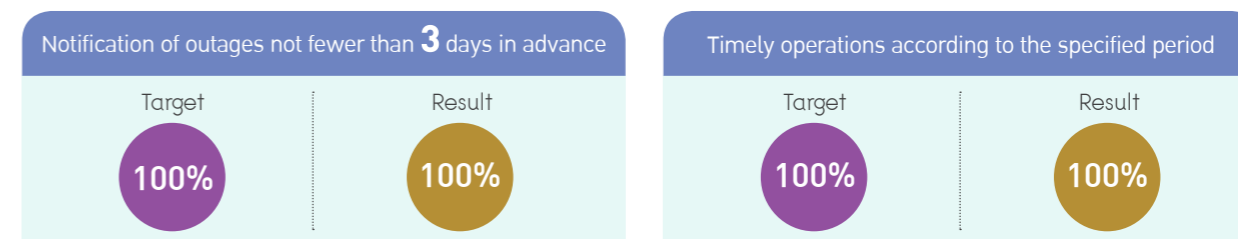


Remark: SAIFI: System Average Interruption Frequency Index  
SAIDI: System Average Interruption Duration Index

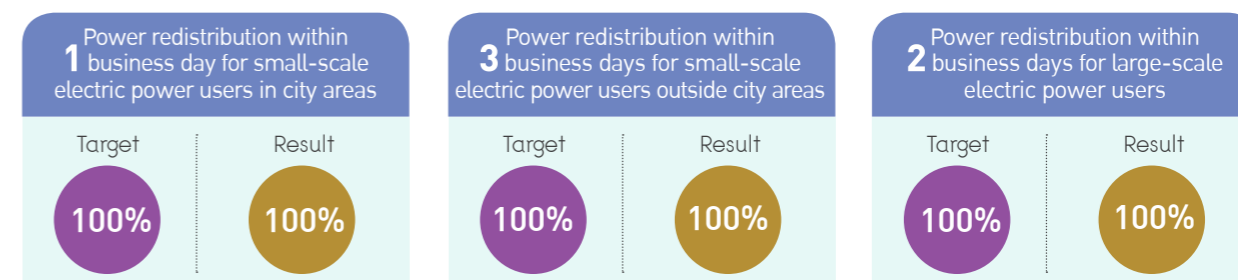
## Recovery of Distribution Systems After Outages



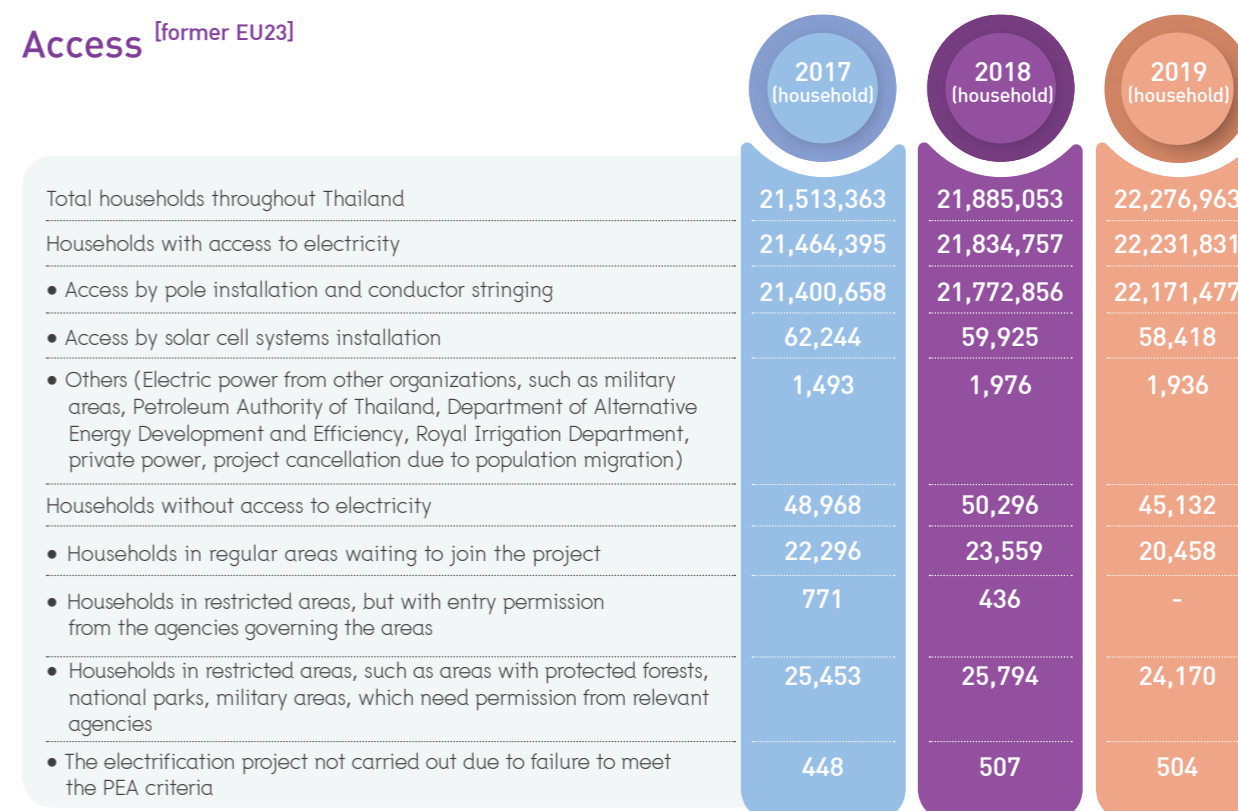
## Advanced Notification of Outages for Operations According to the Plan for Electric Power Users with the Total Transformer Installation of 300 Kva or Over, Except for Emergency Cases



## Period of Recovery of Distribution in Case of Power Cut (Counting From the Date the Electric Power User Makes Payment and Follows All the Conditions)



## Access [former EU23]



Remark: Data from the Technology Administration and Development on Registration Division, Bureau of Registration Administration, Department of Provincial Administration as of December every year

## Provision of Information to Customers and the Public

PEA recognized the importance of provision of information to customers and the public, so it was determined to continually improve the services in providing information to customers and the public to create "convenient, fast, easy-to-access, and fair" services of giving information on PEA products and services and to create the highest satisfaction among customers and people using the services<sup>[103-1]</sup>.

### Target<sup>[103-2]</sup>



- Facilitating customer and public convenience in access to information.

### Strategy<sup>[103-2]</sup>



- Reducing barriers in communication or request for information among customers and general public.
- Raising customers' and general public's awareness in electrical hazards and prevention.

### Management Approach<sup>[103-2]</sup>



- Improving services of the 1129 PEA Call Center by adding languages, which were Burmese, Cambodian, and Malay in addition to Thai and English.
- Publishing electric service information, such as request for meter installation, information on how to save electricity and how to use electricity safely, with 24 hours availability through various channels, such as PEA Smart Plus Application, Website [www.pea.co.th](http://www.pea.co.th), and social media.
- Improving the website format to support access of all types of users, as well as the visually impaired and the deaf to facilitate fair and inclusive access to information<sup>[former EU24]</sup>.
- Improving the office according to the Government Easy Contact Center (GECC) standards, which consisted of physical criteria, pre-service system, during-service system, and service support system to better meet the standards.

### 2019 Outstanding Performance<sup>[103-3]</sup>



- The customers' overall satisfaction in products and services was 4.4962 points, and satisfaction in each aspect was as follows:
  - Request for meter installation at 4.5271 points
  - Request for electrification at 4.3754 points
  - Meter service at 4.3733 points
  - Electricity billing at 4.5387 points
  - Electricity bill payment at 4.5746 points
  - Notification of power outages at 4.3785 points
  - Solving power outages at 4.4107 points
  - Complaint management at 4.2610 points
  - Call Center services at 4.3287 points
  - Information technology system at 4.4286 points
- There were 436 GECC accredited PEA offices at the end of 2019. In 2019, there were 149 certified offices for the period of 2019-2021 (126 offices at a basic level and 23 offices at an advanced level).

### Improvement Plan for Future Operation<sup>[103-3]</sup>



- Maintaining the standard in having zero complaint of communication barriers and miscommunication.

## Electric Power User Safety

As electrical hazards caused damages to both lives and properties of electric power users, PEA highly regarded electric power user safety and carried out survey, improvement, and inspection of electric power systems, as well as educating electric power users on safety in electric power use to minimize possible damages caused by electricity, and promoting better quality of life of electric power users<sup>[103-1]</sup>.

### Target<sup>[103-2]</sup>



- Reducing user accidents from PEA electric power systems.

### Strategy<sup>[103-2]</sup>



- Adopting the occupational health and safety management system (TIS 18001) to monitor, inspect, and improve operations on safety matters continually.
- Solving problems of close spacing between power lines and buildings or structures in accordance with the PEA standards.

### Management Approach<sup>[103-2]</sup>



- Assessing points at risk with 100% tendency to affect electric power users, which was found that the operations with high risks to the trading partners and electric power users were those close to the power lines.
- Requiring inspections and assessments in terms of design standards, quality, and safety standards in installing equipment related to power distribution and transmission systems, reconstruction, and maintenance, which accounted for 100% of all the products and services<sup>[416-1]</sup> to ensure electric power user safety and receipt of quality products and services.
- Setting a work plan to survey and improve high-voltage electric power systems close to buildings and structures, and disseminating knowledge about how to use electric power to minimize possible impacts.
- Requiring all electricity authorities to inspect spacing between power lines and buildings or structures in accordance with the standards on safe spacing for construction of power lines, and requiring all electricity authorities to be strict and always inspect the electric power systems in their responsible areas.

### 2019 Outstanding Performance<sup>[103-3]</sup>



- Power lines close to buildings or structures of 87 out of 116 places were fixed and improved. The details of operations to improve power lines close to buildings or structures in accordance with PEA standards can be summarized as follows:

Particulars	Number (place)	Operation budgets (baht)
1. Improvement was done.	87	6,916,693.96
2. Budgets were approved and operations were being carried out.	7	3,239,141.34
3. The plan was created, and budgets were pending for approval.	3	16,835,917.00
4. Under the process of creating a plan	19	-
Total	116	26,991,752.30

- The impact from PEA electric power systems on electric power users was 0.0067 points, which was at Level 5, accounting for 23.10 % of Level 5.

### Improvement Plan for Future Operation<sup>[103-3]</sup>



- Urgently completing the improvement of power lines close to buildings or structures in accordance with PEA standards and work plan.

## Cyber Security, Data Storage, and Customer Privacy



PEA cyber security operations were in accordance with the PEA strategic plans and digital action plans to upgrade cyber and information system security management to meet the international standards, monitor and handle cyber threats, and raise PEA employees' awareness of cyber and information system threats. This would enable PEA to perform its missions smoothly and build confidence among stakeholders and related sectors both in the public and private sectors that PEA had standard cyber and information system security management and observed the information technology laws, such as the Cyber Security Act, B.E. 2562 (2019), and the Personal Data Protection Act, B.E. 2562 (2019), etc. <sup>[103-1]</sup>

### Target <sup>[103-2]</sup>



- Being certified with ISO/IEC 27001 for key ICT infrastructure to cover the head office and 12 areas.
- Establishing a Security Operation Center (SOC).
- Raising employees' awareness of cyber and information system security, as well as data storage and customer privacy.

### Strategy <sup>[103-2]</sup>



- Developing the information technology security systems according to the standards and applying for certification of ISO/IEC 27001 international standard.
- Monitoring cyber security and reporting unusual incidents for relevant personnel to take corrective actions and reporting to high-level executives for acknowledgement and giving orders.
- Encouraging system administrators and users of all levels to receive education in cyber security and customer personal data storage.

### 2019 Outstanding Performance <sup>[103-3]</sup>



- There were 6 PEA offices certified with ISO/IEC 27001 as follows:
  - Head office
  - Northern PEA Area 1, Chiang Mai Province
  - Northern PEA Area 2, Phitsanulok Province
  - Northern PEA Area 3, Lop Buri Province
  - Central PEA Area 2, Chon Buri Province
  - Central PEA Area 3, Nakhon Pathom Province
- There was 0 complaint of customer privacy violation and loss of customer data <sup>[418-1]</sup>.

### Management Approach <sup>[103-2]</sup>

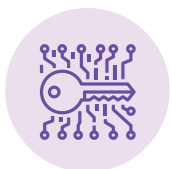


- Arranging the information security management structure both at the head office and area offices to ensure operations according to the PDCA cycle, and organizing training and development of relevant personnel to be able to observe the ISO/IEC 27001 standards.
- Establishing a log collection system and security information and event management (SIEM) system, and reporting to the supervisors.
- Creating and publishing 3 sets of VDO clips under the theme "Ignoring" to educate employees and raise their awareness of information technology security.
- Carrying out operations under the Work Management and Public Services through Digital Systems Act, B.E. 2562 (2019) and the Personal Data Protection Act, B.E. 2562 (2019), and appointing a working group to provide information services and pilot management of data in the customer management and support system.

### Improvement Plan for Future Operation <sup>[103-3]</sup>



- ISO/IEC 27001 certification for PEA offices in all the 12 areas
- Assessing and developing cyber security capabilities and ensuring the Security Operation Center (SOC) covers information technology and operations technology.
- Carrying out e-learning for PEA employees to study, understand, and be aware of measurable information technology security.



## Our Community and Society

### Participation in Community and Social Development

PEA recognized the importance of community enterprises, which are the joint operations of people in the community, so it supported and encouraged knowledge about the use of alternative energy and adoption of operation guidelines based on corporate social responsibility (ISO 26000) in order to understand the demands and expectations of people in the community, which would lead to development and promotion of a better quality of life of people in the community and society, as well as care for environmental impacts <sup>[103-1]</sup>.



#### Target <sup>[103-2]</sup>



- Promoting and encouraging strong communities through PEA expertise.

#### Strategy <sup>[103-2]</sup>



- Promoting a plan to develop community enterprises with alternative energy by encouraging the community to use alternative energy for operating the business of the community enterprises to increase the capacity of electric power systems in the community to meet the long-term demands.
- Promoting jobs in the community to enhance security of electric power systems in the community.
- Encouraging people in the community to live their lives sufficiently through the development focused on economic, social, and environmental balance based on decisions consistent with the community context, as well as promoting participation and development of strong community enterprises.

#### Management Approach <sup>[103-2]</sup>



- Developing engagement of stakeholders with community groups, society, and the environment by creating the criteria for selection of major communities affected by PEA business operations to ensure that selection and prioritization of stakeholders were efficient, met the need, and were consistent throughout the organization, as well as creating development plans and area-based action plans to handle impacts.
- Assigning the Department of Corporate Social Responsibility and Section of Corporate Social Responsibility of electricity authorities in the area to play an important role in providing knowledge and consultation to communities regarding utilization of alternative energy, enhancing the capacity of electric power systems, and assessing and following up the results of the project continually <sup>[413-1]</sup>.

#### 2019 Outstanding Performance <sup>[103-3]</sup>



- PEA implemented the Alternative Energy Promotion for Community Enterprises Project to solve electric power consumption problems by encouraging the use of alternative energy in operating community enterprise businesses, for instance, solar green houses and solar power generation systems to promote self-reliance of people in the community, reduce community expenses, and upgrade the quality of life. There were 1,378 households benefited by this project.



- PEA carried out 1 Tambon 1 Electrical Technician Project since 2017 to solve community electric power consumption problems by producing electrical technicians with knowledge, abilities, and expertise in carrying out basic, correct, and safe household electrical system repair according to the standards prescribed by law, and to generate stable income and better quality of life. Such the project was under the responsibility of PEA head office, and 74 PEA provincial offices covering all the PEA service areas. Throughout project implementation, there were 5,344 people benefited from skill development and job creation.

	2017 (person)	2018 (person)	2019 (person)
Project participants	1,784	1,885	1,675

- The ratio of all the organization operation units carrying out activities/projects to build relationships with the community was 5.33% (with an increase of 4.66% compared with 2018) <sup>[413-1]</sup>.

#### Improvement Plan for Future Operation <sup>[103-3]</sup>



- Extending the results of utilization of alternative energy and application of the Internet of Things (IoT) to support business operations of community enterprises, covering all the 12 major areas of PEA nationwide.
- Extending the results of PEA Care and Service Application to support services nationwide by 2020.



# Planet



## Resource Utilization and Environmental Quality Management

PEA recognized the importance of environmental protection, so it focused on efficient use of natural resources in the work process in order to reduce both direct and indirect impacts on the environment caused by production and services. To do so, the eco-efficiency assessment criteria were adopted as a tool for management to promote increased operation capabilities and responsibility for natural resources and the environment <sup>(103-1)</sup>.

### Target <sup>[103-2]</sup>



- Upgrading the organization's operation capabilities and promoting responsibility for natural resources and the environment.

### Strategy <sup>[103-2]</sup>



- Consistently improving the organization's operation capabilities based on the results of eco-efficiency assessment.

### Management Approach <sup>[103-2]</sup>



- Determining success factors to upgrade PEA's eco-efficiency in 7 aspects as follows:
  - 1) Reducing the use of resources or raw materials for production and services
  - 2) Reducing energy consumption for production and services
  - 3) Reducing discharge of toxic substances into the environment
  - 4) Promoting reuse
  - 5) Promoting the use of renewable resources
  - 6) Increasing product lifetime
  - 7) Upgrading services
- Setting a 3-year intermediate-range guideline and work plan for assessing eco-efficiency (2019-2021) to minimize environmental impacts caused by consumption of resources or raw materials for production and services, and consistently improving the organization's operation efficiency based on the results of eco-efficiency assessment <sup>[102-11]</sup>.

### 2019 Outstanding Performance <sup>[103-3]</sup>

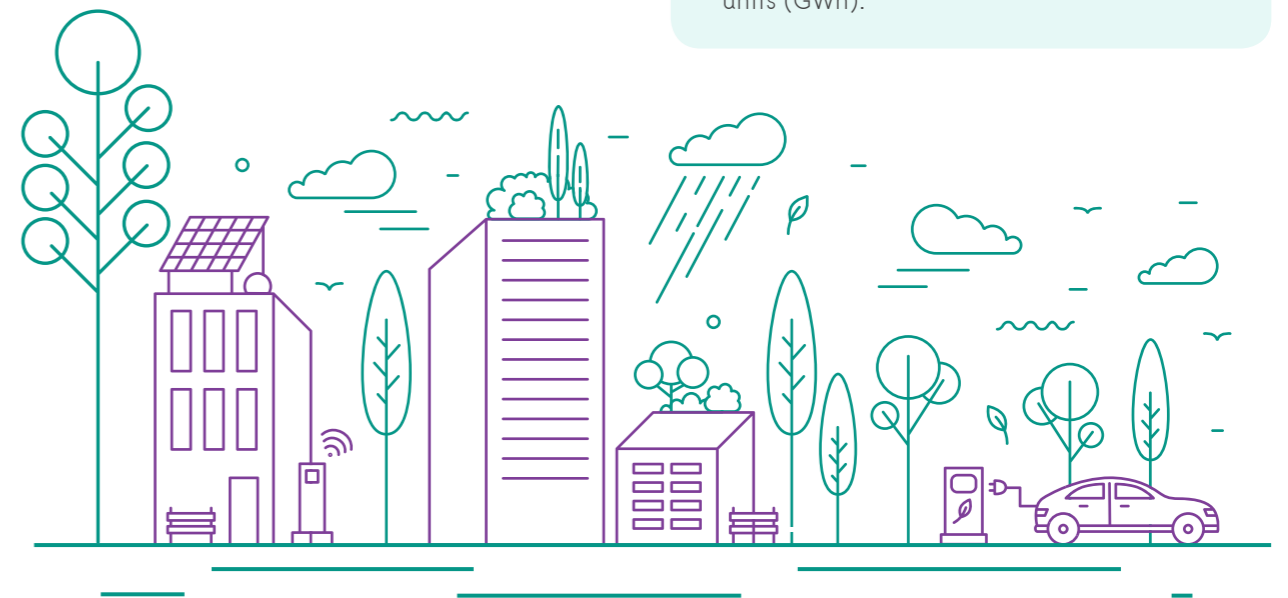


- PEA changed the method of sending electricity bills to electricity users via e-mail, so-called E-Tax system, to reduce printing and sending electricity tax invoices to electricity users, with an aim to reduce 5,000 rolls of thermal papers per year or 1,000,000 papers/year. At the beginning, PEA planned to start implementing the system by September 2019. However, due to information system limitations, the implementation was postponed to January 2020.

### Improvement Plan for Future Operation <sup>[103-3]</sup>



- PEA had a plan to change the air-conditioning system from fixed speed split type air-conditioners to inverter split type air-conditioners using R-32 refrigerant, which would not cause ozone depletion, would cause 3 times less global warming compared with R410A refrigerant, and would have 60% more refrigeration efficiency than R22 refrigerant. PEA aimed to reduce energy consumption in 2020 by 10.28 million units (GWh).



## List of Materials Used for Production and Services <sup>[301-1]</sup>

Total Materials Used						
	Unit	2017	2018	2019	Type of Materials	Source of Materials
<b>Non-Renewable Materials</b>						
Diesel fuel for PEA electric power generation	Liter	11,849,400	12,007,362	13,290,417	Raw materials	External supplier
Diesel fuel for vehicles		20,617,061	20,442,645	21,167,266	Associated process materials	
Transformer oil		439,800	973,200	670,218	Components	
SF6 (Sulphur Hexafluoride)	Kilogram	1,089.80	978.60	560.00	Components	External supplier
R-22		3,685.85	2,985.72	2,037.62	Associated process materials	
R-501		5.00	0.00	0.00		
R-12		7.00	0.00	27.00		
R-123		181.44	0.00	0.00		
R-134a		155.90	8.30	153.00		
R-32		8.00	17.70	149.00		
R-410A		90.00	30.00	387.00		
Self-produced concrete poles	Pole*	No data collection	1,712	1,170	Components	In-house supplies
Procured concrete poles			18,015	14,786		External supplier
<b>Renewable Materials</b>						
A4 papers (2.496 kilograms/ream)	Kilogram	702,596.54	543,189.50	323,808.58	Associated process materials	External supplier
Thermal papers (0.005599 kilogram/paper)		74,906.80	107,099.46	214,398.81		
Water supply	Cubic meter	No data collection	1,159,986.44	1,268,641.00	Associated process materials	External supplier

Remarks: \*Concrete poles in use consisted of various sizes, and the data on weight were not yet collected.

## Supporting Trading Partners Towards Sustainability

To increase trading partners' capabilities in product development and operations by taking into consideration environmental impacts, PEA determined the criteria for assessing its trading partners in the environmental aspect and for choosing the trading partners to work with. Such criteria would encourage the trading partners to improve their operations by taking into account environmental protection and reduction of greenhouse gas emissions, which would lead to sustainable business operations <sup>[103-1]</sup>.

### Target <sup>[103-2]</sup>



- Developing and upgrading the trading partners towards sustainable operations.

### Strategy <sup>[103-2]</sup>



- Promoting procurement from the trading partners manufacturing eco-friendly products.

### Management Approach <sup>[103-2]</sup>



- PEA determined the criteria for using price and other criteria in PEA procurement and set products with "Green Label" certification or products from ISO 14001 certified factories as part of the performance criteria consideration <sup>[102-11]</sup>.

### 2019 Outstanding Performance <sup>[103-3]</sup>



- Adopted price and other criteria for PEA's procurement of 9 types of supplies, which were electric power transformers, cables, SF6 remote control switches, insulators, reclosers, single phase meters, disconnecting switches, drop-out fuse cutouts, and lightning arresters (grounding system), having 26 trading partners/suppliers register for such products which were screened based on environmental criteria <sup>[308-2]</sup>.

### Improvement Plan for Future Operation <sup>[103-3]</sup>

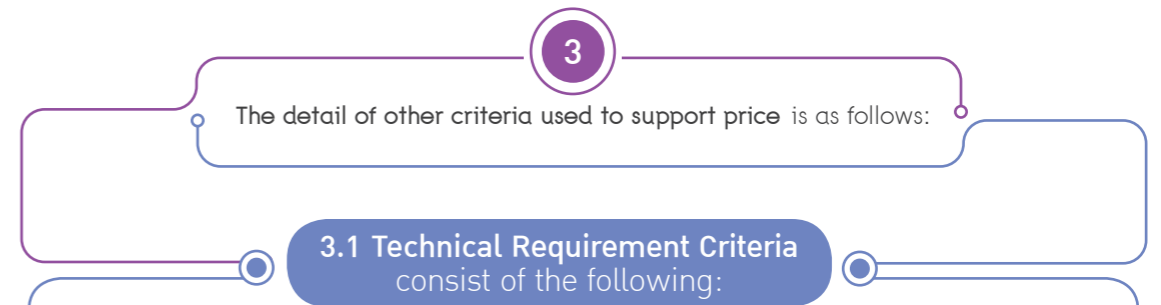
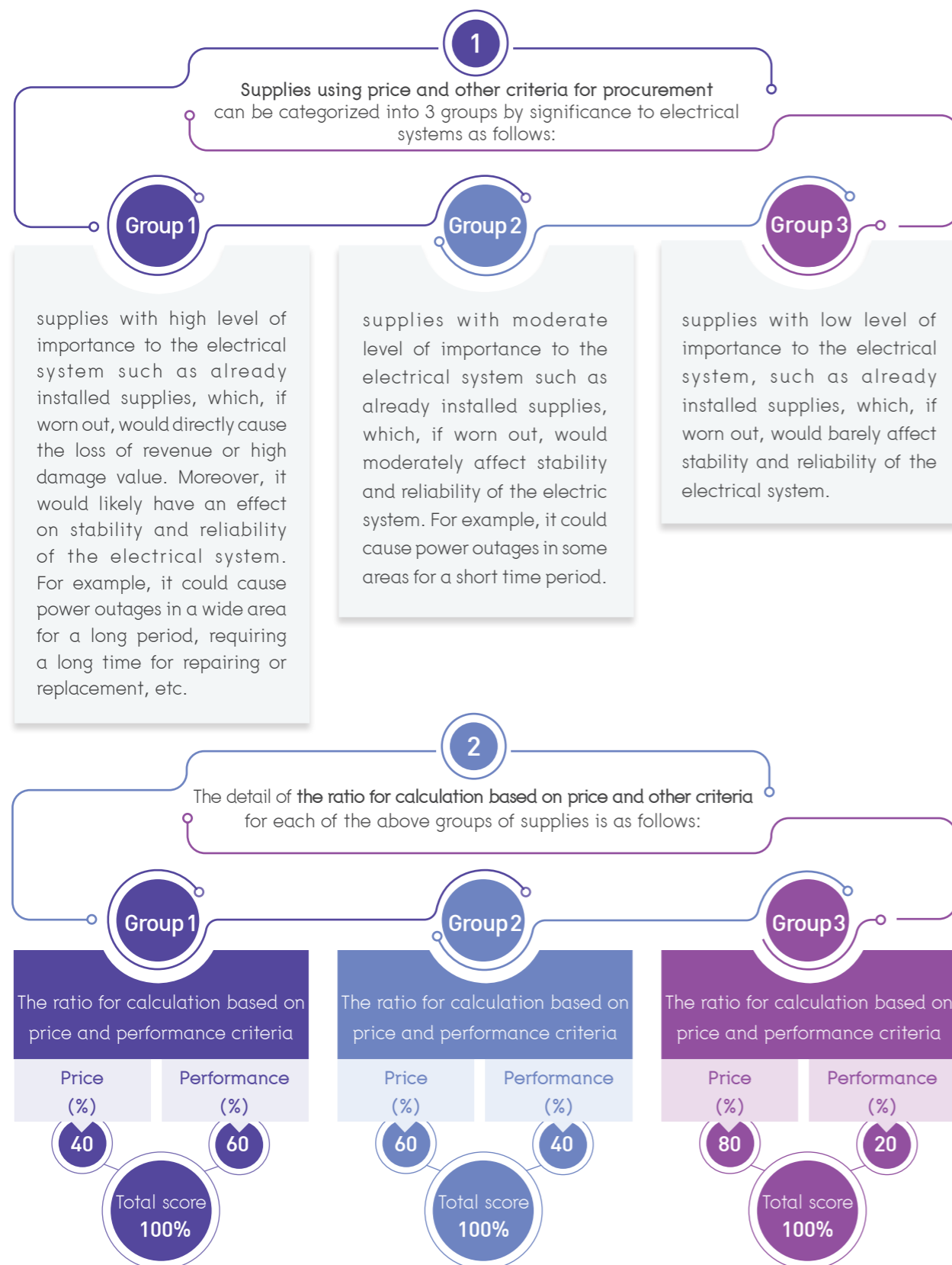


- PEA planned to survey, review, and create price and other criteria for PEA procurement to cover procurement of 11 major types of supplies.



## PEA's Environmental Criteria Used for Screening

The Detail of Price and Other Criteria is as Follows:



- (1) The proposed products had to be in accordance with PEA's technical specifications.
- (2) The proposed products had to be manufactured by ISO 9001 certified factories. If the proposed products did not meet any of the technical requirements, PEA would not proceed with procurement and would not perform assessment both in terms of price and performance.



- (1) History of damages, referring to PEA's database on product damage information in the past 3 calendar years (for example, the 2018 procurement relied on the damage history of 2017, 2016, and 2015 for calculation).
- (2) Products with a license to present industrial standard certification marks or products registered with the Ministry of Industry.
- (3) Products with "Green Label" certification or products from ISO 14001 certified factories (environmental management system standard).
- (4) Products from factories certified with ISO/IEC 17025 (competence of testing and calibration laboratories) covering all topics specified by PEA in the attached list of equipment or products manufactured by factories certified for routine test procedures or with testing unit certification by PEA.
- (5) Products under PEA Product Acceptance or Product List for power station construction contracts or other certified processes specified by PEA.



# Appendix

**Despite** being a utility service provider, “PEA” is ready to be by your side and come up with initiatives to move towards becoming a sustainable organization with social and environmental responsibility, through a smart, efficient, and eco-friendly energy management.

# GRI Content Index <sup>(102-55)</sup>



This report has been prepared in accordance with the GRI Standards: Core option <sup>(102-54)</sup>.

- For the Materiality Disclosures Service, GRI Services reviewed that the GRI content index is clearly presented and the references for Disclosures 102-40 to 102-49 align with appropriate sections in the body of the report.
- For the SDG Mapping Service, GRI Services reviewed that the disclosures included in the content index are appropriate mapped against the SDGs.

GRI Standard	Disclosure	Page Number(s) and/or URL(s)	Omission			SDG Linkage to Disclosure
			Identified Omission(s)	Reason(s) for Omission(s)	Explanation for Omission(s)	
GRI 101: Foundation 2016						
General Disclosures						
GRI 102: General Disclosures 2016	102-1 Name of the organization	14				
	102-2 Activities, brands, products, and services	14				
	102-3 Location of headquarters	18				
	102-4 Location of operations	18				
	102-5 Ownership and legal form	14				
	102-6 Markets served	18				
	102-7 Scale of organization	18-19, 67				
	102-8 Information on employees and other workers	90-91				SDG 8
	102-9 Supply chain	16-17				
	102-10 Significant changes to the organization and its supply chain	15, 18				
	102-11 Precautionary principle or approach	111, 113				
	102-12 External initiatives	19				
	102-13 Membership of associations	19				
	102-14 Statement from senior decision-maker	4-5				
	102-15 Key impacts, risks, and opportunities	30, 32-33				
	102-16 Values, principles, standards, and norms of behavior	20, 31				SDG 16
	102-18 Governance structure	15				
	102-19 Delegating authority	47				
	102-25 Conflicts of interest	21				SDG 16
	102-26 Role of highest governance body in setting purpose, values, and strategy	47				
	102-31 Review of economic, environmental, and social topics	28				
	102-32 Highest governance body's role in sustainability reporting	48				
	102-40 List of stakeholder groups	38, 40				
	102-41 Collective bargaining agreements	89				SDG 8
102-42 Identifying and selecting stakeholders	38					
102-43 Approach to stakeholder engagement	38, 40					
102-44 Key topics and concerns raised	38, 40					

GRI Standard	Disclosure	Page Number(s) and/or URL(s)	Omission			SDG Linkage to Disclosure
			Identified Omission(s)	Reason(s) for Omission(s)	Explanation for Omission(s)	
	102-45 Entities included in the consolidated financial statements	17, 128				
	102-46 Defining report content and topic boundaries	52-62				
	102-47 List of material topics	49, 50-51				
	102-48 Restatements of information	128				
	102-49 Changes in reporting	48				
	102-50 Reporting period	128				
	102-51 Date of most recent report	128				
	102-52 Reporting cycle	128				
	102-53 Contact point for questions regarding the report	128				
	102-54 Claims of reporting in accordance with the GRI standards	118, 128				
	102-55 GRI content index	118-125				
102-56 External assurance	126-127, 128					
Material Topics						
Economic Performance						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	31, 42, 66				
	103-2 The management approach and its components	24-27, 31-33, 42-46, 50-52, 66-67				
	103-3 Evaluation of the management approach	31-33, 43, 45, 52, 67				
GRI 201: Economic Performance 2016	201-1 Direct economic value generated and distributed	67				SDG 8, SDG 9
	201-3 Defined benefit plan obligations and other retirement plans	94				
Indirect Economic Impacts						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 68				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 53, 68-69				
	103-3 Evaluation of the management approach	43, 45, 53, 69				
GRI 203: Indirect Economic Impacts 2016	203-1 Infrastructure investments and services supported	69				SDG 5, SDG 9, SDG 11
	203-2 Significant indirect economic impacts	69				SDG 1, SDG 3, SDG 8
Procurement Practices						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 70				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 53, 71				
	103-3 Evaluation of the management approach	43, 45, 53, 71				

GRI Standard	Disclosure	Page Number(s) and/or URL(s)	Omission			SDG Linkage to Disclosure
			Identified Omission(s)	Reason(s) for Omission(s)	Explanation for Omission(s)	
GRI 204: Procurement Practices 2016	204-1 Proportion of spending on local suppliers	71				SDG 8
<b>Anti-corruption</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	20, 42				
	103-2 The management approach and its components	20-21, 24-27, 42-46, 50-52				
	103-3 Evaluation of the management approach	21, 23, 43, 45, 52				
GRI 205: Anti-corruption 2016	205-2 Communication and training about anti-corruption policies and procedures	22-23	Total number and percentage of employees that the organization's anti-corruption policies and procedures have been communicated to, and received training on anti-corruption, broken down by employee category.	Information unavailable	Improving the data collection process. The complete disclosure of information will report on the next reporting period.	SDG 16
	205-3 Confirmed incidents of corruption and actions taken	23				SDG 16
<b>Materials</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 110				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 62, 110-111				
	103-3 Evaluation of the management approach	43, 45, 62, 111				
GRI 301: Materials 2016	301-1 Materials used by weight or volume	112				SDG 8, SDG 12
<b>Supplier Environmental Assessment</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 113				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 62, 113				
	103-3 Evaluation of the management approach	43, 45, 62, 113				

GRI Standard	Disclosure	Page Number(s) and/or URL(s)	Omission			SDG Linkage to Disclosure
			Identified Omission(s)	Reason(s) for Omission(s)	Explanation for Omission(s)	
GRI 308: Supplier Environmental Assessment 2016	308-2 Negative environmental impacts in the supply chain and actions taken	113	Number of suppliers identified as having significant actual and potential negative environmental impacts.  Percentage of suppliers identified as having significant actual and potential negative environmental impacts with which improvements were agreed upon as a result of assessment and which relationships were terminated as a result of assessment, and why.	Information unavailable	Improving the data collection process. The complete disclosure of information will report on the next reporting period.	
<b>Employment</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 88				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 57, 88-89				
	103-3 Evaluation of the management approach	43, 45, 57, 89				
GRI 401: Employment 2016	401-1 New employee hires and employee turnover	92-93				SDG 5, SDG 8
	401-3 Parental leave	93				SDG 5, SDG 8
<b>Occupational Health and Safety</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 98				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 58, 98-99				
	103-3 Evaluation of the management approach	43, 45, 58, 99				
GRI 403: Occupational Health and Safety 2018	403-1 Occupational health and safety management system	90, 98				SDG 8
	403-2 Hazard identification, risk assessment, and incident investigation	98-99	A description of the policies and processes for workers to remove themselves from work situations that they believe could cause injury or ill health, and an explanation of how workers are protected against reprisals.	Information unavailable	Considering for improving the policies and processes. The complete disclosure of information will report on the next reporting period.	SDG 8

GRI Standard	Disclosure	Page Number(s) and/or URL(s)	Omission			SDG Linkage to Disclosure
			Identified Omission(s)	Reason(s) for Omission(s)	Explanation for Omission(s)	
	403-3 Occupational health services	99				SDG 8
	403-4 Worker participation, consultation, and communication on occupational health and safety	98-99				SDG 8, SDG 16
	403-5 Worker training on occupational health and safety	98				SDG 8
	403-6 Promotion of worker health	99				SDG 3
	403-7 Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	98				SDG 8
	403-8 Workers covered by an occupational health and safety management system	99				SDG 8
	403-9 Work-related injuries	100				SDG 3, SDG 8, SDG 16
<b>Training and Education</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 95				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 58, 95				
	103-3 Evaluation of the management approach	43, 45, 58, 96				
GRI 404: Training and Education 2016	404-1 Average hours of training per year per employee	96	Average hours of training that the organization's employees have undertaken during the reporting period, by employee category.	Information unavailable	Improving the data collection process. The complete disclosure of information will report on the next reporting period.	SDG 4, SDG 5, SDG 8
	404-2 Programs for upgrading employee skills and transition assistance programs	97				SDG 8
	404-3 Percentage of employees receiving regular performance and career development reviews	96				SDG 5, SDG 8
<b>Non-discrimination</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 88				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 57, 88-89				
	103-3 Evaluation of the management approach	43, 45, 57, 89				
GRI 406: Non-discrimination 2016	406-1 Incident of discrimination and corrective actions taken	89				SDG 5, SDG 8

GRI Standard	Disclosure	Page Number(s) and/or URL(s)	Omission			SDG Linkage to Disclosure
			Identified Omission(s)	Reason(s) for Omission(s)	Explanation for Omission(s)	
<b>Local Communities</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 108				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 61, 108				
	103-3 Evaluation of the management approach	43, 45, 61, 109				
GRI 413: Local Communities 2016	413-1 Operations with local community engagement, impact assessments, and development programs	108-109				
<b>Customer Health and Safety</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 105				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 60, 105				
	103-3 Evaluation of the management approach	43, 45, 60, 105				
GRI 416: Customer Health and Safety 2016	416-1 Assessment of the health and safety impacts of product and service categories	105				
<b>Customer Privacy</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 106				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 61, 106-107				
	103-3 Evaluation of the management approach	43, 45, 61, 107				
GRI 418: Customer Privacy 2016	418-1 Substantiated complaints concerning breaches of customer privacy and losses of customer data	107				SDG 16
<b>Socioeconomic Compliance</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	20, 42				
	103-2 The management approach and its components	20-21, 24-27, 42-46, 50-51, 56				
	103-3 Evaluation of the management approach	21-23, 43, 45, 56				
GRI 419: Socioeconomic Compliance 2016	419-1 Non-compliance with laws and regulations in the social and economic area	23				SDG 16

GRI Standard	Disclosure	Page Number(s) and/or URL(s)	Omission			SDG Linkage to Disclosure
			Identified Omission(s)	Reason(s) for Omission(s)	Explanation for Omission(s)	
<b>Availability and Reliability</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 72				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 54, 72-73				
	103-3 Evaluation of the management approach	43, 45, 54, 73				
Electric Utilities (EU)-Specific Information Disclosure of Electric Utilities Sector according to GRI	Management approach to ensure short and long-term electricity availability and reliability (former EU6)	74-75				SDG 7
	EU10 Planned capacity against projected electricity demand over the long-term, broken down by energy source and regulatory regime	76-79				SDG 7
<b>Demand-Side Management</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 72				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 54, 72-73				
	103-3 Evaluation of the management approach	43, 45, 54, 73				
Electric Utilities (EU)-Specific Information Disclosure of Electric Utilities Sector according to GRI	Demand-side management programs including residential, commercial, institutional and industrial programs (former EU7)	80-81				SDG 7, SDG 8, SDG 12, SDG 13
<b>Research and Development</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 82				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 55, 82				
	103-3 Evaluation of the management approach	43, 45, 55, 82				
Electric Utilities (EU)-Specific Information Disclosure of Electric Utilities Sector according to GRI	Research and development activity and expenditure aimed at providing reliable electricity and promoting sustainable development (former EU8)	83				SDG 7, SDG 9, SDG 17
<b>System Efficiency</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 72				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 55, 72-73				
	103-3 Evaluation of the management approach	43, 45, 55, 73				
Electric Utilities (EU)-Specific Information Disclosure of Electric Utilities Sector according to GRI	EU12 Transmission and distribution losses as a percentage of total energy	79				SDG 7, SDG 8, SDG 12, SDG 13, SDG 14

Electric Utilities (EU) - Specific Information Disclosure of Electric Utilities Sector according to GRI

GRI Standard	Disclosure	Page Number(s) and/or URL(s)	Omission			SDG Linkage to Disclosure
			Identified Omission(s)	Reason(s) for Omission(s)	Explanation for Omission(s)	
<b>Disaster/Emergency Planning and Response</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	34, 42				
	103-2 The management approach and its components	24-27, 29, 34, 42-46, 50-51, 56				
	103-3 Evaluation of the management approach	35, 43, 45, 56				
Electric Utilities (EU)-Specific Information Disclosure of Electric Utilities Sector according to GRI	Contingency planning measures, disaster/emergency management plan and training programs, and recovery/restoration plans (former EU21)	34-35 <a href="https://www.pea.co.th/en/About-PEA/Business-Continuity-Management">https://www.pea.co.th/en/About-PEA/Business-Continuity-Management</a>				SDG 1, SDG 11
<b>Access</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 101				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 59, 101				
	103-3 Evaluation of the management approach	43, 45, 59, 101				
Electric Utilities (EU)-Specific Information Disclosure of Electric Utilities Sector according to GRI	Programs, including those in partnership with government, to improve or maintain access to electricity and customer support services (former EU23)	101, 103				SDG 1, SDG 7
	EU28 Power outage frequency	73, 102				SDG 1, SDG 7
	EU29 Average power outage duration	73, 102				SDG 1, SDG 7
<b>Provision of Information</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 104				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 59, 104				
	103-3 Evaluation of the management approach	43, 45, 59, 104				
Electric Utilities (EU)-Specific Information Disclosure of Electric Utilities Sector according to GRI	Practices to address language, cultural, low literacy and disability related barriers to access and safely use electricity and customer support services (former EU24)	104				SDG 1, SDG 7
<b>Cyber Security</b>						
GRI 103: Management Approach 2016	103-1 Explanation of the material topic and its boundary	42, 106				
	103-2 The management approach and its components	24-27, 42-46, 50-51, 60, 106-107				
	103-3 Evaluation of the management approach	43, 45, 60, 107				

Electric Utilities (EU) - Specific Information Disclosure of Electric Utilities Sector according to GRI



# Assurance Statement <sup>(102-56)</sup>



## Assurance Statement

### To Provincial Electricity Authority on the Sustainability Report 2019

Provincial Electricity Authority or PEA requested the Foundation for Thailand Rural Reconstruction Movement under Royal Patronage by the Thaipat Institute to carried out an assurance engagement response to the Sustainability Report 2019.

#### Criteria for report preparation

- GRI Sustainability Reporting Standards, in accordance with the Standards using 'Core' option.

#### Criteria for assurance standards

- The AA1000 Assurance Standard (AA1000AS 2008).

#### Addressee

The intended users of this assurance statement are the management of PEA and its associated stakeholders.

#### Scope of Assurance

The scope of this assurance engagement based on Type 1, Accountability Principles: evaluation of adherence to the AA1000 Accountability Principles and to the GRI Sustainability Reporting Standards in accordance with 'Core' option. The scope of this assurance engagement does not provide conclusions on the reliability of the performance information.

#### Disclosures Covered

The assurance engagement is based on information that is publicly disclosed on the Sustainability Report 2019 of PEA for the year ended 31 December 2019.

#### Methodology

We carried out Type 1 moderate assurance in accordance with AA1000AS. The Type 1 engagement requires us to report on the nature and extent of adherence to AA1000 APS. To achieve moderate level assurance, we have used the criteria in AA1000AS to evaluate adherence to AA1000APS. We undertook the following procedures:

- Reviewed the policies, practices, management systems and processes and performance

information to be included within the Sustainability Report 2019 of PEA.

- Analyzed information on performance provided in the Sustainability Report 2019 of PEA as a source of evidence to evaluate adherence to the principles and guidelines.
- Inquired the processes PEA undertaken to adhere to the principles of inclusivity, materiality and responsiveness.
- Assessed the extent to which PEA has applied the GRI Reporting Standards including the Reporting Principles and GRI Electric Utilities Sector Disclosures.
- Provided observations/recommendations to PEA in accordance with the Scope of Assurance based on defined criteria.

#### Findings and Conclusions

- Based on the scope of assurance using the AA1000AS (2008), we conclude that PEA has applied processes and procedures that adhere with the principles of inclusivity, materiality and responsiveness as set out in the AA1000APS (2008); and
- Based on the scope of assurance using the GRI Reporting Standards, we conclude that PEA has followed Reporting Principles and Standard Disclosures in a reasonable and balanced presentation of information and consideration of underlying processes for preparing the report.

#### Observations and Recommendations

Nothing came to our attention which caused us to believe that the Sustainability Report 2019 of PEA did not adhere to the Principles. To improve future reporting of Sustainability in accordance with AA1000APS, we have made following observations:

*Inclusivity:* The report demonstrates the stakeholder identification, various channels of stakeholder engagements, stakeholder expectations, practices to stakeholders as well as disclosures which show sustainability performance results of those actions. However, PEA should establish ways for stakeholders

to be involved in decisions that will improve sustainability performances.

*Materiality:* The report clearly illustrates its defining report content process on materiality principle according to GRI standards. Also, the assessment process, and the linkage to relevant Sustainable Development Goals (SDGs).

*Responsiveness:* The report demonstrates its intensive response on the material topics in relating to PEA sustainable development strategies – Performance- People-Planet with corresponding targets, management approach and topic-specific disclosures.

To improve future sustainability reporting in relation to GRI Reporting Standards, we have made the following observations:

PEA has in place the underlying processes for preparing the report content indicated on Standard Disclosures including GRI G4 Electric Utilities Sector Disclosures. It is observed that PEA has room to improve on principles for ensuring report content and quality, such as balance and comparability.

In addition to the recommendations, there are a number of suggestions:

- Performance on indirect economic impacts should be indicated specific communities or local economies impacted by PEA's infrastructure investments and services supported.
- Performance on anti-corruption shall be indicated total number and percentage of employees that PEA's anti-corruption policies and procedures have been communicated and received training on anti-corruption, broken down by employee category.
- Performance on supplier environmental assessment shall be indicated number of suppliers who having significant actual/potential negative environmental impacts, percentage of those suppliers which improvements were agreed upon and percentage of those suppliers which relationships were terminated as a result of assessment.
- Performance on occupational health and safety shall be indicated the policies and processes for workers to remove themselves from work situations that they believe could cause injury or ill health, and the explanation of how workers are protected against reprisals.
- Performance on training and education shall be indicated in term of average hours of training that PEA's employees have undertaken during the reporting period by employee category.

- Performance on local communities shall be indicated percentage of operations with implemented local community engagement, impact assessments, and/or development programs.

#### Competencies and Experiences

Thaipat Institute is a public organization established in 1999 with its roles in researching, training, and consulting in corporate responsibility and sustainability practices. Thaipat Institute is an AA1000AS (2008) Licensed Providers granted by AccountAbility, the creator and proprietor of the AA1000 Assurance Standard. In 2010, Thaipat Institute has become the first GRI Organizational Stakeholder in Thailand and has been certified as GRI training partner in Thailand since 2013. Our team has the relevant professional and technical competencies and experience in corporate responsibility and sustainability for several years.

For Thaipat Institute

By Veraya Preeyapan

Bangkok  
7 Aug 2020



## About this Report

### History of the Report <sup>[102-48]</sup>

The 2019 Sustainability Report is the third report following the 2017 Sustainability Report <sup>[102-51]</sup> which the Provincial Electricity Authority (PEA) has delivered according to the GRI Standards in order to disclose annual operational results of the organization in terms of economic, social and environmental performance, with annual reporting period <sup>[102-52]</sup> from 1<sup>st</sup> January to 31<sup>st</sup> December 2019 <sup>[102-50]</sup> and guidelines used for the report based on the GRI Standards and Electric Utilities (EU) of the Global Reporting Initiative (GRI), 'This report has been prepared in accordance with the GRI Standards: Core option' <sup>[102-54]</sup> based on the extent for the disclosure of information.

Furthermore, to express the determination dedicated to sustainable development, PEA conducts its operation in connection with the 17 Sustainable Development Goals (SDGs) of the United Nations, which are included in this report as well.

### Scope of the Report <sup>[102-45]</sup>

The disclosure of information in this report shows the information and impacts from the operation thoroughly throughout the value chain of PEA. The scope of the report covers PEA Headquarters and its provincial offices, power plants, power stations, including relevant stakeholders, the scope however does not extend to its affiliates.

### External Assurance for the Report <sup>[102-56]</sup>

The Board of Directors and high-level executives of PEA are tasked to monitor and give advices, as well as to approve and validate important information in this report, in order to deliver a report with inclusive and complete content and comprehensive coverage of responses to every group of stakeholders.

Moreover, PEA provides the endorsement of report from Third Party entities with expertise in the endorsement and External Assurance of the process for the making of the report, in order to enhance credibility and transparency according to the reporting guidelines of the GRI Standards.

### Upgrade of the Quality in Preparation for the Report

PEA opens up an opportunity for every group of stakeholders to be able to express their opinions and comments regarding the annual Sustainable Development Report via questionnaires to draw opinions and comments of readers, which PEA will use for the development and upgrade in preparation for the next Sustainable Development Report in order to satisfy the needs, demands/expectations of the stakeholders.

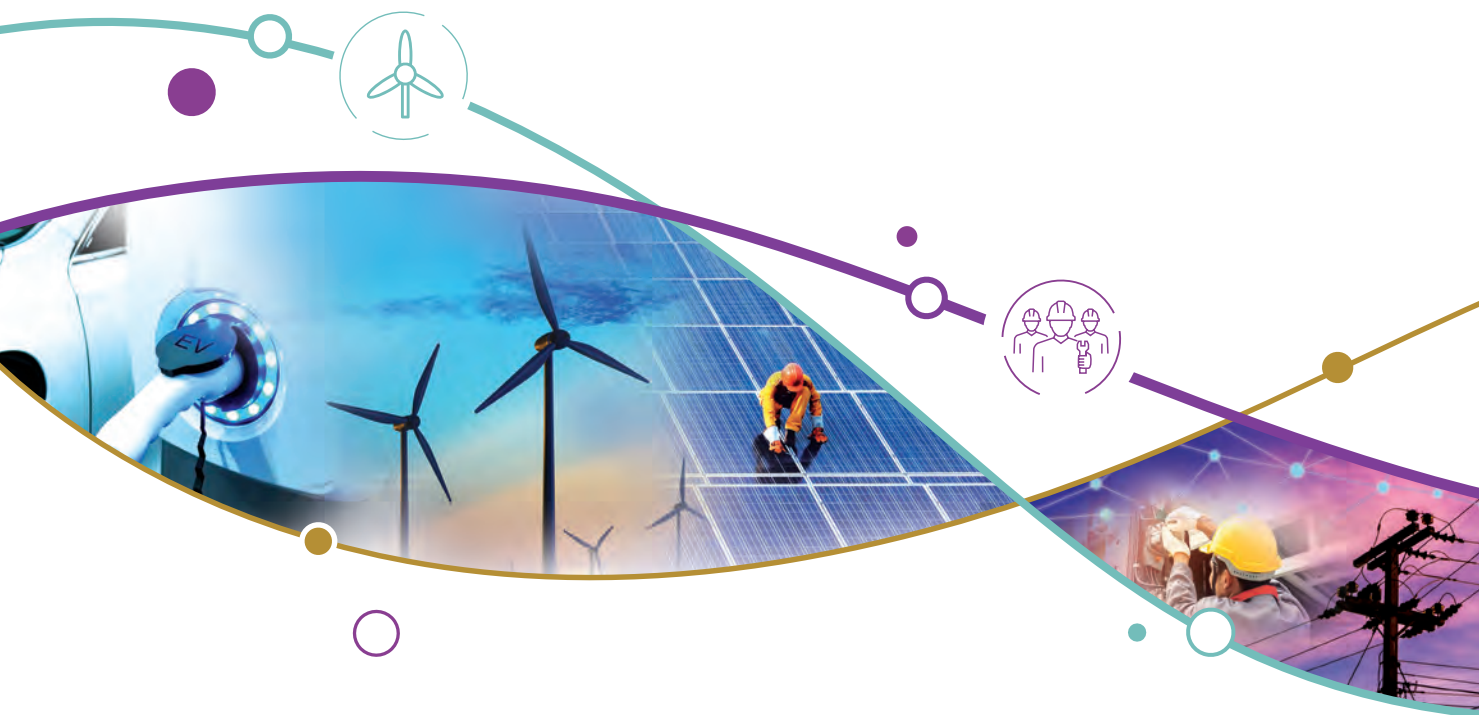
### Inquiry for information <sup>[102-53]</sup>

Any additional suggestion or inquiry for information shall be directed to the Corporate Social Responsibility Department, PEA Headquarters, LED Building, 200 Ngamwongwan Road, Ladyao Sub-district, Chatuchak District, Bangkok 10900,  
E-mail: analysis.csr@pea.co.th,  
Tel.: 0 2590 9916, Fax: 0 2590 9919.

For more information about PEA's work on sustainability, please follow us at

[www.sustainability.pea.co.th](http://www.sustainability.pea.co.th)





## Provincial Electricity Authority

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