Sustainability Report 2017

The Electric Utility of the Future

PEA

The Electric Utility of the Future

Every steps of PEA

means the revolutionize for the better. PEA aims to develop all aspects to create an innumerable stability under the following 7 important technology driven plans

4.0

Human Capital

The investment in develop employees to be equipped with skills, experienced and ready for digital world.

Service

Improve and increase customer service performance to achieve an impeccable services.

Grid

PEA Smart Grid

For modern electricity, PEA will develop protocols to enhance strong grid and support smart grid.

Innovation

Build and design technological innovation, establish knowledge to expand the usage of commercialized electrical equipment (PEA Brand) for internally, and substitution including outsider reduction acquirement.

ICT

Focus on quality of technology.

Create information technology, communication to support Smart Grid development and internet of thing society.

Business Investment

In order to own a project or to be a partner in any projects for a new business, PEA must be well prepared and ready for worth investing and support very fast growth in technology.

Asset Management

Utilize all the resources efficiency and effectively.

Focus on asset management properly within the organization since the purchasing process, maintenance during the passage of time and end cycle of each asset.

Contents

Message from PEA Governor [102-14]

2017 was a year of innovation and development for the Provincial Electricity Authority (PEA), focusing on streamlining organizational operations and developments in several dimensions in an attempt to catapult PEA into "the Electric Utility of the Future." Its vital operational philosophy is "Being Committed to Developing People; Promoting Innovation; Creating New Businesses; Keeping Pace with Technology; Providing Service Excellence; Being Transparent; and Focusing on Civil State Policy," all of which are conducive to moving the organization toward sustainability.

PEA has mobilized its organization in accordance with its organizational strategy plan and PEA 4.0 Policy, ushering in innovation as a component that drives the organization's key businesses by increasing the motivation to create work portfolios in areas that include Production Innovation, Process Innovation, and Business Model Innovation. In terms of the provision of services, PEA has come up with a mobile application called "PEA Smart Plus" for customers in order to facilitate and provide them with useful information and news. In addition, PEA is committed to the development and creation of a new renewable energy business, designating its affiliate, PEA ENCOM International Company Limited, to operate a solar rooftop business in an effort to provide an additional choice of full-fledged services to customers, as well as to accommodate the exponential changes that come with disruptive technologies. In conjunction with other aforementioned plans, PEA also fully focuses on the capacity-building of its employees in hopes of accommodating future businesses, while, at the same time, organizing the body of knowledge that responds to innovation creation and major operations in a complete manner.

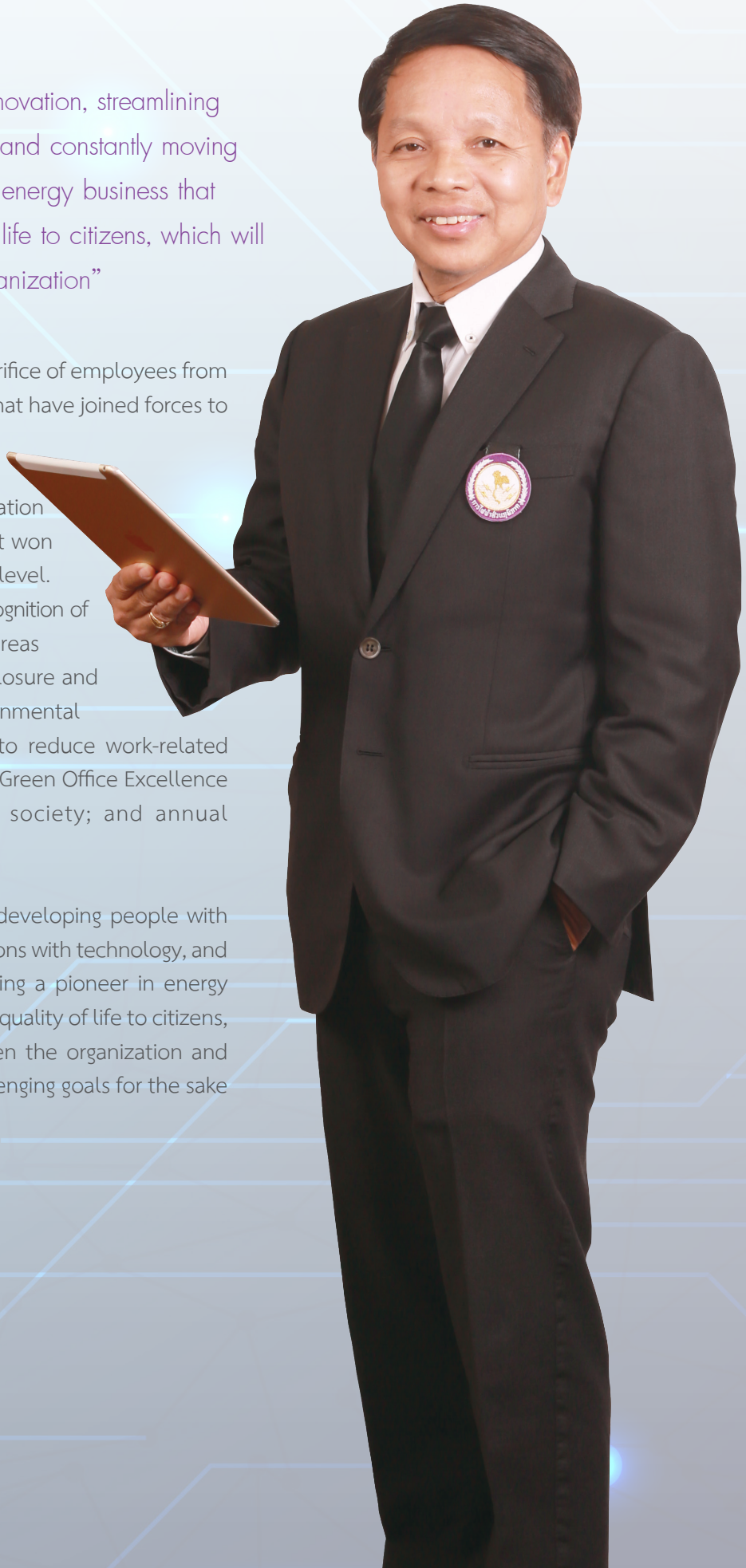
With regard to corporate governance, PEA operates its business by complying with the principle of good governance and developing its good cooperate governance practices in accordance with international standards. Furthermore, PEA seeks to develop and increase efficiency in its operational management system in line with PEA's transparency standards, while also aiding in the expansion of operational performance that fully covers the entire organization by consistently adopting good corporate governance. In doing so, PEA has received the State Enterprise Awards for Development Excellence in mobilizing work plans that raised the level of operational integrity and transparency. Those awards were given in recognition of two areas: Excellence in Operational Integrity and Transparency and Excellence in Corruption-Free Work Environment. Aside from those accolades, PEA was ranked first among energy corporations in the Integrity and Transparency Assessment (ITA), the results of which were far better than in previous years.

PEA remains committed to operating in a manner that brings about sustainability by raising the profile of its operational work in Corporate Social Responsibility in Process, while also conforming to guidelines on sustainability in accordance with international standards to create operational principles that generate shared value and promote the involvement of all relevant sectors.

The Electric Utility of the Future

Grow together...with PEA

"Developing people with innovation, streamlining operations with technology, and constantly moving towards being a pioneer in energy business that delivers the good quality of life to citizens, which will ultimately strengthen the organization"



Thanks to the diligence and sacrifice of employees from all departments and divisions that have joined forces to carry out their duties to the best of their abilities, PEA has now become a leading organization with outstanding portfolios that won several awards at the national level. Those awards were given in recognition of its outstanding efforts in many areas which include information disclosure and transparency; social and environmental operations; campaigns raised to reduce work-related accidents to zero (Gold Level); Green Office Excellence (G-Gold); power energy for society; and annual sustainability reports.

PEA will still be dedicated to developing people with innovation, streamlining operations with technology, and constantly moving towards being a pioneer in energy business that delivers the good quality of life to citizens, which will ultimately strengthen the organization and enable it to walk towards challenging goals for the sake of sustainable development.

(Mr. Sermsakool Klaikaew)
PEA Governor

About this Report [102-48]

This sustainability report was prepared in accordance with the GRI Standards and the Electric Utilities Sector Disclosures of the Global Reporting Initiative, identifying the content of the organizational profile, management approaches, and performance related to material topics of substantiality covering economic, social, and environmental dimensions. The report aims to analyze and link the sustainability operations to the Sustainable Development Goals of the year 2030 in a manner consistent with the criteria and scope of the report as follows:

Claims of reporting in accordance with the GRI Standards [102-54]	This report has been prepared in accordance with the GRI Standards: Core option.
Reporting Period [102-50]	January 1, 2017 - December 31, 2017
Reporting Cycle [102-52]	Annual
Defining Report Content and Topic Boundaries [102-45]	The disclosure of report content only covers the internal agencies of the Provincial Electricity Authority, excluding its affiliates due to the limitations of the data collection system. Nonetheless, in order to bring about the inclusiveness and clarity of the content, PEA will seek to strategize and streamline the data collection system to the effect that it fully complies with the GRI standards in the future.
External Assurance [102-56]	The Board of Directors of the PEA are tasked with monitoring the making of this sustainability report and providing suggestions in an attempt to bring about the inclusiveness of the report, covering all material topics relevant to the organization and stakeholders. In addition, they have a role in approving and verifying the accuracy of the content. Moving forward, the organization has a plan to allow third party agencies to examine the report in an effort to build trust and bring about the inclusiveness of the report.
Date of Most Recent Report [102-51]	PEA Sustainability Report 2017

Defining Report Content [102-46]

PEA conducted a material assessment, as well as took into account the opinions and suggestions of the stakeholders in an effort to review the assessment of the organization's material topics and stakeholders. The process is as follows:

Step 1: Identification

Identify topics of interest relevant to the organization's sustainability by taking into account both positive and negative impacts and boundaries that can occur within and outside of the organization in order to analyze relevant topics in line with the principles of stakeholder inclusiveness and sustainability context. These principles are considered based on important information including the organization's business nature and strategies, organizational risks, GRI Standards indicators, world trends of similar business types, and material topics gleaned from the stakeholders' viewpoints and expectations.

Step 2: Prioritization

Organize workshops to define report content in cooperation with senior-level executives and relevant employees by means of the Materiality Test that prioritizes and takes into account the significance of each topic on two dimensions: 1) Influence on stakeholder assessments and decisions 2) The significance of economic, environmental, and social impacts.

Step 3 Validation

Validate the completeness of material topics and present a validated list of material topics of sustainability to senior-level executives who will approve and assess them against the topic boundaries both within and outside of the organization, so as to make sure that they cover the organization's economic, social, and environmental impacts.

Step 4 Review

Review a variety of material topics, content details, stakeholders' opinions and suggestions, all of which were identified in a previous report (such as the questionnaire in the appendix of the report and the organization's participation in the Thai Listed Companies Association-led assessment of a sustainability report), so that the organization can use these suggestions and opinions to improve its sustainability report in the following year.

In this regard, according to the abovementioned process of defining report content, the outcome of the assessment of each of the material topics and reporting boundaries that covers the impacts both inside and outside of the organization can be summarized as follows:

Contact Point for Questions Regarding the Report [102-53]

Please Contact : The Department of Corporate Social Responsibility, Provincial Electricity Authority
Head Office: 200 Ngamwongwan Road, Ladyao Sub-district, Chatuchak District, Bangkok 10900
Tel : 02-590-9916 Fax : 02-590-9919
Website : www.pea.co.th Facebook : www.facebook.com/PEACSR

[102-47] [102-49] [103-1]

Performance	Material Topics According to GRI	Topic Boundaries	
		Within Organization	Outside Organization
Economic	Economic Performance	•	Regulatory Agencies
	Indirect Economic Impacts	•	Customers / Communities and Society
Environmental	Energy	•	Communities and Society
	Effluents and Waste	•	
	Environmental Compliance	•	
Labor Practices	Employment	•	-
	Occupational Health and Safety	•	-
	Training and Education	•	-
Human Rights	Non-discrimination	•	Customers
Social	Local Communities	•	Communities and Society
	Anti-Corruption	•	Customers / Regulatory Agencies /Collaborators / Trading Partners / Suppliers/ Communities and Society
Product Responsibility	Customer Health and Safety	•	Electric Power Users
	Customer Privacy	•	Electric Power Users
	Provision of Information	•	Customers / Regulatory Agencies /Collaborators / Trading Partners / Suppliers/ Communities and Society
Electric Utility Business	Availability and Reliability	•	Customers/ Communities and Society
	System Efficiency	•	Customers/ Communities and Society
	Disaster/Emergency Planning and Response	•	Customers/ Communities and Society
	Research and Development	•	Customers
	Demand-Side Management	•	Customers/ Communities and Society
	Access	•	Customers/ Communities and Society

Remark : Quotation "•" denotes PEA's internal agencies

Vision, Mission, Core Value and Core Competency

Vision

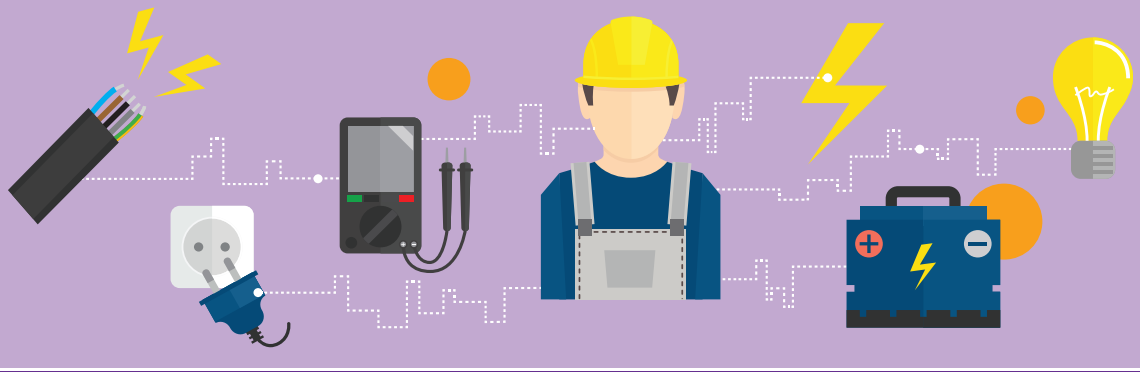
PEA, a leading modern organization, aims to provide efficient and reliable electricity services for quality of life, sustainability of economy and society.

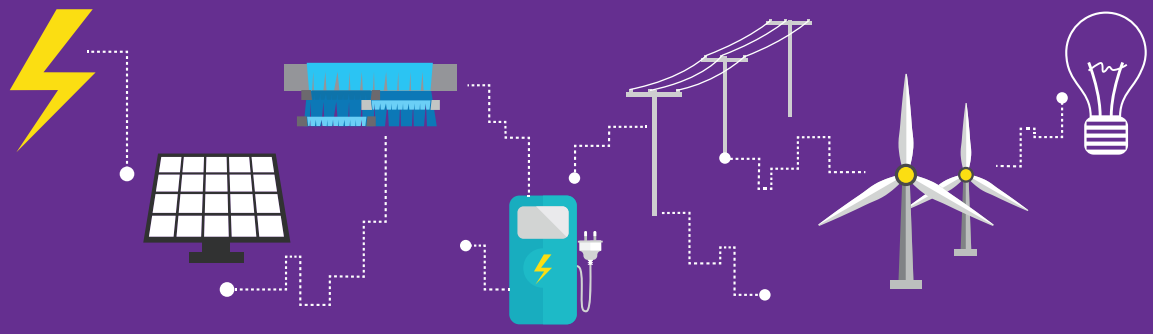
Mission

PEA is responsible for the provision of standardized electricity services and related business to attain the customer's satisfaction on products and services through PEA's continual corporate development plans with the recognition of social and environmental responsibility.

Core Value [102-16]

Modernization, Good Services, Good Governance





Core Competency

Organization's Core Competency

- Manage and provide inclusive, efficient, secure and reliable services in electric power distribution systems.
- Provide full-fledged, standardized and reliable services in electric power system.

Organization's Needed Competency in the Future

- Enhance operational competencies and employees' skills to accommodate the expansion of relevant businesses in the future.

Getting to Know Provincial Electricity Authority

The Provincial Electricity Authority was established as the **"Provincial Electricity Organization"** on March 6, 1954 and was subsequently published in the Royal Gazette on March 16, 1964, with an initial legal capital of 5 million Baht. In addition, there were 117 electricity authority offices under its supervision. It was not until September 28, 1960 that it was officially established as the **"Provincial Electricity Authority"** under the Provincial Electricity Authority Act B.E. 2503, taking over and the mission of the Provincial Electricity Organization in order to create continuity in its operations; accommodate the expansion of large communities; and respond to public demands for electricity. At the time, PEA had the capacity to generate electricity for 26.4 million units (kilowatt-hour), making electricity available to approximately 1 million citizens out of a total of 23 million citizens, or 5 percent of the total population.

At the present time, the Provincial Electricity Authority (PEA) is an energy state enterprise under the Ministry of Interior, whose primary business operations are related to electric power supplies, services, and other supporting businesses covering 7 work areas: electric power systems construction, power supply rental, repair and maintenance, electrical testing/inspection and analysis, personnel development workshops, consulting and design services and etc. PEA is regarded as a leading electric power service provider that has networks of transmission and distribution covering 74 provinces with the exception of Bangkok, Nonthaburi, and Samut Prakan - a total of 99.99 percent of all areas in Thailand. The highest amount of electricity transmitted was 132,401 million units per a total of 19,360,779 customers. The head office is located at 200 Ngam Wong Wan Road, Ladyao Sub-district, Chatuchak District, Bangkok 10900. There are 29,835 employees and 5,826 workers. [102-1] [102-2] [102-3] [102-5] [102-7]

Structure of PEA's Electric Power Customers in 2017 [102-6]

Organizational Profile Summarized on December 31, 2017

Number of Personnel by Employment Type [102-8]

Year	Gender	Employees	Workers
2015	Male	21,969	3,676
	Female	7,433	1,958
2016	Male	22,309	3,809
	Female	7,799	1,957
2017	Male	22,002	3,881
	Female	7,833	1,945

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 Burea/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 Centre, Manager of Electric Vocational School, Manager of PEA Grade 2,3 or those in equivalent positions, Deputy/Assistant Manager of Division, Deputy/Assistant Director of Centre, Deputy/Assistant to Technician School Directors, PEA Deputy Managers Grade 1-2, Manager of PEA Branch, Assistant Manager of PEA Grade 3, Chief of Section, Manager of PEA Subbranch, Assistant Chief of Section, (2) Groups of Specialists such as Expert Level 12-13, Professional Officer Level 9-11, Specialists Level 9, Professional Officer Level 7-8, Specialists Level 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.

Number of Personnel by Area [102-8]

Area	Employees			Workers		
	2015	2016	2017	2015	2016	2017
Head Office	4,002	4,137	4,105	250	248	249
North	6,052	6,099	6,023	1,197	1,211	1,169
Northeast	6,774	6,980	6,912	1,346	1,350	1,440
Central	7,094	7,268	7,196	1,635	1,723	1,704
South	5,480	5,624	5,599	1,206	1,234	1,264

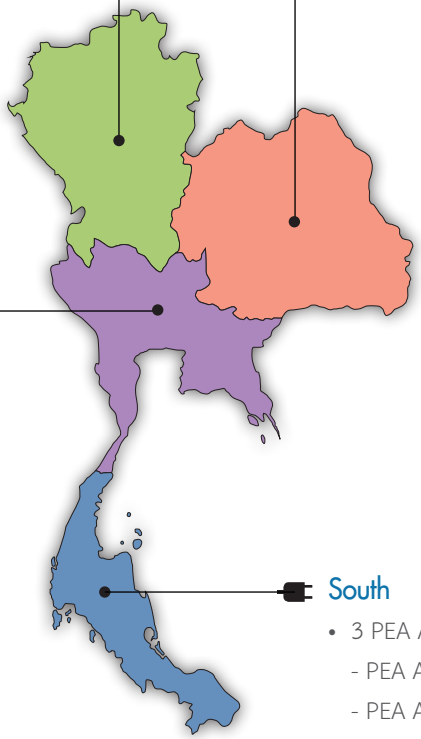
Number of PEA's Citizen Service Offices [102-4] [102-6] [102-7] [102-10]

North

- 3 PEA Areas
  - PEA Area 1, Chiang Mai Province (N.1)
  - PEA Area 2, Pitsanulok Province (N.2)
  - PEA Area 3, Lopburi Province (N.3)
- 40 PEA Offices in Province/district
- 88 PEA Branches
- 120 PEA Sub-branches
- 18 Service Centers
- 14 VSPPs
- 112 Substations
- 31 Warehouses

Northeast

- 3 PEA Areas
  - PEA Area 1, Udon Thani Province (NE.1)
  - PEA Area 2, Ubon Ratchathani Province (NE.2)
  - PEA Area 3, Nakhon Ratchasima Pronvince (NE.3)
- 43 PEA Offices in Province/district
- 86 PEA Branches
- 182 PEA Sub-branches
- 21 Service Centers
- 4 VSPPs
- 108 Substations
- 34 Warehouses



Central

- 1 Head Office
- 3 PEA Areas
  - PEA Area 1, Phra Nakhon Si Ayuttaya Province (C.1)
  - PEA Area 2, Chon Buri Province (C.2)
  - PEA Area 3, Nakhon Prathom Province (C.3)
- 62 PEA Offices in Province/district
- 53 PEA Branches
- 62 PEA Sub-branches
- 29 Service Centers
- 12 Small Power Stations
- 244 Power Stations
- 32 Warehouses

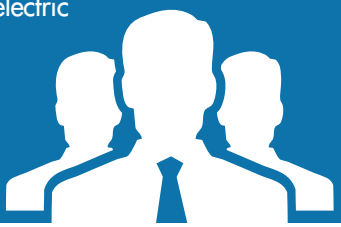
South

- 3 PEA Areas
  - PEA Area 1, Petchaburi Province (S.1)
  - PEA Area 2, Nakhon Si Thammarat Province (S.2)
  - PEA Area 3, Yala Province (S.3)
- 41 PEA Offices in Province/district
- 62 PEA Branches
- 94 PEA Sub-branches
- 22 Service Centers
- 15 VSPPs
- 100 Substations
- 29 Warehouses

PEA's Affiliate [102-45]

PEA ENCOM International Company Limited (PEA ENCOM)

PEA ENCOM was established in line with the cabinet resolution dated June 3, 2009 in order to invest in domestic and international energy businesses and provide workshops on electric power systems to private and public sectors in Thailand and internationally. It was registered as a juristic person on October 14, 2009 in which the PEA held all shares. Its initial capital was 100 million baht and has risen to 782.28 million baht at the present time.



Organizational Charters, Principles, Initiatives, and Membership [102-12] [102-13]

PEA has operated business in accordance with the provisions of the PEA Act (4th Edition) B.E. 2542 and has also complied with the set of rules, criteria, and provisions of the State Enterprise Policy Office (SEPO). In addition, PEA has implemented charters, principles, and initiatives at the national and international level to develop the development in an effective and efficient manner, so as to deliver value to the organization and society simultaneously. Its primary objective is to move the organization towards sustainable development in line with the international context. These efforts are manifested in the following projects: participating in the achieving of the Sustainable Development Goals (SDGs); preparing sustainability reports in line with the Global Reporting Initiative (GRI); implementing Down Jones Sustainability Indices (DJSI) and the ISO26000 Social Responsibility Guidance Standard to develop a master plan on PEA's social and environmental responsibility; emphasizing the development and promotion of good corporate governance and moving towards the standards of the Organization for Economic Co - operation and Development (OECD); applying internal control systems in accordance with the Committee of Sponsoring Organizations of the Treadway Commission (COSO); applying the ISO/IEC 27001:2013 Information Security Management System (ISMS); bringing its Business Continuity Management Systems (BCMS) in harmony with the ISO22301 business continuity standard; signing a memorandum of understanding on Thailand's Public Sector Collective Action Coalition Against Corruption (PCAC) to fight against bribery in all forms.

Economic Value Distribution and Wealth Generation for Stakeholders [102-7] [201-1]

Direct Economic Value Generated and Distributed	Amount (Million Baht)		
	2015	2016	2017
(1) Direct Economic Value Generated			
• Revenues	465,754.73	456,707.78	463,747.42
(2) Direct Economic Value Distributed			
• Operating Costs	418,621.59	403,130.90	408,119.81
• Employee Wages and Benefits	22,440.93	24,361.62	24,662.89
• Payments to Providers of Capital	3,313.29	3,087.61	3,056.45
• Payments to Government	13,636.00	13,039.00	13,857.00
• Community Investment	278.77	234.79	294.54
(1)-(2) Economic Value Retained	7,464.14	12,853.86	13,756.72

PEA's total revenue in 2017 was 463,747.42 million baht, an increase from 2016 by 7,039.64 million baht. Its direct economic value in 2017 stood at 449,990.69 million baht whereby its operating costs rose to 4,988.91 million baht. Its employee wages and benefits also rose by 301.27 million baht, while its payments to providers of capital dropped by 31.16 million baht. Its payments to the Government or the Ministry of Treasury increased by 818 million baht. Its community-related investments such as social, environmental, public and charity expenditures rose by 59.75 million baht compared to 2016.

PEA's Supply Chain [102-9]

Regulatory Agency

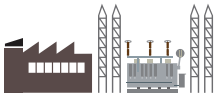
Suppliers

Electricity Generating Authority of Thailand (EGAT)

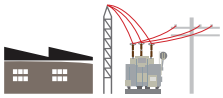
Very Small Power Producers (VSPPs)

Solar PV Rooftop

Employees, Trading Partners, Collaborators



High Voltage Electricity Power System



Medium Voltage Electricity Power System

Low Voltage Electricity Power System

Customers/Service Users Community Society and Environment

Large Electric Power Users, Large-Scale Industries

Medium-Scale Instructress, Hotels, Condominiums, Department Stores

Small Electric Power Users, Households

Value Chain Management [102-9]

PEA recognizes the importance of managing relationships with stakeholders throughout its value chain, not by simply focusing on providing products and services of adequate, quality, and on time, but also by placing emphasis on transparent, fair, and non-discriminatory procurement, with extensive communication and convenient complaint channels. PEA also recognizes the importance of fostering knowledge and management skills such as improving cooperation to optimize operations, developing a body of knowledge and experiences of its personnel to sustainably advance its competitiveness at the international level, which is only possible through cooperation with its entire value chain.

Types of stakeholders in the value chain

PEA has categorized the stakeholders in its value chain into 4 groups, which were electric power suppliers, equipment suppliers, business partners, and cooperating partners. It has the same general engagement strategy for all, though they differ in detail due to the various contexts and collaborations with each group.

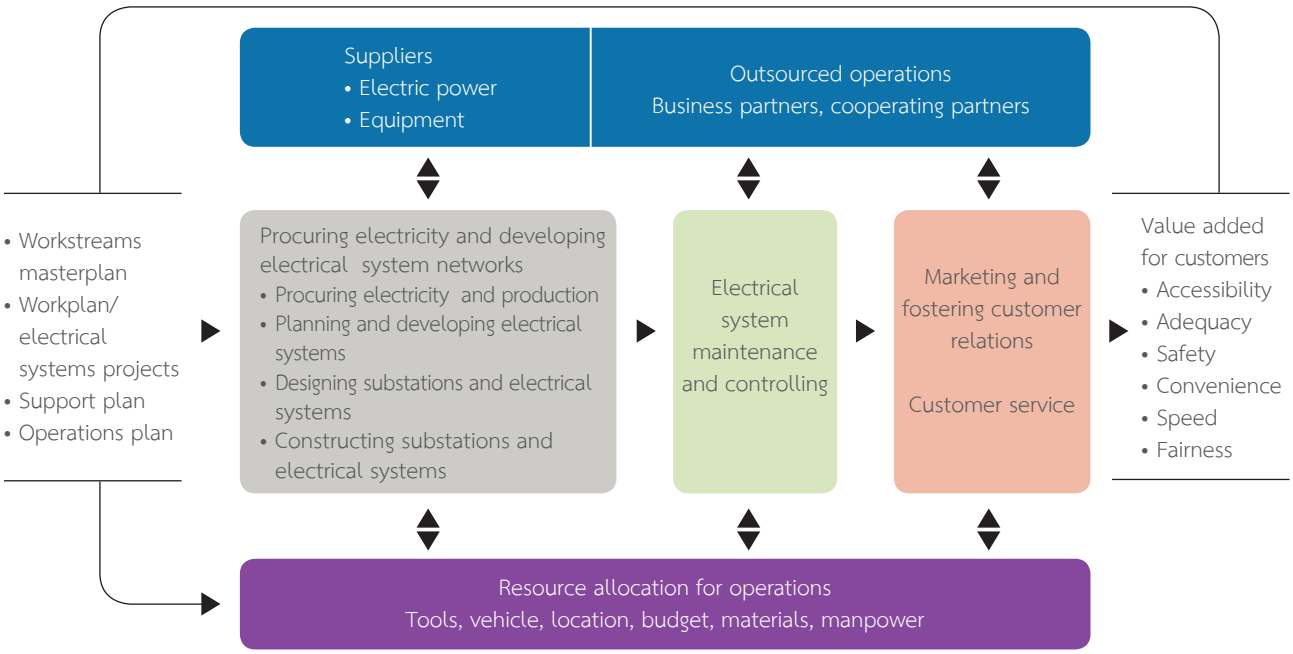
Engagement with the Organization	Electric Power Suppliers • Electricity Generating Authority of Thailand (EGAT) • Very Small Power Producers (VSPPs) • Department of Alternative Energy Development and Efficiency (DEDE) • Rooftop Solar Photovoltaic System (Solar PV Rooftop)	Equipment Suppliers • Suppliers of electrical equipment such as transformers and electricity meters	Business Partners • Construction contractors for substations and electric power systems • Companies providing external ICT services • Recruiting companies • Invoice data collector • Call Center • Meter services contractors • Tree trimming contractors	Cooperating Partners • Electricity bill payment center partners • Partner banks for direct bank account deduction bill payment • Partner credit cards for bill payment
Role in production systems	• Supply electricity for the 115 kV and 22-33 kV systems. • Supply no more than 10 MW electricity to PEA. • Supply electricity generated from renewable energy. • Supply electricity generated from solar power.	• Supply equipment to PEA according to contracts issued.	• Construct power substations and electric power systems according to work plan outcomes. • Develop ICT systems, monitor, assess and maintain relevant equipment. • Recruiting personnel to ensure sufficient capacity for achieving PEA's mission. • Record electricity usage and invoice. • Provide 24-hour service for incidents reporting, public information and complaints filing. • Installing, suspending and reconnecting electricity meter. • Trimming trees according to PEA's work plan.	• Increase electricity bill payment channels.
Role in innovation	• Ensure product's adequate quality.	• Support safe and sufficient electric power systems expansion.	• Maintain electric power systems quality condition.	• Facilitate customers' convenience.

Engagement with the Organization	Electric Power Suppliers	Equipment Suppliers	Business Partners	Cooperating Partners
	• Electricity Generating Authority of Thailand (EGAT) • Very Small Power Producers (VSPP) • Department of Alternative Energy Development and Efficiency (DEDE) • Rooftop Solar Photovoltaic system (Solar PV Rooftop)	• Suppliers of electrical equipment such as transformers and electricity meters	• Construction contractors for substations and electric power systems • Companies providing external ICT services • Recruiting companies • Invoice data collector • Call Center • Meter services contractors • Tree trimming contractors	• Electricity bill payment center partners • Partner banks for direct bank account deduction bill payment • Partner credit cards for bill payment
		• Support timely customer service.	• Support/expand operations towards higher efficiency. • Facilitate customers' convenience. • Increase the efficiency of customer support. • Improve efficiency of services.	

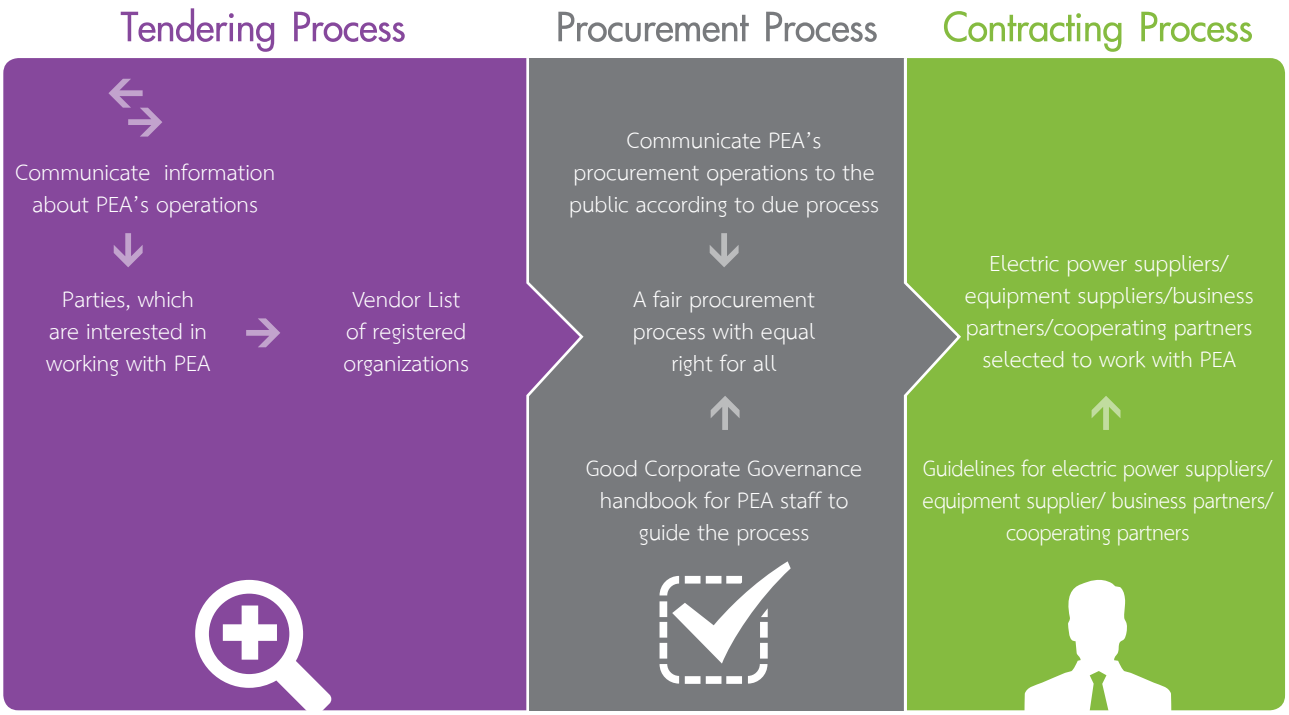
Supply Chain Management [102-9]

In 2017, PEA reviewed its supply chain management by convening all work streams at a seminar between July 24-25, 2017 to review the overall work system and improve key processes. It aimed to systematically manage PEA's supply chain for better effectiveness. It restructured Warehouse and Regional Warehouse Division into Warehouse Management Division 1-4 and substituted Main Warehouse and Service Warehouse structure with Warehouse Section Grade 1-3 to increase transport efficiency and timeliness of services.

Learning and Planning Process for Responsive Customer Service



Value Chain Management of Suppliers/Business Partners/Cooperating Partners



For all operations throughout the value chain, PEA proceeds according to the various pertinent laws and regulations such as the Government Procurement and Supplies Management Act B.E. 2560, Regulations of the Ministry of Finance Governing Government Procurement and Supplies Management 2017, Regulations of Office of the Prime Minister on e-Procurement, and etc. Below are the following key proceedings in 2017:

Identification Process

• PEA utilized vendor lists as one of the measures to help shorten its procurement process, and also as a quality assurance process to help suppliers improve over time and maintain their standards. PEA's vendor list registration follows PEA's Regulation on Suppliers/Contractors Registration 2012, which covers registration of suppliers/ contractors, monitoring and evaluation of product quality, and the removal of suppliers/contractors from the vendor list.

Procurement and Contracting Process

• For all procurements, PEA communicated these opportunities to all its suppliers fairly and extensively, as stipulated in the guidelines within the Good Corporate Governance Handbook which guides the operations of all employees involved in procurement. In 2017, the relevant employees received training on the communication and operations guidelines, to ensure that all procurement is communicated according to PEA's decision.

• Communicated the guidelines and good practices for awareness and compliance of suppliers/ business partners/cooperating partners. In 2017, suppliers, business partners and cooperating partners regularly received these trainings/communications.

• Created a business partner evaluation guidebook for construction work and project management, used in evaluating the contractors of substations construction.

• Established a requirement for station equipment suppliers to have barcodes on equipment, which served as reference in all of PEA's systems, and helped ensure its management is in line with asset management guidelines.

• Established a process for testing the supplied goods to ensure the delivered products are in line with PEA's specifications. A supply delivery inspection committee was set up to examine if the delivered supply is complete and correct according to the contract.

• Continued monitoring the quality of products and services provided by all (100% of) suppliers/business partners/cooperating partners.

Evaluation Process

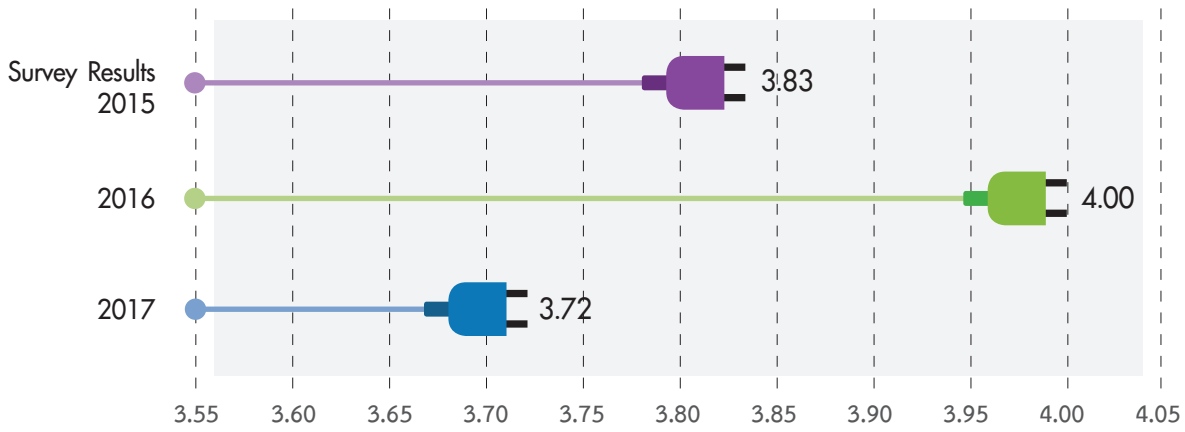
• There has been revision and addition of indicators for the supply chain management process, particularly for electric power and supplies management.

• There were evaluations of suppliers, business partners and cooperating partners, including regular information exchange through meetings. The objective was to inform the continued improvement of quality and work processes, in order to cater to customers' needs and expectations. This can also be used as part of evaluation criteria for suppliers, business partners and cooperating partners in the next round of selection.

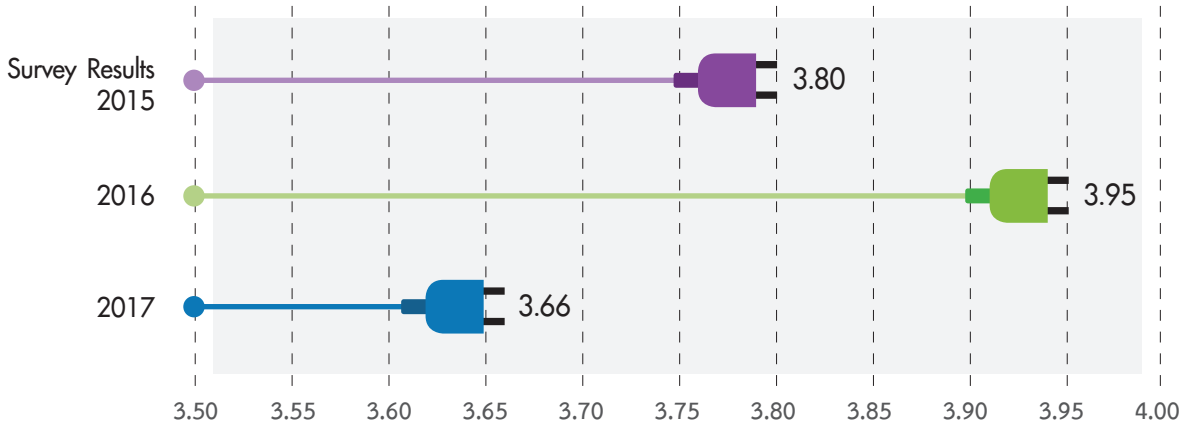
• PEA procurement transparency satisfaction survey 2017 was conducted as a pilot to examine the satisfaction of suppliers and contractors. PEA also plans to expand this survey to determine its own employees' satisfaction in the next phase.

PEA implemented this aforementioned satisfaction survey during September-October 2017. The PEA procurement transparency satisfaction survey 2017 revealed that overall, suppliers/contractors were highly satisfied (3.77 points on average). Further analysis was conducted on the following 7 aspects: (1) information dissemination about procurement opportunities via website and other media, (2) accessibility of procurement information, (3) participation in PEA's procurement processes, (4) quality and fairness of procurement processes, (5) responsiveness to feedback/suggestions regarding procurement processes, (6) transparency of the overall procurement process, and (7) handling of complaints related to procurement. This detailed analysis found that PEA's suppliers and contractors were highly satisfied (3.49-4.01 on average, out of 5), according to the breakdown below.

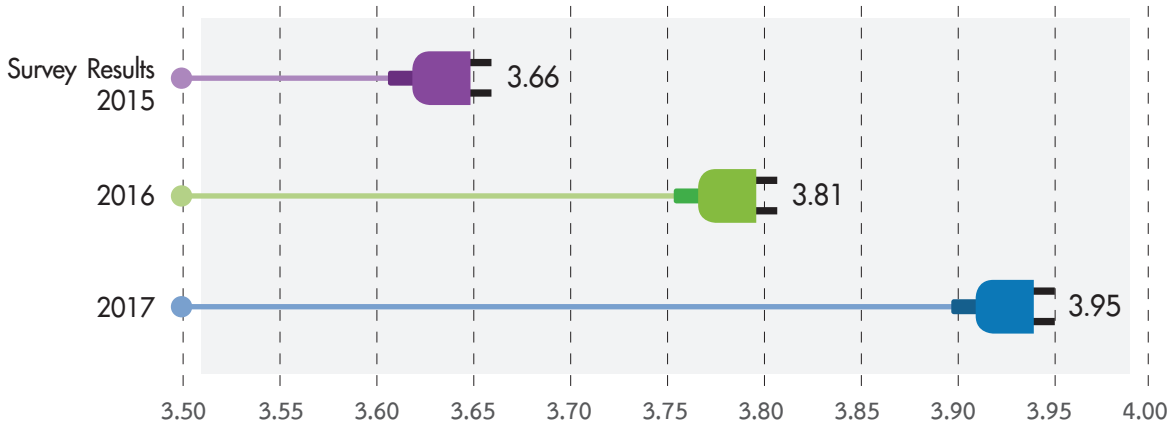
Information Dissemination about Procurement Opportunities via Website and other Media



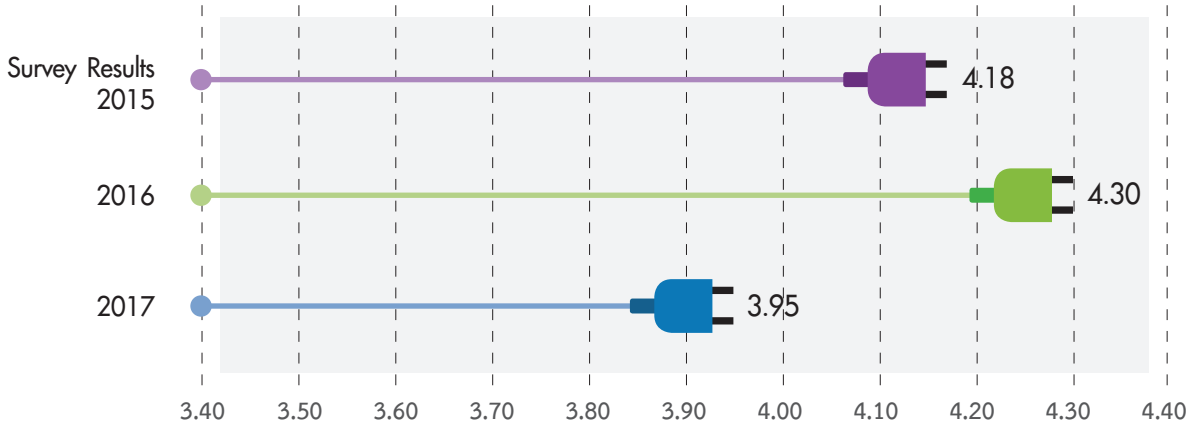
Accessibility of Procurement Information



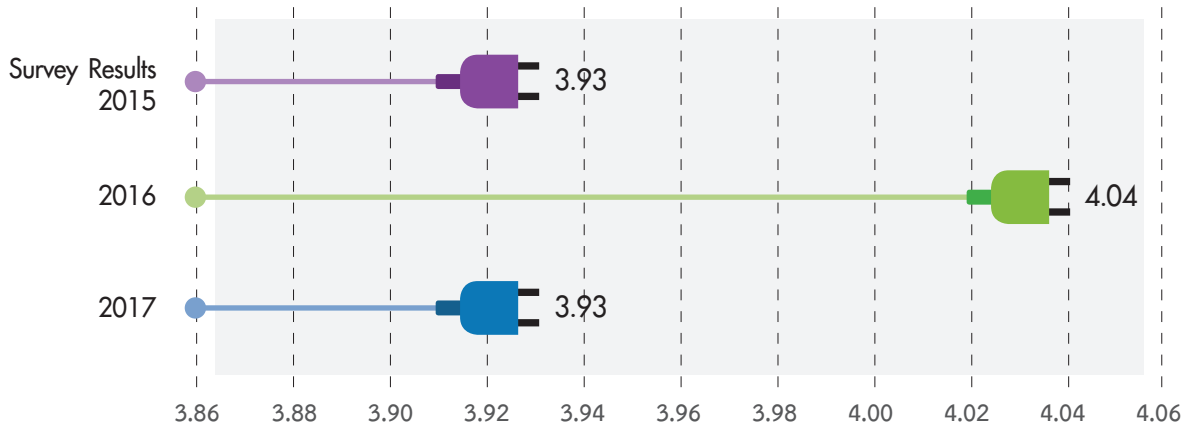
Participation in PEA's Procurement Processes



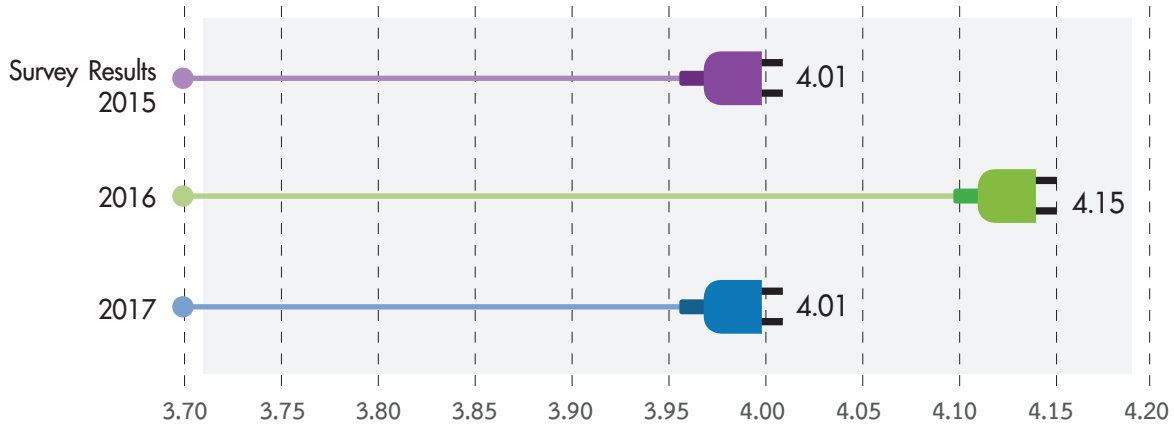
Quality and Fairness of Procurement Processes



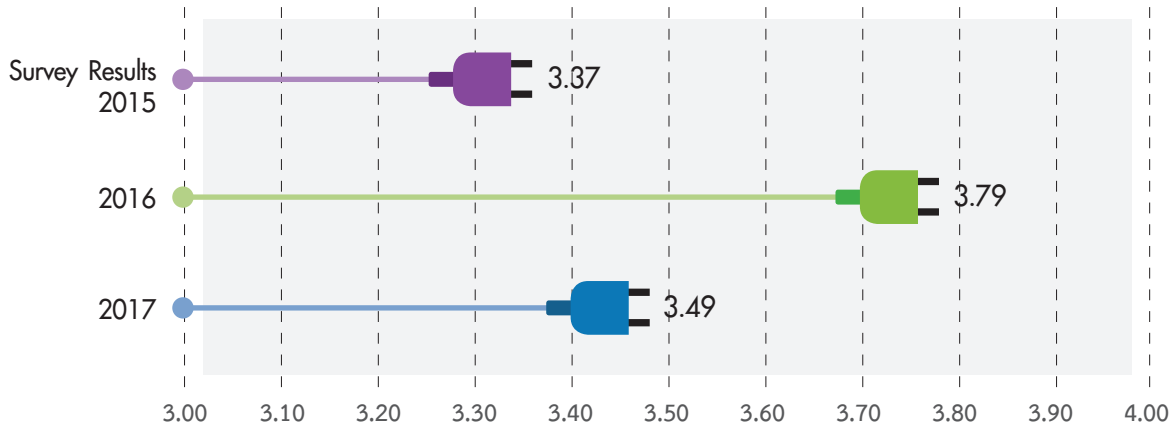
Responsiveness to Feedback/Suggestions



Transparency of the overall Procurement Process



Handling of Complaints Related to Procurement



Strategic Plan for **Sustainable Development**

PEA reviewed the PEA Strategic Plan for 2014-2023 and as a result, developed the PEA Strategic Plan for 2014-2023 (May 3, 2017 edition) which provides the overall agenda for the organization over a 10-year period. In the first 3-5 years, the direction and strategic focus emphasize transforming PEA into a high performance organization. It covers all the key aspects, for example its electric power distribution systems, customer service operations, including other support systems such as human resources and ICT management. PEA also has a business model which enables related diversification of business in the future. As such, in the next 5-10 years, the organization will strive to operate a comprehensive electric power business and seek to become a regional leader. To this end, the new Strategic Plan was also adapted to better fit the context of internal and external environment, which continue to see rapid changes with implications for PEA's operations. [103-1]

The framework and direction for PEA at present until 2023 comprises of 15 strategies to drive the organization, first towards its strategic outcomes, and subsequently to achieve its vision. The detailed summary is as follows: [103-2] [103-3]

Strategy 1: Promote PEA's Sustainable Growth

Focus on the analysis and identification of driving factors toward corporate sustainability, including on the communication and application of those factors to corporate sustainability planning. PEA aims to achieve its objectives in three dimensions, namely economic, social, and environmental. For the economic dimension, it will follow the government's policy, focusing on the strategy for energy to support the country's growth, while maintaining the organization's capacity to generate economic wealth. For the social dimension, PEA will foster good relationship with all stakeholders, and contribute to their quality of life and social well-being. For the environmental dimension, PEA shall consider environmental wellness and take responsible, concrete actions accordingly. PEA shall also prioritize good corporate governance, and strive to achieve the international standards such as the Organization for Economic Co-Operation and Development (OECD) Principles by 2020. This will promote PEA's reputation and bolster its stakeholders' confidence in the organization.

Furthermore, PEA shall encourage participation in undertaking responsibilities towards society, community, and the environment by refine stakeholder engagement processes such as with personnel, customers and business partners. This is to provide insight to each group of stakeholder's needs and expectations. PEA shall practice social hiring - recruiting with considerations for the benefit of both the organization and society. It shall establish a corporate safety standard, including a procedure for supply chain monitoring alongside change management, and ensure responsiveness to rapid changes to allow flexibility, profitability and growth. Key measures include improving work systems, infrastructure, and PEA's supporting processes for related diversification, fostering good corporate culture and work environment that encourage employees to be results-driven, focusing on communicating corporate vision and strategic positions to create an understanding in moving towards the same direction.

Strategy 2: Good Corporate Governance

Promote compliance with rules, laws, regulations, policies and standards at both the national and international level. Improve work processes, rules, guidelines and operations to achieve efficiency and transparency.

Furthermore, increase the effectiveness in monitoring affiliated businesses through systematic directing, with indicators to measure the quality and impact of strategy or policy, and closely monitor implementation progress at appropriate intervals by measuring against goals, outputs, outcomes and impacts achieved. This is to assure that affiliated businesses can invest and operate, while genuinely providing value added to PEA.

Strategy 3: Asset Management and Building Financial Stability

Develop PEA's asset management system to enhance the efficiency of asset utilization and overall operations. The system will also seek to reduce operational costs, maintenance fees, and increase the organization's financial internal rate of return.

Strategy 4: Modify Operations to Align with the Demands and Direction of the Business

Modify operations to ensure alignment with the business's demands and the organization's direction, streamlining processes to increase flexibility, speed and responsiveness to customers' demands and expectations. Conduct business structure analysis by looking at the organization's workflow structure, as well as by analyzing and improving the requirements and indicators for each of PEA's processes. This is to inform the design and development of work systems/ procedures to allow flexibility and complementarity with PEA's vision, strategy, and goals.

Strategy 5: Provide Quality Electric Power Distribution on par with International Standards

Strive to increase PEA's capacity to distribute electrical power efficiently and extensively, which entails developing new electric power systems and building more power stations. This will enable PEA to distribute electricity sufficiently, stably and reliably, including to be able to support the growing demand for electricity. It will also reduce operational issues and the need for maintenance, as well as decrease power losses through transmission lines. It will revamp and establish electric power distribution systems in business and industrial areas, industrial estates, and in key areas, to increase power system stability. To this end, PEA will ensure the alignment between the voltage stability index figures and the 12th National Economic and Social Development Plan to raise the standards for power distribution to deliver with higher quality and stability. PEA shall establish a clear action plan to decrease power loss by improving the stability of electric power systems, and connecting the systems to facilitate more supplies from VSPP and renewable energy sources. The various equipment and tools employed should have interoperability and safety to enable the introduction of newer technologies and Smart Grid systems.

PEA will review its Smart Grid capacity to ensure it is in line with the country's overall policies. It will do so through the following 3 - pronged approach: 1) improving electric power systems' capacities (Smart System), 2) improving quality of service delivery (Smart Life), and 3) Enhancing electric power systems' infrastructure to become more environmentally friendly (Green Society).

Strategy 6: Enhance Human Resource Management for Excellence

Employ strategic Human Resource Management (HRM) to establish an efficient and effective human resource management system, building PEA's human resource capacity to achieve its goals. Focus on competency development, which is an essential tool in linking vision, mission, and strategy with human resources management. It analyzes the necessary competencies for employees in each position to enable employees to continue working efficiently in their distinctive roles towards the same direction and goals as the organization.

Dedicate efforts to develop work competencies, targeting 3 areas: core competency, management competency, and functional competency to support the competencies PEA will need in the future. To this end, PEA will employ competency-based approach to recruitment and selection, as well as training and development to ensure that the organization's personnel have the necessary qualities moving forward.

Strategy 7: Transform into a High Performance Organization (HPO)

Focus on Human Resource Development (HRD), including in terms of knowledge, skills, ability, as well as other characteristics to fit the needs of the strategic plan and business growth in the future. This strategy has the following key measures, namely increasing personnel's core competencies, creating individual development plans, and knowledge management which seeks to capture the key learnings of the organization and create a learning system within the organization. The main objective is to increase products and more innovation in producing and providing new services, including by improving PEA's work processes.

Strategy 8: Develop Products and Services that are Responsive to Customer's Needs and Expectations

Invest in learning about the influencing factors, demands, and expectations of each customer segment and how they affect customer satisfaction. This should be done based on information analysis from survey results to better understand the customers and the market, to formulate recommendations for improving PEA's work. The aforementioned data will be used to inform product and services planning, marketing, systems improvement, development of related diversification opportunities, as well as to cultivate relationships with specific customer segments.

Strategy 9: Provide Comprehensive Customer Service par Excellence

Provide excellent, one-stop customer service by learning from customer's audio-recorded feedback to comprehensively improve services and build long-term customer relations. Key steps include integrating electric power system information database within the organization, including customer's audio-recordings from various channels to help strategize electric power system development plan for each customer segment. Further, develop a customer relationship management system to optimize the effectiveness of services provided to specific customer segment, and deliver according to their expectations. PEA will also improve the PEA One Touch Service to improve the customer service processes by utilizing information systems.

Strategy 10: Stakeholders' Demands Management

Build good relationships with stakeholders by taking stock of all PEA stakeholders, researching and analyzing their demands and expectations, as well as prioritizing them for specific relationship building. Ensure that PEA's operations are responsive to the demands of stakeholders both inside and outside of the organization, including by providing participatory measures to drive the organization towards its stated visions and goals.

Strategy 11: Seek Domestic and International Opportunities for Related Diversification Investment

Promote investment/joint-ventures and business development to prepare for future changes in the electricity market, as the technology and infrastructure of the industry are constantly evolving. Operating business as usual in the present by simply providing electric power distribution services may lead to slower growth in the future. Therefore, PEA will seek investment opportunities for related diversification to expand its business growth. Within the next 6-10 years, PEA will continue to adapt its direction to comprehensively encompass the electric power industry to establish its status as a regional leader through its own operations as well as its affiliated businesses. To increase the efficiency and agility in operations, PEA will pursue technical cooperation, share its experiences from the electric power industry, and develop collaborative partnership with public and private sectors alike, in its domestic and international investments.

PEA will support its related diversification through the following approaches:

1) Promote investment and partnership establishment with business allies.
2) Analyze the management structure of the organization, as well as that of the affiliated businesses.

3) Conduct work system redesign both internally and externally in accordance with business's demands and competitive capacity.
4) Ensure the appropriate level of manpower and capacity among the personnel to support related diversification.

Strategy 12: Promote and Support Renewable Energy, as well as Efficient Use of Energy

Promote investment and mobilize partnerships to develop energy efficient and renewable energy businesses. Invest in electricity generation from renewable energy to provide new alternative energy sources that will help reduce fuel usage, in accordance with government policy. PEA will also be a source of Green Investment by positioning itself as a major investor and business partner.

Furthermore, promote efficient use of energy and energy conservation. This is in line with the government policy and measure which requires electric power producers or providers to help their customers increase their efficiency in electricity usage, according to the Energy Efficiency Resource Standard (EERS). The EERS initiative is also a part of the Energy Efficiency Plan 2015-2036, which consists of two phases. Phase 1 focuses on compiling studies and experiences with EERS from Thailand and abroad. Phase 2 then proceeds with evaluation and the long-term improvement of the EEP.

Strategy 13: Promote and Build Partnerships in Innovation Research and Development, to Develop PEA's Core Business and Related Diversification

Encourage the utilization of researches to help select key PEA studies for long-term commercialized application.

Prioritize research and innovation on Smart Grid & Strong Grid to support reliable and efficient electric power systems. Review for ways to improve electric power systems to support buying electricity from alternative sources, which has a high tendency to grow in the future.

In addition, establish partnerships with organizations, institutes and research think-tanks domestically and internationally to develop innovation for PEA. It should also catalyze resources and knowledge exchange.

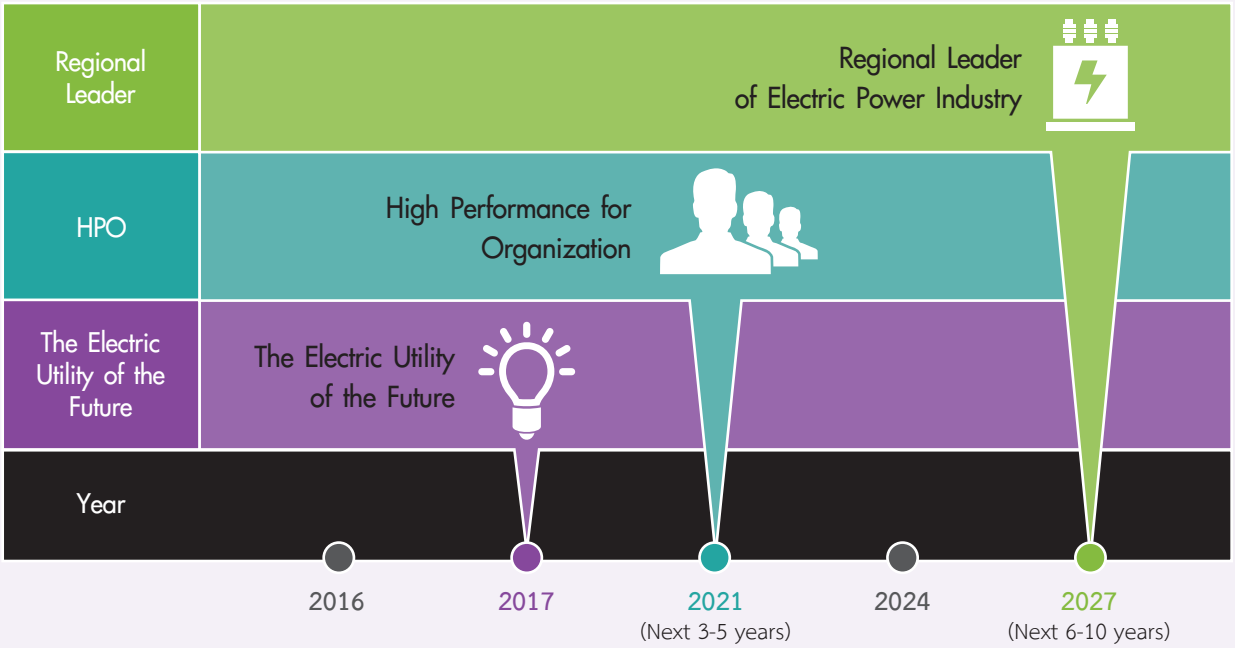
Strategy 14: Promote and Develop ICT Capacity to Achieve ICT Excellence, which Entail Standards, Safety, Reliability, and Extensiveness to Efficiently Drive PEA forward

Promote the development and delivery of hardware infrastructure service, ICT resources management, establish a Data Center (DC) and Data Recovery Center (DRC) and an IT Consolidation Roadmap to minimize the redundancy of the various systems which may overlap. PEA shall also develop an integrated ICT and communications system to support optimal performance operations.

In addition, develop systems to efficiently connect information within the organization that facilitate automatic information exchange, then expand to inter-organization connection. Develop customer service systems that are responsive to the demands and satisfaction of customers within the organization/staff, and customers by ensuring service's speed, accuracy and proactiveness.

Strategy 15: Promote and Develop Sustainable ICT Management

Develop and promote the application of IT governance principles in PEA's operations, to improve ICT management and decision making of the organization to meet international standards and ensure its compliance with PEA's Strategic Plan implementation. Invest in human resources, ICT intellectual resources to improve the capacity and performance of personnel. Simultaneously, nurture a culture of learning with knowledge management excellence to equip personnel with the capacity to efficiently utilize ICT and communicate, to produce creative outcomes and innovation which contribute to PEA's mission.



Beyond creating the PEA Strategic Plan for 2014-2023 (3rd edition, 2017) as mentioned, the organization also prepared the masterplan of PEA's corporate social and environmental responsibilities for 2017-2021, which is aligned with the new PEA Strategic Plan's operations. It will also enable the organization to operate on par with international standards through the four key measures below [103-2] [103-3]

Measure 1: Develop Products, Services, and Operations to Meet International Standards

Develop technology and innovation for products and services that are environmentally friendly, promote knowledge and capacity development to enhance operations standards, and foster a corporate culture that recognizes PEA's responsibilities towards sustainable society and environment.

Measure 2: Encourage Conservation of Natural Resources and the Environment

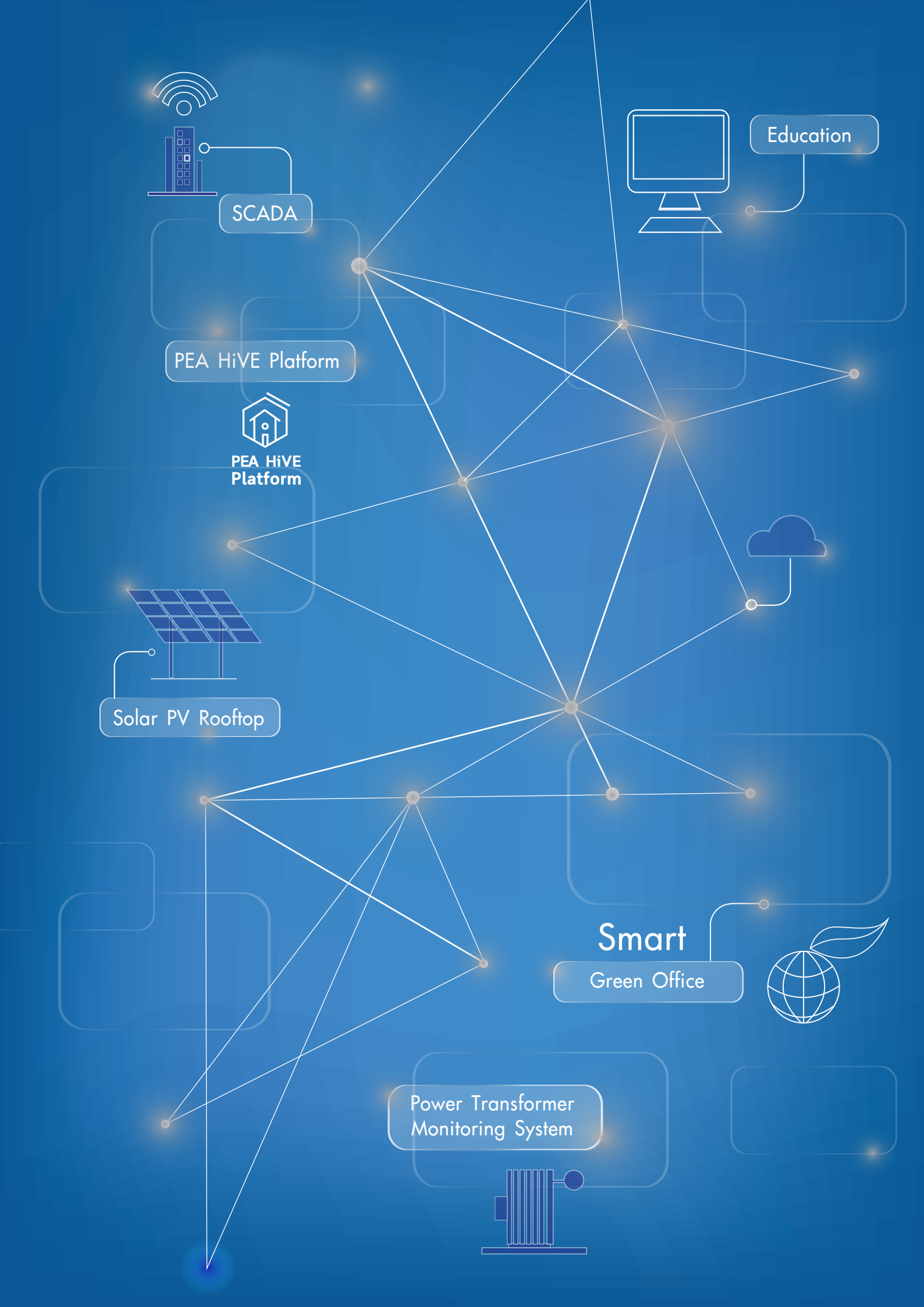
Encourage the organization to become environmentally friendly and meeting the relevant international standards. Develop a database of PEA's natural resources and the environment use. Inculcate an environmental consciousness in both the management and staff, to promote conscientious usage of resources.

Measure 3: Cultivate Relationships to Strengthen Economic, Social and Environmental capacities

Be responsive to stakeholders' demands and expectations and promote safe and conservative use of energy. Encourage participation in contributing towards public goods for key communities. Establish good relations with all stakeholders involved in PEA's implementation of its mission (public relations), support and strengthen communities, including by championing investments and mobilizing partnerships to develop energy businesses.

Measure 4: Support Sustainable Development of Technology

Advocate for efficient energy use, promote and support social enterprises, develop model communities based on the Sufficiency Economy Philosophy, as well as technology and innovation according to His Majesty the King's guidance.


SCADA
Education
PEA HiVE Platform
PEA HiVE Platform
Solar PV Rooftop
Smart
Green Office
Power Transformer Monitoring System

Stakeholder's Engagement

The Provincial Electricity Authority emphasizes forming the stakeholder's engagement in order to be open to their opinions, expectations, interests, concerns, and a variety of suggestions, all of which are used to improve products and services in an efficient and effective manner. PEA has processes whereby key stakeholders are identified and determined for the purpose of engage stakeholder by (1) studying business plans and impacts arising from the organization's operations; (2) analyzing and identifying both internal and external stakeholders; (3) delegating responsible agencies and choosing channels of engagement and communication. [102-42]

Studying business plans and impacts arising from the organization's operations	Analyzing and identifying both internal and external stakeholders	Delegating responsible agencies and choosing channels of engagement and communication

With regard to the making of the 2017 annual sustainability report, PEA has gathered stakeholders' issues and opinions. Key stakeholders are divided into 6 groups: (1) regulatory agencies; (2) employees and workers; (3) suppliers; (4) trading partners; (5) collaborators; (6) customers/clients; (7) communities, society, and environment, all of whom are taken into consideration to define the content of this sustainability report.

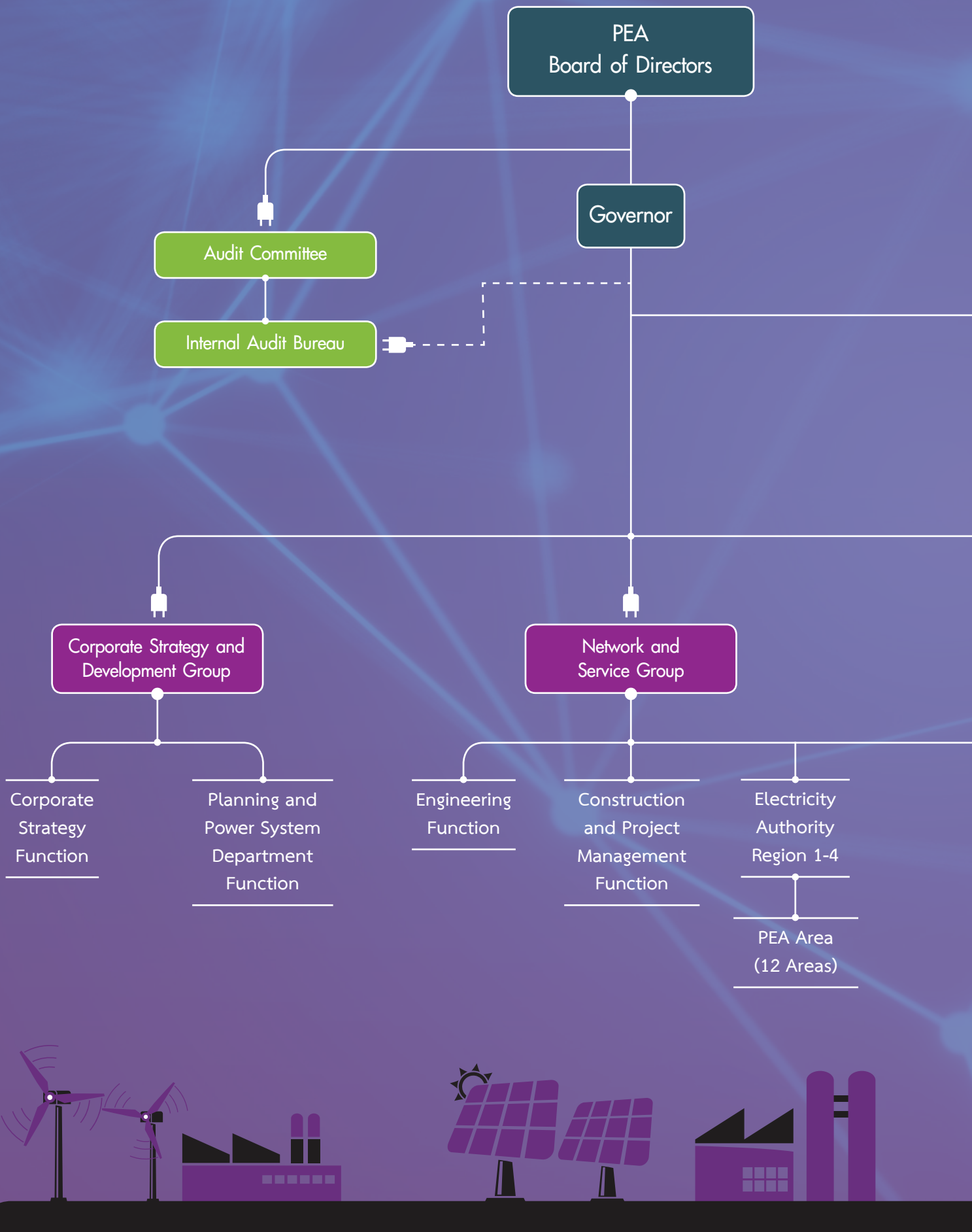
Operations and Reponses to Stakeholders' Expectations

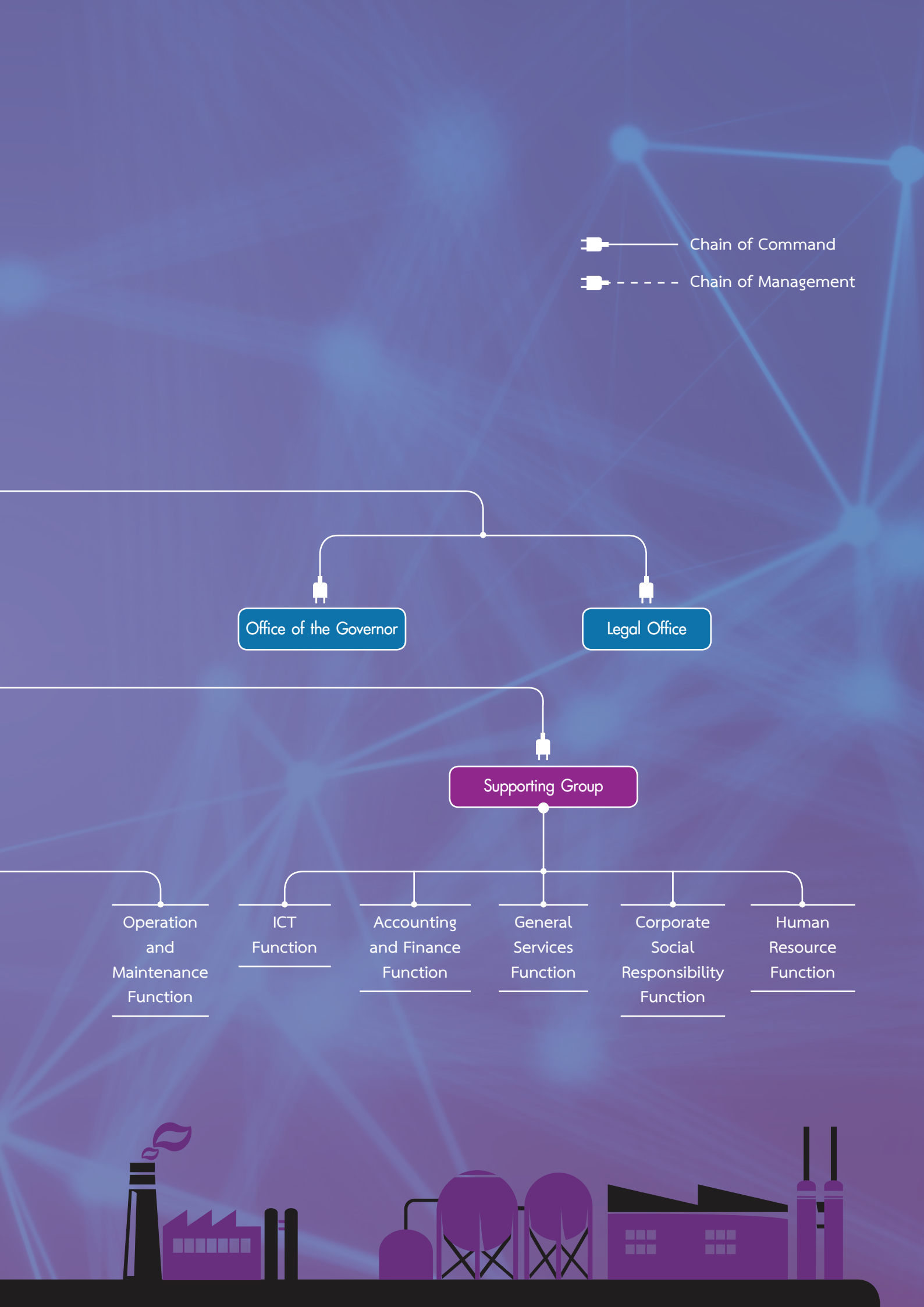
Stakeholders [102-40]	Channels of Engagement [102-43]	Expectations [102-44]	Guidelines for Responding to Expectations	Successful Outcomes
1. Regulatory Agencies	• Hold meetings/seminars once a month. • Organize symposiums/ presentations on operational performance once a year. • Update content on PEA's Website / Youtube / Line Application (Official Account) Facebook / Application AR every day. • Make sustainability reports and annual report.	• Focus on improving electric power distribution systems by making them readily available and safe. • Develop the readiness of the electric power infrastructure. • Promote the effective use of energy. • Promote and support energy conservation and renewable energy. • Support and educate both society and its citizens to be cognizant of energy-related matters. • Manage and respond to the needs of electric power users. (Demand Response). • Ensure transparency in terms of procurement and disclosure of information technology.	• Improve electric power systems and service quality. • Expand electric power distribution system areas in a thorough fashion. • Conduct operations with good governance and responsibilities to society.	• Improvements were made to electric power systems and service quality under the system reliability improvement project, Stage 3. Each project had a 62% progress, with the distribution system efficiency improvement project already completed. • Electric power systems were expanded to 74,304 villages and households in rural areas, totaling 99.99% of the entire area. • Improvements were made to good governance processes under the government agencies' integrity and transparency assessment project led by the National Anti-Corruption Commission (NACC), receiving a 94.39% rating - a 1.86% increase compared to 2016.
2. Employees and Workers	• Hold executive meetings once a month. • Hold operators' meetings once a month. • Broadcast "PEA Governor Meets Employees" once every quarter. • Publicize PEA CEO Newsletters once every two months. • Organize lectures/workshops once a year. • Update content on PEA's Website / Youtube / Line / Application (Official Account) Facebook / Application AR every day.	• Have chances for career advancement. • Have good quality of life and occupational health and safety. • Obtain salaries, benefits, compensations, and other benefits that they are entitled to receive from PEA.	• Build employees and workers' satisfaction by the organization projects related to career advancement and talent management. Improve their know-how, ability, administer compensation, and benefits. • Determine guidelines, standards, and measures in order to bring about a healthy and safe workplace that promotes employee's welfare.	• An overall employees' satisfaction rate stood at a high level of 4.38% - a 2.34 increase compared to 2016. • Chances for both employees and workers to improve their knowledge, skills, and ability stood at a high level of 3.95% - a 3.40 increase compared to 2016. • Employees and workers were content and happy, with their organizational commitment rate stood at a high level of 4.49% - a 2.28% increase compared to 2016.
3. Suppliers	• Hold meetings/ seminars/ focus groups once a year.	• Ensure fairness in competition. • Negotiate contracts in a fair manner. • Comply with terms and conditions agreed upon in contracts.	• Take into account suppliers' feedback and factor them into the management of operations.	• The achievement of goals was evaluated through an internal control report, a SLA compliance report, and a sequential action plan report for extra monitoring purposes.

Stakeholders [102-40]	Channels of Engagement [102-43]	Expectations [102-44]	Guidelines for Responding to Expectations	Successful Outcomes
4. Trading partners 5. Collaborators	• Hold meetings/seminars/ focus groups once a year. • Publicize news internally and externally once a year. • Communicate the information via Line Application every day.	• Ensure transparency in joint business operations. • Comply with the terms and conditions agreed upon in contracts. • Exchange information within an appropriate period of time to develop work collaboratively. • Negotiate contracts/ agreement in a fair manner. • Adopt IT technology to support operations.	• Conduct operations with good governance and responsibilities to society. • Take into account trading partners and collaborators' feedback and factor them into the management of operations. • Improve overall operational procedures, develop activities relevant to both trading partners and collaborators, and present them to PEA's Grievance Management Committee.	• Improvements were made to good governance processes under the government agencies' integrity and transparency assessment project led by the National Anti-Corruption Commission (NACC), receiving a 94.39% rating - a 1.86% increase compared to 2016. • Improvements were made, with a goal to develop excellence in mobilizing work plans that raised operational integrity and transparency in 2017. Those plans centered on "Transparency" and "Corruption-Free" operations. • PEA's Act and Information Center was established in an attempt to ease the process of searching and inquiring about official news and information. • The achievement of goals was evaluated through an internal control report, a SLA compliance report, and a sequential action plan report for extra monitoring purposes. • Grievance management mechanisms were reviewed, resulting in the adjustment of the period of monitoring and contacting complainants from 5 business days to 5 consecutive days, regardless of weekends and official holidays. In addition, the target of responding to grievances was improved and adjusted from 30 business days to 30 consecutive days, regardless of weekends and official holidays.
6. Customers/ Clients	• Publicize newsletters/ "Saijaifaifa" Journals once a month. • Publicize news externally and internally once a year.	• Ensure the reliability of electric power systems. • Have the monitoring measures in place to prevent power outages.	• Provide maximum satisfaction for customers/ clients in terms of service quality and provision.	• The reliability of electric power systems increased, with the 2017 System Average Interruption Frequency Index (SAIFI)

Stakeholders [102-40]	Channels of Engagement [102-43]	Expectations [102-44]	Guidelines for Responding to Expectations	Successful Outcomes
	• Organize meetings/ seminars/ focus groups once a year. • Make available 1129 PEA Call Center • Communicate the information via Line Application every day.	• Have substitute electric power systems in place to prevent power outages. • Increase speed of fixing power outages. • Have remedial measures for damages resulting from power outage. • Improve electric power systems and electrical cables in an orderly manner.		averaging 4.5 times per year - a 12.96% decrease compared to 2016. • The reliability of electric power systems increased, with the 2017 System Average Interruption Duration Index (SAIDI) averaging 118.70 minutes per year - a 22.48% decrease compared to 2016. • The 2017 customer and market satisfaction rate stood at 87.09%. • Grievance of service-related complaints in 2017 increase to 8.44%. • Grievance of complaints about the quality of electric power in 2017 increase to 87.64%.
7. Communities, society, and environment	• Organize symposiums once a year. • Publicize news internally and externally once a year. • Collect opinions from all areas of communities once a year. • Communicate the information via Line Application every day.	• Ensure safe electric power systems. • Have no adverse environmental impacts • Receive support in sustainable social and environmental affairs from PEA.	• Conduct operations with good governance and responsibilities to society.	• Improvements were made to good governance processes under the government agencies' integrity and transparency assessment project led by the National Anti-Corruption Commission (NACC), receiving a 94.39% rating. • The reliability of electric power systems increased, with the 2017 System Average Interruption Frequency Index (SAIFI) averaging 4.5 times per year - a 12.96% decrease compared to 2016. • The reliability of electric power systems increased, with the 2017 System Average Interruption Duration Index (SAIDI) averaging 118.70 minutes per year - a 22.48% decrease compared to 2016. • The 2016 satisfaction rate with regard to PEA LED, the Communities using PEA's Electricity Safety project and Community Relations project stood at 90.35% - a 7.47% decrease compared to 2016.

PEA's Governance Structure [102-18]




Chain of Command
Chain of Management
Office of the Governor
Legal Office
Supporting Group
Operation and Maintenance Function
ICT Function
Accounting and Finance Function
General Services Function
Corporate Social Responsibility Function
Human Resource Function

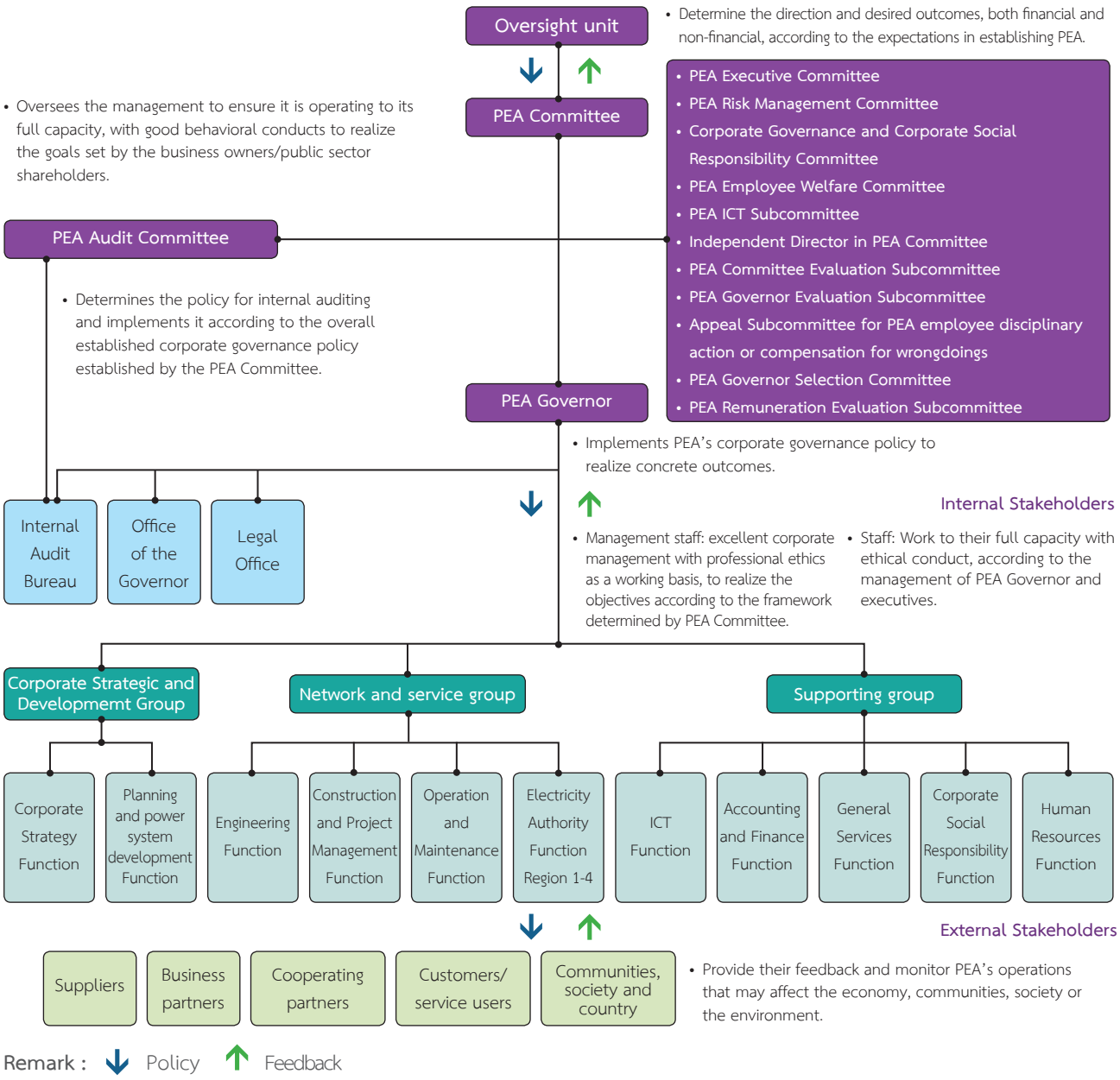
Corporate Governance and Anti-Corruption

PEA operates according to good corporate governance principles, complies with laws and regulations, and values transparency and fairness. It cultivates good relationships with both internal and external stakeholders. It strives to operate according to governance principles, ethics standards and professionalism in line with PEA's core value of "Modernization, Good Service, Good Governance" which serves as the foundation enabling the organization to grow while being widely accepted and creating value for all stakeholders in the long term. [103-1]

PEA has established its corporate governance structure as the following:

1) **Regulatory authorities** are responsible for determining the direction and desired outcomes, both financial and non-financial, according to the expectations in establishing PEA.
2) **PEA board of directors, PEA committee, and subcommittees** oversees the management section to ensure it is operating to its full capacity, with good behavioral conducts to realize the goals set by the Oversight unit. It is also in charge of creating PEA's corporate governance policy and publishing to personnel within the organization to implement.
3) **PEA audit committee** determines the policy for internal auditing and implements it according to the corporate governance policy established by the PEA Committee.
4) **PEA governor** implements PEA's corporate governance policy to achieve concrete outcomes.
5) **Office of the governor** coordinates between the Committee, the Governor and management staff and facilitates PEA Committee's implementation of the corporate governance policy to yield highest effectiveness possible.
6) **Internal audit bureau** implements the internal audit policy approved by PEA Audit Committee and PEA Committee.
7) **Legal office** is responsible for monitoring and supporting the Committee, executives and PEA employees, enabling them to fully perform their duties in compliance with the laws, rules, regulations and standards relevant to PEA business operations.
8) **Central and provincial units** serve as the organization's management entities that adhere to PEA's corporate governance policy as its operational framework and encourages its personnel to work to their full capacity with ethics, according to the organization's goals.
9) **External stakeholders** participate by providing their feedback and monitoring PEA's operations that may affect the economy, communities, society or the environment.

PEA's Corporate Governance Structure



In 2017, PEA created the PEA Corporate Governance Handbook 2017 (3rd edition). The content is made in line with the Organization for Economic Cooperation and Development's international standard and current context. It includes key information on the principles and mechanisms of good corporate governance, laws, regulations and rules that are essential to PEA governance and operations, PEA Corporate Governance policy, Anti-Corruption policy, Transparency PEA 2.0 policy, and good corporate governance practices. It also compiles the relevant ethics, code of conduct, and measures to prevent conflict of interest for example. Thus, the handbook serves as a framework for the committee, executives and employees at all levels to strictly adhere to. In addition, PEA also reviewed its PEA's Masterplan for Corporate Governance

and Anti-Corruption (2017-2021) to provide a suitable framework for corporate development, to ensure the comprehensiveness of corporate governance and concrete application of standards under corporate governance, to enable sustainable growth for the organization in the future. The details of the policies and handbook for good corporate governance, as well as the masterplan and operational plan, are available on PEA's website (https://www.pea.co.th/เกี่ยวกับเรา/การกำกับดูแลกิจการที่ดี) [103-2] [102-16]

Furthermore, PEA has promoted morals and ethics among its executives and employees. It also evaluates its corporate governance work in its various forms, with the key proceedings from 2017 as follows: [103-2] [103-3]

1. Promotion of morals and ethics among the executives and employees by organizing activities which raise awareness on corporate governance, morals, ethics and transparency in operations for employees at all levels. The goal was to engage 2,500 executives and employees through these activities across the country. PEA invited experts from several agencies, such as the Deputy Minister for Education, Secretary-General of the Chaipattana Foundation, representative of the National Anti-Corruption Commission (NACC), Office of Public Sector Anti-Corruption Commission (PACC), and university lecturers to speak on various subjects. These topics include the Sufficiency Economy Philosophy, good corporate governance principles, work ethics and transparency, governance principles, preventing conflict of interest, anti-corruption, transparent procurement.

2. Performance evaluation of Corporate Governance and Corporate Social Responsibility Committee on a quarterly basis revealed excellent performance, according to evaluation standards of SOE Committee.

3. Evaluation of the awareness and application of good corporate governance principles, morals and ethics by executives and employees in their operation for 2017. On 6,851 survey respondents, the result showed 91.87% awareness, an increase from 2016.

Level of Awareness 2015 (Percentage)	Level of Awareness 2016 (Percentage)	Level of Awareness 2017 (Percentage)
90.18 (Sample size 5,948 employees)	90.25 (Sample size 5,990 employees)	91.87 (Sample size 6,851 employees)

4. National Anti-Corruption Commission's Integrity and Transparency Assessment (ITA) in public organization operations 2017 was used as an indicator according to the MOU and helped valuate PEA's operations with the Ministry of Finance. PEA participated in this assessment since 2014 and has shown steady improvement, reflecting its continuously enhanced transparency according to the breakdown below.

Index	2014	2015	2016	2017
Transparency	74.81	96.36	93.34	96.40
Accountability	80.84	97.20	91.33	92.15
Corruption-Free in Operation	95.71	99.25	99.40	96.64
Integrity culture	65.59	79.52	92.51	93.82
Work Integrity	68.42	70.84	84.95	91.46
Total	**77.87**	**89.86**	**92.67**	**94.39**
Overall SOEs Ranking	**11**	**7**	**4**	**4**

Remark : PEA is ranked first among energy and public utility State-Owned Enterprises (SOEs).

Anti-Corruption [103-2] [103-3]

PEA recognizes the importance of preventing and suppression corruption, and has outlined four key strategies in the PEA Masterplan for Corporate Governance and Anti-Corruption (2017-2021), in line with the National Anti-Corruption Strategy Phase 3 (2017-2021). The strategies are namely (1) raise the agenda of the Corporate Governance and Anti-Corruption Committee, (2) cultivate against corruption society and culture across the organization, (3) develop corporate governance standard and a proactive corruption suppression system, and (4) establish efficient processes and mechanisms for suppression, monitoring, assessment, and punishment which can be internationally accepted, with a view to enhance the role, knowledge and capacity of the various committees and subcommittees. PEA also encourages an integrated learning between executives, employees and workers to foster the correct understanding of good corporate governance. It seeks to inculcate a conscience and culture against corruption, which will contribute to a corporate image of work ethics and transparency, both internally and externally. PEA also established efficient anti-corruption processes and mechanisms to promote working in line with governance principles, with participation from all stakeholders in combating corruption. To this end, PEA has created the following key workplans: an integrated information technology system plan for Corporate Governance development (CG-eSystem), plan for monitoring and clarification of internal control mechanisms for units with detected corruption, risk analysis and management of conflict of interest plan, procurement process development plan to ensure its compliance with the Government Procurement and Supplies Management Act (2017) and Ministry of Finance's Regulation on Government Procurement and Supplies Management Act (2017), and a plan for increasing the efficiency of complaint handling regarding service quality and corruption or misconduct under the PEA Anti-Corruption Center, plan for enhancing e-governance standards and developing a monitoring and investigating system for misconducts (E-investigate). Lastly, PEA endeavors to communicate and train its committees and employees at all levels regarding the organization's policies and measures against corruption. The figures from 2017 of those participated in the outreach and training activities are below.

PEA Policy and Anti-Corruption Measures Outreach [205-2]

Group	Number of People Engaged in the Outreach	Percentage
Committees	14 people (out of 14)	100
Employee by regions		
Head office	3,626 people (out of 4,105)	88.33
North	5,590 people (out of 6,023)	92.81
Northeast	5,387 people (out of 6,912)	77.94
Central	5,882 people (out of 7,196)	81.74
South	5,591 people (out of 5,599)	99.86
Total	**26,076 people (out of 29,835)**	**87.40**

Training on PEA Policy and Anti-Corruption Measures [205-2]

Group	Number of People in training	Percentage
Committees	14 people (out of 14)	100
Employee by regions		
Head office	3,606 people (out of 4,105)	87.84
North	1,202 people (out of 6,023)	19.96
Northeast	900 people (out of 6,912)	13.02
Central	1,193 people (out of 7,196)	16.58
South	1,011 people (out of 5,599)	18.06
Total	**7,932 people* (out of 29,835)**	**26.59***

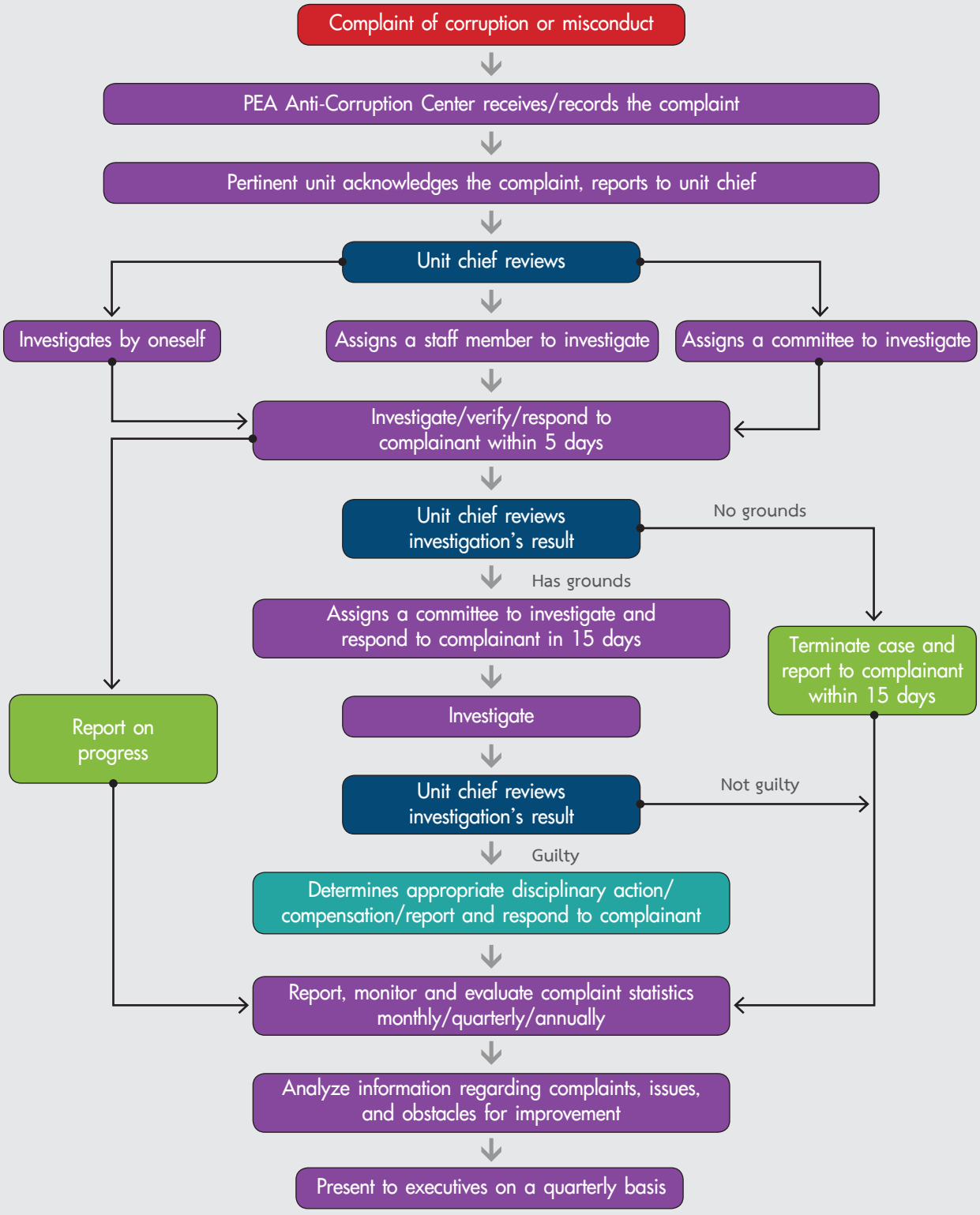
Remark * The organization has the PEA Masterplan for Corporate Governance and Anti-Corruption (2017-2021) and PEA Action Plan on Corporate Governance and Anti-Corruption for 2017. It has established the "Corporate governance, morals, ethics and transparency in operations awareness-raising plan" (Soft-Control) for executives and employees at all levels. PEA actually exceeded its target of conducting training for 2,500 people/year for 2017, by including 7,932 participants in its training, or 317.28% of its initial goal. However, it is 26.59% when compared with the total number of employees. Therefore, PEA plans to review its target for the training mentioned in 2018, to expand the awareness among its personnel. The implementation following this review will commence in 2019.

Furthermore, PEA established the PEA Anti-Corruption Center on January 21, 2015, following Ministry of Interior's policy for SOEs to designate anti-corruption centers to implement the government's good governance and anti-corruption policy for public service delivery, and also form networks to drive the various measures into practice. Executive Director of Office of the Governor serves as the PEA Anti-Corruption Center Director, and has a working group consisting of members from various relevant offices. PEA's Anti-Corruption Center is divided into two groups: prevention and suppression of corruption and promoting and protecting integrity. The Center divides corruption into five categories:

1) Appropriating public property or funds for personal gain
2) Failing to perform duties for undue benefits
3) Facilitating others' gains
4) Abuse of power to extort gains
5) Helping wrongdoers escape accountability

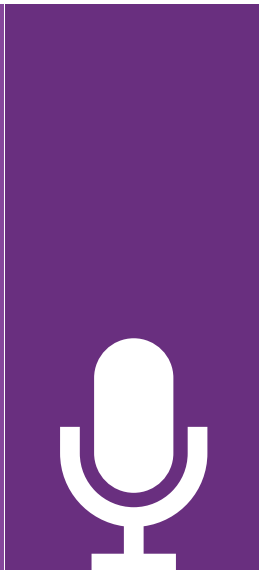
In 2017, PEA increased the efficiency of its grievance mechanisms by reviewing the processes and analyzing issues or obstacles in its implementation. Thus, this led to a revision in PEA's handbook for grievance mechanisms, by establishing clear steps and definitions of different types of complaints, complaint and communication channels, as well as designated responsible unit. In addition, PEA employed the e-One Portal Service information system to record complaints, suspicions, feedback and suggestions. The Portal also allows for the monitoring of complaints lodged to demonstrate fair treatment of stakeholders and systematic grievance mechanism across the organization, as well as improve the overall efficiency and responsiveness toward complaints. To this end, PEA clearly established the following processes and channels for complaints and corruption suspicion reporting as the following:

The Process of Complaints Regarding Corruption and Misconducts



Channels for Reporting Complaints or Suspicion Regarding Corruption and Misconducts [103-2]

- Website (http://intranet.pea.co.th or www.pea.co.th)
- 1129 PEA Call Center
- Other channels
  - Governor/Area Offices Region 1-4
  - Through other organizations
  - Post Office 150
  - Media
  - Damrongdhama Center
  - PEA Area Offices and local branches
  - PEA online community
  - PEA Anti-Corruption Center



In addition, PEA regularly participated in anti-corruption activities and events hosted by various organizations. For instance, on February 9, 2017, PEA hosted the event **"Following in the footsteps of our father's honesty; PEA pledges to do good for the kingdom"** to declare its intent to demonstrate PEA's honesty and transparency in its work and engagement with internal and external stakeholders. PEA also participated in **the International Anti-Corruption Day (Thailand)** event on December 9, 2017 hosted by the government, in cooperation with the National Anti-Corruption Commission (NACC), Office of Public Sector Anti-Corruption Commission (PACC), Anti-Corruption Organization of Thailand (ACT), a network of public organizations, SOEs, private sector, and civil society. Furthermore, PEA has allowed other organizations to learn about its Corporate Governance work since 2015. These organizations include Bank for Agriculture and Agricultural Cooperatives, State Railway of Thailand, Bangkok Mass Transit Authority (BMTA), Provincial Waterworks Authority, Rubber Authority of Thailand, as well as Office of the Ombudsman Thailand. PEA also sought to share its knowledge by participating in exhibitions such as **"the academic exhibition for NACC's 8th batch of 'Anti-Corruption Strategic Management for Senior Executives"** on July 21, 2017, and another exhibition which is part of **the initiative to support the implementation of Phase 3 of the National Anti-Corruption Strategy (2017-2021)**, under NACC's 2017 MOU on September 18, 2017.

As a consequence of these efforts and the continuous corruption monitoring and investigation, PEA saw a total of 14 corruption cases in 2017 that are deemed as wrongdoings per the organization's regulations, resulting in the termination of relevant employees' status as PEA employees.

Number of Incidents Related to Corruption and Management Approach [205-3]

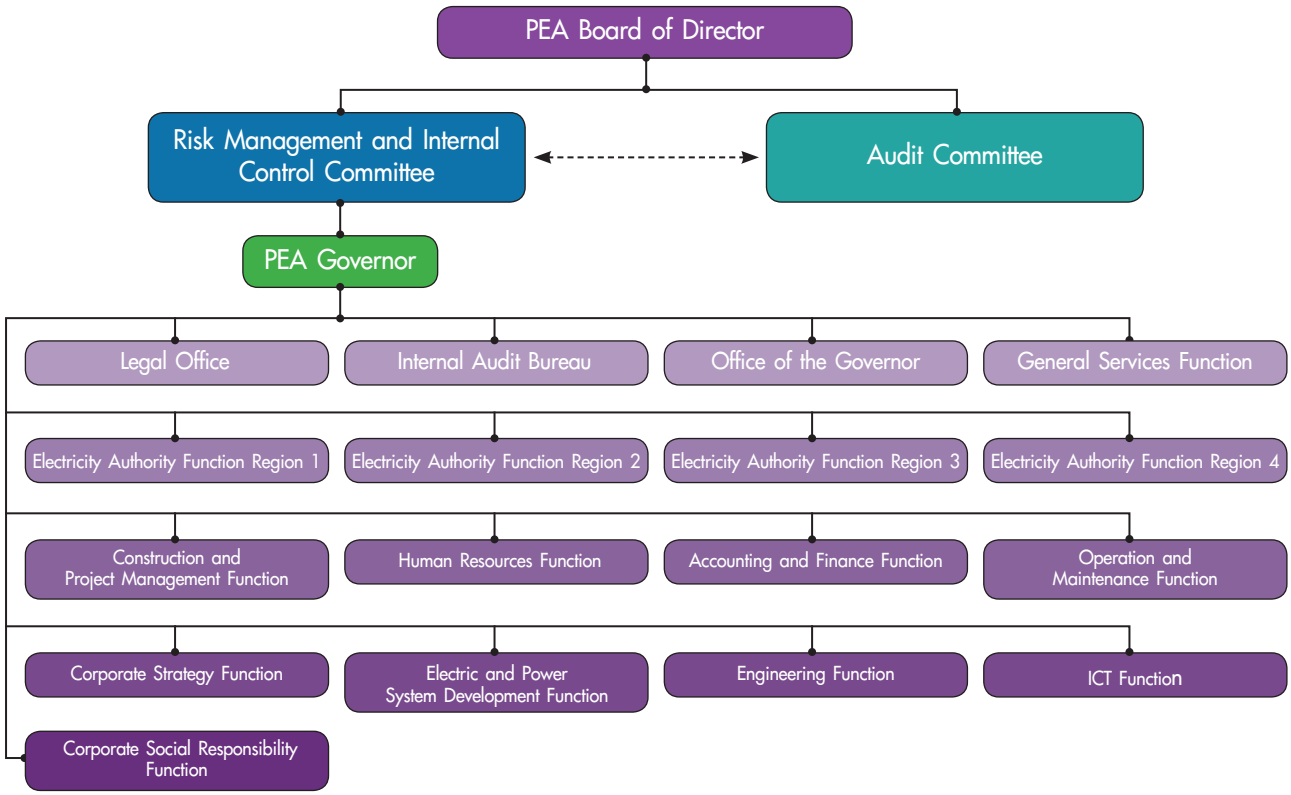
Incidents	Number of Cases
Accusations on corruption	-
Total number of incidents resulting in staff contract termination or other disciplinary measures	14 cases
Number of confirmations received when signing contracts with trading partners or discontinuing agreements due to corruption	-
Legal cases related to corruption by the organization or its employees, between reporting periods and their verdicts	-

PEA's determination and dedication through all the aforementioned endeavors to ensure that the organization is transparent and has zero tolerance toward corruption, had earned it **the 2017 SOE Award for "Outstanding Disclosure and Transparency"** from the State Enterprise Policy Office (SEPO) under the Ministry of Finance. Other awards include "**state enterprise with development excellence** in mobilizing and raising the level of integrity and transparency in operations" which has two components: **"Transparency Excellence"** in PEA's plan for sustainable improvement of corruption prevention and promotion of integrity and transparency, and **"Corruption-Free Operations"** based on PEA Anti-Corruption action plan, as well as **an honorable mention under Transparent Organization Award for the 7th NACC Integrity Awards,** administered by the NACC.

Management of Risks and Sustainability Challenges

The Provincial Electricity Authority puts great emphasis on risk management processes by preparing and setting forth its annual 2018 risk management plan (approved on November 17, 2017). This plan brings into play the strategic objectives of PEA's strategic plan 2014-2023 (4th revision, 2018) and the operational outcomes of its 2017 strategic plan and risk management plan, all of which are used as frameworks for assessing and analyzing risks in an attempt to enable PEA's risk management systems to oversee factors, activities and other operational processes. In doing so, PEA seeks to minimize causes and damages that each risk could impose on the organization to an acceptable level, while also preventing or mitigating the severity of those causes to ensure that PEA is capable of instantaneously adapting to changes and that its operations could move forward with them. In addition, PEA takes into account its vision, mission, and organizational goals in accordance with strategic plans, so as to make this risk management plan an instrument that ultimately creates value for the organization. The risk management principles were adopted in line with the Committee of Sponsoring Organizations of the Tread Way Commission - Enterprise Risk. Management: COSO-ERM and the State Enterprise Policy Office (SEPO) of the Ministry of Finance. They are used as one of the tools that helps the organization to achieve success in terms of sustainability and good governance aspects, to become a power distribution business leader, to focus on a customer-centric approach, to be ready to invest in new markets and relevant businesses domestically and internationally and to become the organization of innovation and technology. To this end, all factors relevant to the economic, social, and environmental dimensions will be taken into account. Those factors also include the needs of customers, all groups of stakeholders, and future business prospects.

PEA's Risk Management Structure [102-18]



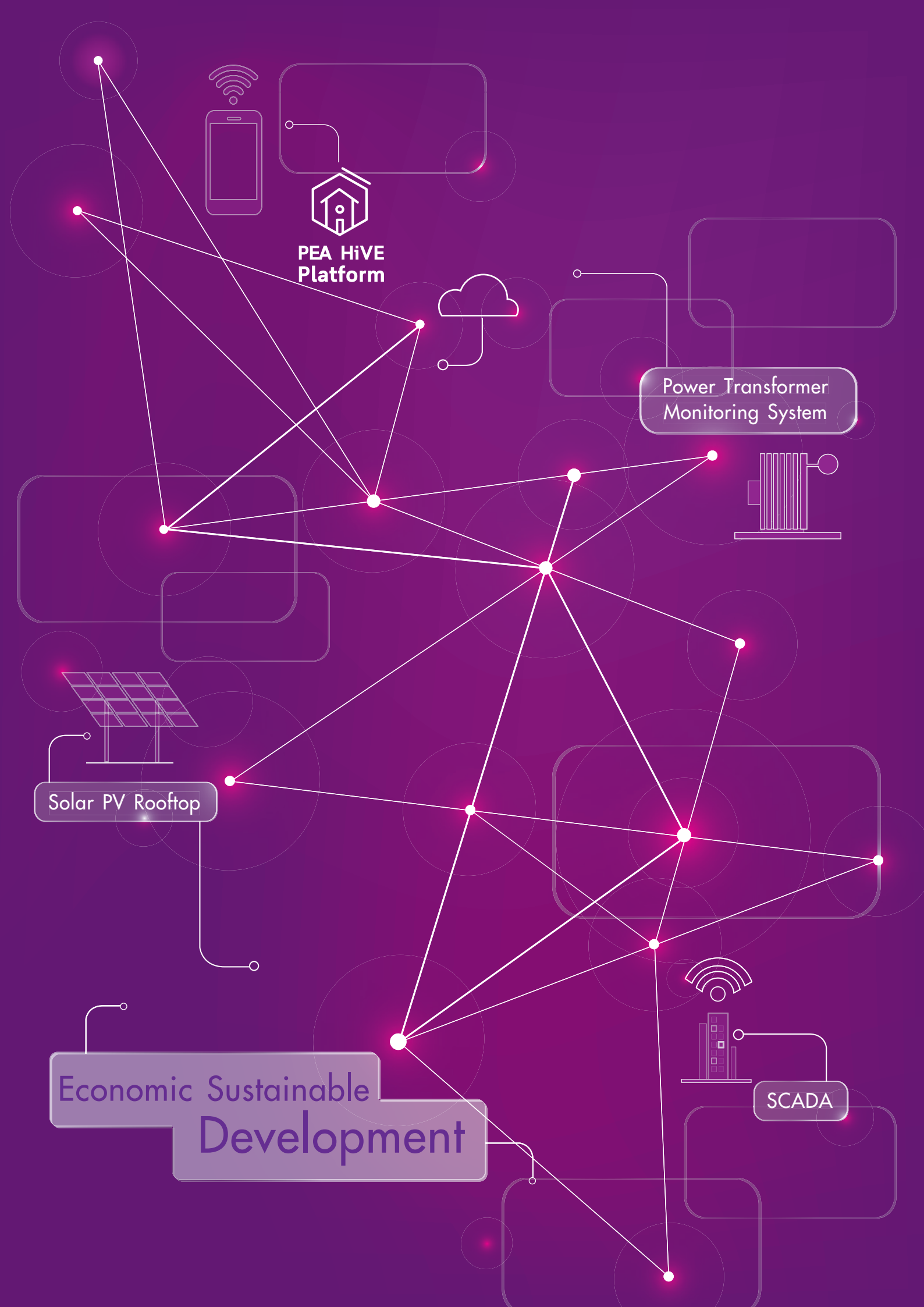
PEA's Overall Risk Management [102-15]

Risk Types	Risk Factors	2017 Risk Management Measures	Operational Outcomes
Financial Risk	Manage assets to generate maximum efficiency.	• Apply asset management systems to management processes. • Form main assets (electric power systems) inspection procedures in place for consideration to generate maximum benefit. • Prepare a database through TAMS (Transportation Asset Management Software) to monitor the use of electrical wire poles.	ROA was 55.88 % better than set targets Actual = 7.01 % Target = 4.87 %
Operational Risk	Raise the level of service provision and distribute electricity power in a continuous manner.	• Develop IT systems to support expeditious follow-ups and project progress reports in order to enhance the security of distribution systems. • Improve the quality of information gleaned from Geographic Information Systems: GIS. • Enhance employees' skills in solving electric power-related problems and supervising project management work.	The System Average Interruption Frequency Index (SAIFI) was 2.39 % better than set targets. Actual = 4.50 Target = 4.61 time/year The System Average Interruption Duration Index (SAIDI) was 0.13 % better than set targets. Actual = 118.70 Target = 118.85 minutes/year.
	Develop personnel's potential to accommodate core and relevant business operations.	• Analyze and revise competency models and align it with organizational directions. • Prepare individual development reports for necessary positions and keep them in line with organizational strategies. • Proceed with knowledge management projects to improve critical processes. • Do a work plan aimed at raising learning levels in order to move towards becoming the organization of sustainable learning and innovation. • Do a work plan aimed at developing IT and knowledge management systems.	The success of competency models was in 100 % compliance with set plans. The employees' commitment level in 2017 was on target. Actual = 4.40 Target = 4.40
	Overall Loss Unit Management	• Revise and consider the recruitment of employees that is aligned with workloads by taking into account manpower. • Increase time periods for workshops on specialized inspection to cover the entire curriculum content titled "Mitigation of Loss in Electric Power Systems" by providing tests before and after workshops.	PEA's Total Loss was 0.28% better than set targets. Actual = 5.12 % Target = 5.40 %

Risk Types	Risk Factors	2017 Risk Management Measures	Operational Outcomes
		• Usher in the Information Management System Program known as "U-CUBE" that can be linked to information on power units, meters, transformers, and distribution circuits in both System Application Program (SAP) and Geographic Information System (GIS), and power unit measurement systems, so as to analyze abnormal power use and loss units in power circuits.	
	Success of Relevant Business Investment Models	• Do a work plan aimed at mobilizing the development of new businesses by brainstorming and monitoring information on relevant business on a habitual basis. Study additional information sought from relevant internal and external agencies, as well as from new technologies both inside and outside the country, in order to accommodate changes in electric power businesses.	PEA received the ISO27001 certification and was in 100 % compliance with relevant businesses (Smart Home Business).
Strategic Risk	Cyber Security	• Manage cyber security and conduct an organizational assessment in line with the ISO/IEC 27001:2013 standard. • Revise and conduct a drill on Business Continuity Planning (BCP) in emergency situations, as well as significant Information Technology (IT) Work. • Improve the IT security of the SCADA (Supervisory Control and Data Acquisition) center. • Adopt and put to use Managed Detection and Response (MDR) processes in IT security. • Proceed to construct PEA's Data Center.	Operations conducted were 100 % on target.

According to the operational outcomes of the 2017 risk management measures, PEA was capable of managing all organizational risks at an acceptable level.

In addition, in the process of getting ready for managing risks in an efficient manner, PEA analyzed risk factors in 2017 and other risk factors that might happen in the future. PEA's Risk Management and Internal Control Committee identified 4 other strategic risk factors in addition to what is mentioned above: (1) Organizational adjustment with digital Transformation; (2) Business potential analysis of affiliates and relevant subsidiaries; (3) Competitive capability analysis and income loss from medium and large-scale businesses using renewable energy; (4) Inability to recruit programmers in charge of creating PEA's Core Business Software (CBS) Stage 2 within the stipulated timeframe. All of these factors will play a role in determining risk management measures in the following year.


PEA HiVE
Platform
Power Transformer
Monitoring System
Solar PV Rooftop
SCADA
Economic Sustainable
Development

Availability and Reliability of Electric Power Systems

The Provincial Electricity Authority emphasizes managing electric power sufficiently and meets its customer needs both at the present time and in the future, which have the tendency to rise continuously every year. In addition, PEA also puts emphasis on the quality and reliability of electric power systems and is well aware that electric power is a crucial basic factor in raising the quality of citizens' lives and developing the economic systems of all industrial sectors of the nation. [103-1]

In 2017, PEA conducted an assessment and prepared a report which forecasted the number of electric power users, the amount of power units sold, and future demands for electric power projected until 2022. A number of factors were taken into account when it came to forecasting such demands for electric power. Those factors included Thailand's potential economic trends, number of citizens, energy conservation plans, renewable and alternative energy development plans, and government policies related to electric cars, high-speed trains, Eastern Economic Corridor Development Plan, and Special Economic Zone Development Master Plan. In doing so, PEA attempted to make sure that the operations executed in line with these plans to secure the organization's electric power could sufficiently accommodate the increasing needs for electric power use. The forecasting statistics and data are as follows:

Forecast of Number of Electric Power Users Categorized by User Type

Data	Existing Values	Forecasted Values (Users)				
	2017	2018	2019	2020	2021	2022
Residences	17,095,797	17,436,899	17,779,955	18,123,641	18,469,219	18,802,512
Increase/(Decrease) Percentage	2.13	2.00	1.97	1.93	1.91	1.80
Small Businesses	1,609,842	1,647,513	1,702,759	1,758,005	1,813,251	1,868,498
Increase/(Decrease) Percentage	4.59	2.34	3.35	3.24	3.14	3.05
Medium Businesses	74,263	78,127	81,970	86,246	90,811	95,467
Increase/(Decrease) Percentage	2.49	5.20	4.92	5.22	5.29	5.13
Large Businesses	6,693	7,009	7,389	7,761	8,136	8,528
Increase/(Decrease) Percentage	3.70	4.72	5.42	5.03	4.83	4.82
Specific Businesses	12,531	14,472	14,882	15,631	16,398	17,045
Increase/(Decrease) Percentage	(0.53)	15.49	2.83	5.03	4.91	3.95
Non-Profit Organizations	1,305	1,386	1,416	1,447	1,477	1,508
Increase/(Decrease) Percentage	3.49	6.21	2.16	2.19	2.07	2.10
Water Pumps for Agriculture	5,046	5,453	5,712	5,971	6,230	6,489
Increase/(Decrease) Percentage	2.25	8.07	4.75	4.53	4.34	4.16
Temporary Electric Power	312,657	324,560	339,964	355,368	370,772	386,176
Increase/(Decrease) Percentage	6.93	3.81	4.75	4.53	4.33	4.15
Total	19,118,134	19,515,419	19,934,047	20,354,070	20,776,294	21,186,223
Increase/(Decrease) Percentage	2.40	2.08	2.15	2.11	2.07	1.97

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

Forecast of Power Units Sold Categorized by User Type [EU10]

Data	Existing Values	Forecasted Values (Gigawatt - hour : GWh)				
	2017	2018	2019	2020	2021	2022
Residences	31,333	31,539	32,315	33,065	33,788	34,457
Increase/(Decrease) Percentage	1.29	0.66	2.46	2.32	2.19	1.98
Small Businesses	13,035	13,274	13,813	14,340	14,784	15,230
Increase/(Decrease) Percentage	2.67	1.84	4.06	3.81	3.10	3.02
Medium Businesses	21,157	22,023	23,035	24,026	24,896	25,775
Increase/(Decrease) Percentage	1.22	4.09	4.59	4.30	3.62	3.53
Large Businesses	58,733	61,746	64,513	66,972	69,202	71,725
Increase/(Decrease) Percentage	2.71	5.13	4.48	3.81	3.33	3.65
Specific Businesses	4,183	4,357	4,563	4,765	4,938	5,112
Increase/(Decrease) Percentage	0.26	4.16	4.74	4.42	3.65	3.51
Non-Profit Organizations	66	89	107	124	141	157
Increase/(Decrease) Percentage	(12.88)	34.44	19.84	16.22	13.14	11.39
Water Pumps for Agriculture	298	389	444	499	555	610
Increase/(Decrease) Percentage	11.56	30.34	14.25	12.47	11.09	9.98
Temporary Electric Power	977	1,157	1,341	1,525	1,708	1,892
Increase/(Decrease) Percentage	(0.89)	18.51	15.87	13.69	12.05	10.75
Total*	129,783	134,574	140,131	145,316	150,013	154,958
Increase/(Decrease) Percentage	2.01	3.69	4.13	3.70	3.23	3.30
Free Electric Power	2,618	2,866	3,103	3,339	3,557	3,774
Increase/(Decrease) Percentage	6.68	9.49	8.25	7.62	6.51	6.10

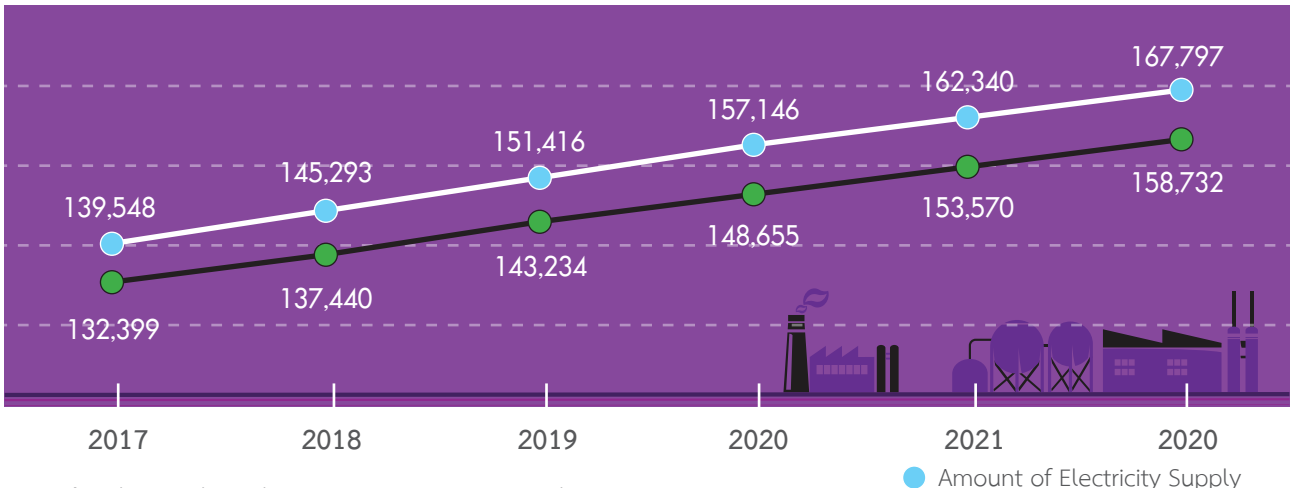
Remark : * Total is not included free electric power use.

Forecast of Demands for Electric Power [EU10]

Data	Existing Values	Forecasted Values				
	2017	2018	2019	2020	2021	2022
Purchased Quantities from EGAT						
Electric Energy (GWh)	130,252	135,083	140,522	144,905	148,815	153,217
Maximum Electric Power (MW)	19,721	20,362	21,196	21,951	22,657	23,393
Purchased Quantities from Department of Alternative Energy Development and Efficiency						
Electric Energy (GWh)	112	85	85	85	85	85
Maximum Electric Power (MW)	8	8	8	8	8	8
Quantities Generated by PEA						
Electric Energy (GWh)	105	104	104	104	104	104
Maximum Electric Power (MW)	6	6	6	6	6	6
Purchased Quantities from VSPPs						
Electric Energy (GWh)	9,079	10,022	10,706	12,053	13,337	14,391
Maximum Electric Power (MW)	854	935	979	1,055	1,110	1,160
Total						
Electric Energy (GWh)	139,548	145,293	151,416	157,146	162,340	167,797
Increase/(Decrease) Percentage	1.80	4.12	4.21	3.78	3.31	3.36
Maximum (MW)	20,590	21,312	22,190	23,021	23,783	24,568
Increase/(Decrease) Percentage	(3.03)	3.51	4.12	3.74	3.31	3.30

Comparison of Electricity Supplied with Expected Electricity Demand from 2017 - 2022 (Million Units) (EU10)

(Million Baht)



Remark : The numbers shown in 2017 are existing values.

Management of Electric Power Adequacy against Long-term Demands [EU6] [EU10] [103-2] [103-3]

PEA has proceeded with the first stage of the power transmission and distribution development project, whose continuous operations will have spanned from 2015 to 2020, in an attempt to develop electric power systems and construct power stations aimed at accommodating increasing demands for electric power in a sufficient manner. In addition, PEA seeks to increase the efficiency, security, and reliability of electric power systems; to minimize operational and maintenance problems; to enhance transmission and distribution capabilities and efficiencies in an attempt to distribute electric power efficiently and safely in accordance with international standards; to minimize loss units in distribution systems; to install or change power transformers, and to install quality electrical devices with even higher standards. These development plans are carried out in order to connect electric power distribution systems to industrial business areas, industrial estates, tourism spots, different communities, current and new electric power users, and other significant areas. Doing so will strengthen the security of electric power systems, with targets and areas of operations in 4 regions, each of which is divided into 3 PEA Areas electricity authorities totaling 12 PEA Areas offices. Each of these PEA Areas is supervised by each province's electricity authorities as follows:

1) Northern region : PEA Area 1 office, Chiang Mai Province (N.1), PEA Area 2 office, Phitsanulok Province (N.2), and PEA Area 3 Office Lopburi Province (N.3)
2) Northeastern region : PEA Area 1 office, Udon Thani Province (NE.1), PEA Area 2 office, Ubon Ratchathani Province (NE.2), and PEA Area 3 office, Nakhon Ratchasima Province (NE.3)
3) Central region : PEA Area 1 office, Phra Nakhon Si Ayuttaya Province (C.1), PEA Area 2 office, Chon Buri Province (C.2), and PEA Area 3 office, Nakhon Pathom Province (C.3)
4) Southern region : PEA Area 1 office, Petchaburi Province (S.1), PEA Area 2 Office, Nakhon Si Thammarat Province (S.2), and PEA Area 3 office, Yala Province (S.3)

Operational Plan on Power Transmission and Distribution Development Project (Phase 1)

Operations	North	Northeast	Central	South	Total
Construction of Power Stations and Power Transmission Systems (115 kV)					
Construction of Power Stations (Site)	12	18	24	7	**61**
Construction of Switching Stations (Site)	1	1	8	1	**11**
Add/Change Power Transformers (MVA)	250	375	400	450	**1,475**
Transmission Lines in Support of Power Stations (Circuit-Kilometer)	294	433	507	139	**1,373**
Construction Areas for Power Stations in Subsequent plans (Site)	11	11	27	5	**54**
Power Stations Construction Enhancing the Security of High-Voltage Power Systems (115 kV)					
Transmission Loop Lines (Circuit-Kilometer)	64	31	1	193	**289**
Improvement of PEA's Power Stations (Site)	8	3	2	5	**18**

Operations	North	Northeast	Central	South	Total
Construction of High-Voltage Distribution Systems (22/33 kV)					
Construction of Overhead High-Voltage Distribution Systems (Circuit-Kilometer)	2,445	2,816	1,151	1,375	**7,787**
Improvement of Overhead High-Voltage Distribution Systems (Circuit-Kilometer)	1,898	2,168	514	2,480	**7,060**
Improvement of Underground Distribution Systems (Circuit-Kilometer)	13	4	2	4	**23**
Installation of Circuit Breakers (Set)	41	49	-	-	**90**
Installation of Reclosers (Set)	165	415	18	139	**737**
Installation of Load Break switches (Set)	623	830	1,162	680	**3,295**
Installation of Automatic Voltage Regulator (Set)	27	6	3	11	**47**
Installation of Capacitors (Set)	505	489	17	194	**1,205**
Installation of Drop fuse cutouts (Set)	1,303	4,930	-	-	**6,233**
Installation of Multiple Address Radio System Master (Set)	26	42	45	29	**142**
Construction of Low-Voltage Distribution Systems					
Construction of Low-Voltage Distribution Systems (Circuit-Kilometer)	788	667	653	1,245	**3,353**
Improvement of Low-Voltage Distribution Systems (Circuit-Kilometer)	2,752	3,132	843	2,050	**8,777**
Construction of Lateral Distribution Systems (Circuit-Kilometer)	936	484	213	1,505	**3,138**
Improvement of Lateral Distribution Systems (Circuit-Kilometer)	600	782	359	884	**2,625**
Installation of Additional Power Transformers (kVA)	569,080	279,600	72,440	208,000	**1,129,120**
Change of distribution transformers' sizes (kVA)	141,010	232,990	84,965	78,865	**537,830**
Use of existing transformers for installation (kVA)	41,630	16,270	7,115	17,760	**82,775**
Change of Installation Spots for Distribution Transformers (kVA)	9,920	19,390	6,830	-	**36,140**
Installation of Drop Fuse Cutouts (Set)	1,237	829	333	190	**2,589**
Installation of Load Break Switches (Set)	45	117	3	1	**166**
Installation of Reclosers (Set)	27	70	3	1	**101**

In this respect, PEA has allotted an investment budget of 62,679 million Baht for these projects whose benefits will help enhance the capacity of the power transmission systems in order to meet increasing demands for electricity and accommodate sufficient and efficient electricity services until 2021. In addition, these projects can strengthen the quality of transmission services, making electric power systems secure and reliable, while also minimizing the number of power interruption frequencies (SAIFI) and interruption durations (SAIDI). Apart from what is mentioned above, PEA has proposed electric power system development plans concocted under the twelfth National Economic and Social Development Plan (B.E. 2560-2564) for approval, so as to develop and enhance efficiency in electric power systems as necessary and appropriate for groups of power users in different areas by taking into account disruptive and new technologies that impact the organization's operations. These plans are carried out to accommodate increasing demands for electric power until 2024.

With respect to the maintenance of power stations, PEA has proceeded to do the following: running maintenance checks on switchgears; examining and testing power transformers; and maintaining underground transmission cables inside power stations and other support devices. These maintenance plans are carried out to make power stations ready to continuously provide transmission services; minimize any malfunctions that could arise from the extended use of those devices; reduce the statistics of power outages by not relying on power stations' plans; minimize wait times for fixing faulty electrical devices; and replacing devices that have out-of-service conditions in line with power station improvement plans. Special attention will be paid to all main devices inside power stations such as power transformers, switchgears, and underground cables. In 2017, PEA had power station improvement plans and maintenance efficiency enhancement plans as follows :

- Conduct maintenance checks on main 115 kV high-pressure power systems inside 460 power stations in 12 areas
- Maintain 89 power transformers in the Northern region.
- Maintain 74 power transformers in the Northeastern region.
- Maintain 229 power transformers in the Central region.
- Maintain 95 power transformers in the Southern region.
- Install power transformer monitoring systems and 94 power transformers in all regions (Operations to install 64 monitoring systems are planned to commence in 2018).
- Install 2 sets of Partial Discharge (PD) monitoring systems for Gas Insulate Switchgears (GIS) within power stations in significant areas.
- Change On-Load Tap Changer (OLTC) type H to type W for 8 power transformers that are prone to damage.
- Replace capacitor banks for high-voltage 22 kV and 33 kV distribution systems in 13 power stations.
- Replace 3 power transformers that have been used for a long period of time (33 years) with no availability of spare parts.

- Establish the Transformer Oils Laboratory for testing and assessing the conditions of power transformers.
- Make available main switchyards for emergency situations, including Current Transformers (CT) inductive voltage transformers (IVT) and cable termination.
- Develop Asset Management Systems (AMS) for the management of power transformers.
- Build on pilot projects related to Battery Monitoring Systems (BMS) within power stations and implement them in PEA's important power stations.

The 2017 budget allotted was a total of 331,840,000 Baht, the amount of which was appropriated to 3 different areas: 70,240,000 Baht for power station improvement and maintenance; 53,700,000 Baht for power station maintenance efficiency enhancement; and 208,200,000 Baht for power transformer maintenance development and improvement.

Load Shedding Action Plan in Cases of Power Interruptions [EU6] [EU10] [103-2]

Electric power systems consist of power generation systems, power transmission systems, and power distribution systems. In cases of unexpected events associated with power systems, they might render power generation systems unable to sufficiently accommodate the need for electric power, resulting in an asymmetry within electric power systems. These problems reduce the security of systems and cause power outages on a wide spectrum. There are several factors that bring about the asymmetry within electric power systems, including generator tripping and transmission line tripping, all of which affect the frequency value of power systems and cause them to deviate from normalcy. Furthermore, the malfunctioning of electrical devices is likely to occur, prompting electric power failed to be transmitted to electric power systems. If events like these occur, power generation systems in those times will not be sufficient for the need for electric power usage, which will immediately be detrimental to the balance of power systems. In order to prevent these problems from occurring, PEA makes an action plan on load shedding in cases of power interruptions, which is employed to maintain the balance of power systems at a standard level and keep the negative effects that could happen to customers to a minimum. If load shedding is likely to take several hours, PEA will adopt the principle of Rotational Load Shedding conducted on a rotational basis. PEA will also designate periods of time for load shedding to each group as appropriate until power distribution systems return to normal. This is done in an effort to minimize the impacts that could happen to customers at a minimum level. On top of that, PEA will consider improving its action plan on load shedding in cases of power interruptions that extends to both EGAT and PEA on annual basis in an attempt to tailor it to the current conditions of power distribution systems.

Management of Electric Power and Systems Efficiency

At present, there is globally much attention dedicated toward energy crisis due to the projected increasing energy demands, while electricity production may rely only on one source of energy. Therefore, this scenario will lead to problems such as depleting sources of energy, environmental issues caused by pollution from fuel burning, especially when electric power has become an essential component in our daily lives and

the development of the country's economy. Therefore, Supply Side Management (SSM) to cater to users' needs alone may not suffice. Rather, Demand Side Management (DSM) by promoting conservation and efficient use of electricity, behavioral changes to establish a balance with supply and distribution capacities. In addition, it is also important to consider the quality of the electric power systems to optimize the use of current electric utilities supply. [103-1]

PEA established a working group on electric consumption management, chaired by PEA Deputy Governor for Planning and Power Systems Development Function. Responsibilities include directing the group's work, by creating a PEA DSM plan that is appropriate and in line with PEA Strategic Plan. A sub-working group chaired by Deputy Director of the Alternative Energy Encouragement and efficiency Department. Its role is to deliberate and create DSM workplan, as well as a complementary PR strategy. In 2017, PEA had devised the DSM workplan and implemented it accordingly. For example; **The Demand Side Management project,** which applies the Building Energy Management System (BEMS) to the management, control and monitoring of energy use in buildings. It allows appliances in different parts connect and exchange information, to increase the efficiency of overall energy use within a building. The project was implemented at the PEA Headquarter building, PEA Areas office building, and electric power distribution supervisory control and data acquisition (SCADA) building in all 12 areas, for 48 months (2017-2020) with a budget of 19 million Baht. **The Chiller Optimization project at the PEA Headquarter,** the project aims to install high-efficiency chillers which use the oil-free magnetic bearing centrifugal chiller technology, instead of the oiled bearings older chillers use. This increases its cooling capacity (0.58 kW/TR), can accommodate part load cooling well and also demand low maintenance cost. This is being implemented at Building 3, LED Building, and the SCADA building at the PEA Headquarter. The project duration is 36 months (2017-2019) with a budget of 86 million baht.

Another project is **The Installation of Solar PV Rooftop System on PEA Building Rooftops.** At present, the cost for installing such systems to generate electricity from solar energy has decreased dramatically, and more importantly promotes the use of clean energy, utilizing vacant spaces and lessen the electricity costs. This project is being implemented for 48 months (2017-2020) with a budget of 460 million baht, which translates to approximately 67,800 baht/kWp. Lastly, PEA also implemented **A Project on Management for Energy Conservation in the Public Sector, Universities and Industrial Sectors.** PEA assesses and analyzes energy usage, then makes recommendations and evaluates the energy conservation potential for interested government offices, universities and industrial sectors. It promotes using quality appliances which have high energy efficiency and encourages the efficient use of energy. The project duration is 48 months (2017-2020) with a budget of 16 million baht. Furthermore, PEA also has other DSM workplans and projects, with detailed summary as follows. [103-2] [103-3]

Demand Side Management Plan [EU7] [103-2]

DSM Workplan	Type of Project	Project	Project Duration			
			2017	2018	2019	2020
Provincial Electricity Authority	Measurement & Verification of Energy Conservation	1. Building Energy Management System (BEMS)	←	—	—	→
		2. Unmanned substation energy management project	←	→		
	Chiller	3. Centrifugal chiller optimization project in PEA offices and SCADA buildings	←	—	—	→
		4. Centrifugal chiller optimization project at PEA Headquarter	←	—	→	
	Solar PV Rooftop	5. Project to install solar PV rooftop system at PEA offices	←	—	—	→
	Green Building	6. Project to renovate Buildings 1, 2 and PEA Headquarter building connecting corridor to achieve LEED Gold certification	←	—	—	→
	CSR	7. PEA LED project for cultural tourism destinations	←	—	→	
	Financing Research	8. PEA Electric Vehicle (EV) Charging Station and EV Charging network management (Suvarnabhumi-Pattaya route) pilot project	←	→		
PEA Customers	Small-Scale Electricity Consumers (residential users and small businesses)	9. Project on energy management advisory support for commercial buildings	←	—	—	→
		10. Pilot project to promote energy conservation among residential users	←	—	→	
	Large-scale Electricity Consumers (industrial users)	11. Project on energy management advisory support for the industrial sector	←	—	—	→
	Government Offices	12. Project on management for energy conservation in universities and government offices	←	—	—	→
Street and Public Lighting	Replacing parts and equipment	13. Integrated high-efficiency street lights energy conservation system	←	→		

According to the aforementioned electric power management plan, the following plans were successfully implemented in 2017.

Corporate internal plan

- **Centrifugal chiller electricity consumption efficiency optimization plan** involved installing energy saving equipment for 1,000 air conditioners, completed in July 2017

External plan

- **Project on Energy Management Advisory Support for the Commercial and Industrial Sector** had a target of 300,000 kWh/year energy savings per each of the 12 PEA Areas. At present, energy management measures have been presented in 20 locations. This is estimated to help save 1,000,000 kWh/year of energy in each area
- **Project to Improve and Enhance the Energy Efficiency of Lighting Systems at the Bueng Kan Hospital** installed 2,034 LED bulbs in January 2017. This led to 273,474 kWh/year of electricity saved.
- **Project on Management for Energy Conservation at Thai Customs Department** saw the installation of 22,598 LED light bulbs, completed in March 2017. This resulted in 1,799,000 kWh/year saved.

Furthermore, PEA partnered with the Energy Regulatory Commission (ERC) to implement the **"Project on Demand Response to Natural Gas Shortage in March-April 2017"**, following the Emergency Demand Response Program (EDRP) approach. It is a measure to decrease or average out electricity need during a period which the system requires high electricity generation capacity, by shifting the demand to another period, to minimize fuel costs needed to generate electricity instead of the natural gas which is lacking. The measure provides compensation to electricity users who cooperate by reducing their energy use during that period. The compensation is calculated based on the decrease in electricity use.

The employment of EDRP measure for this case was applied to a specific area, close to the power plant that required fuel use in lieu of natural gas, as well as areas that are heavily reliant on that particular power plant. This project also benefited from the cooperation with Electricity Generating Authority of Thailand (EGAT), Metropolitan Electricity Authority (MEA), Federation of Thai Industries, and Ministry of Energy. Together, the partners encouraged large-scale electricity users (category 4) in Samutprakarn, Ratchaburi, Nakhon Pathom, Samutsongkram, and Samutsakorn province who are interested and have the capacity to reduce their energy consumption towards the end of March and take part in the project. From PEA's service area, 146 users joined the project, out of which 137 were compensated (9 users did not successfully curb their consumption). They were compensated for total of 1,466,292.95 kWh, which was valued at 4,398,878.72 Baht.

Management Guidelines to Control Power Losses [103-2] [103-3]

PEA controls losses in its electric power systems according to its role, policy and management for minimization of power losses in electric power systems of government agencies. The State Enterprise Policy Office (SEPO) oversees the effort to control the percentage of units lost in electric power systems. The MOU on evaluation

of operating enterprises (Performance Agreement) for 2017, includes indicators on the percentage of losses in the electric power system. To this end, PEA established a committee to decrease unit losses in the power system and improving the power factor to manage the unit losses in the electric power system. The committee's responsibilities include

- Establish evaluation criteria for losses in electric power systems by categorizing PEA operations by regions, and workplan for reducing unit losses in electric power systems.
- Monitor and evaluation losses in electric power system to ensure results are within the evaluation criteria.
- Provide recommendations related to reduction of losses in electric power systems for efficiency and appropriateness with power distribution.
- Create working groups in various related areas to help reduce losses in the electric power system.

The management aimed of controlling power losses will be assessed firstly assessed based on the assumption used in estimating power losses in the system, namely hypotheses on the statistics and probability of unit losses in the past, coupled with economic growth rate and increased in electricity users in both industrial and residential groups.

As such, following the efforts to control losses in the electric power system found that most of the technical losses are caused by high-voltage distribution lines, power distribution transformers, low-voltage distribution lines, and connectors. On the other hand, non-technical losses result from illegal use of electricity or abnormal electric meter functions, which requires urgent reparation. However, PEA has a large number of electric meters, it is difficult to assess, particularly for low-voltage electric meters. This can lead to huge power losses if not timely repaired. Hence, PEA applied a screening system for malfunctioning electric meters, by using PEA's Geographic Information System (GIS) in combination with SAP Industry Specific Solutions for Utilities Industry (SAP IS-U). It assesses the normality of electricity consumption and electric meters, primarily to reduce power losses due to illegal consumption or from broken electric meters of low-voltage system users, and helps to analyze power losses in PEA's low-voltage power distribution systems.

Furthermore, PEA also utilizes an information system to aid management (U-CUBE), based on electricity usage, in addition to the GIS database and SAP IS-U system to assess the electric meters. This was started as a pilot in each of the PEA areas. The piloting included teaching and explaining the real application of these systems, and how to analyze the issues or obstacles that arise in real operational scenarios, to inform the areas of improvement for the U-CUBE program. PEA has a plan for its continuous development and the comprehensive assessments of abnormalities in electric meters. It aims to cover other assessments such as creating monitoring systems, evaluating electric meters efficiently, and establishing the format for reporting the results of electric meter assessments, adjusting electricity costs, and prosecuting those illegally using electricity. PEA aims to develop an information system which automatically updates any changes in the electric meters in SAP IS-U and GIS systems to be accurate, congruent, and up-to-date.

Lengths of PEA's Overhead and Underground Transmission and Distribution Line, Categorized by Voltage Levels

Type	Voltage Level		Length (Circuit-Kilometer)
Overhead Cable	Transmission System	230 kV	-
		115 kV	12,062.67
		69 kV	17.65
	High-voltage Distribution System	33 kV	28,024.16
		22 kV	260,414.67
		19 kV	18,704.25
	Low-voltage Distribution System	400/230 V	461,721.30
Underground Cable	Transmission System	230 kV	-
		115 kV	185.25
		69 kV	-
	High-voltage Distribution System	33 kV	117.10
		22 kV	1,526.91
		19 kV	-
	Low-voltage Distribution system	400/230 V	1,528.32
Submarine Cable	Transmission System	230 kV	-
		115 kV	98.09
		69 kV	-
	High-voltage Distribution system	33 kV	115.98
		22 kV	86.70
		19 kV	-
	Low-voltage Distribution System	400/230 V	-

PEA Power Losses between 2015-2017 [EU12]

Power Loss	Percentage of Power Losses in the Transmission and Distribution Systems		
	2015	2016	2017
Total Target Loss	5.46	5.36	5.40
Total Loss	5.50	5.40	5.12

Remark : - Most technical losses are caused by high-voltage distribution lines, power distribution transformers, low-voltage distribution lines, and connectors.

- Non-technical losses are calculated by the total units lost in the distribution system, minus the technical losses. These usually result from inaccuracy of electricity measurement tools, incomplete installation of electric meters, as well as incomplete utility billing or illegal uses of electricity.
- Loss refers to power losses that occur in the transmission and distribution of electricity. It is the difference between the net energy which the transmission system receives from power producers, and the electricity load that the distribution system delivers to the users.

Research and Development for Innovation in Electric Power Distribution [EU8]

PEA values research and development for innovation in electric power distribution. Hence, it established a clear policy for research and development, championing "development of human resources through innovation and operational performance through technology". PEA's vision is to transform itself into an innovative organization by utilizing research and development for innovation to drive the corporate strategy toward safe and efficient work, minimizing time and expenses, as well as increasing its personnel capacity. PEA also values intellectual property management by utilizing research and development for innovation to create value added for the organization. PEA supports, promotes and incentivizes developing researchers and inventors. It creates an inclusive participatory environment, allocates sufficient budget and resources, as well as provides guidelines and appropriate communication channels to catalyze the application of innovation, to improve PEA's power distribution services, and to its highest efficiency. This is in line with the policy of Thailand's energy regulatory organization, and the country's future of energy consumption which emphasizes the importance of using renewable energy and promoting energy sustainability in Thai society. [103-1] [103-2]

In 2017, PEA dedicated efforts to promote the utilization of research findings, by focusing on ones that can be commercialized in the long term, and research and innovation on Smart Grid & Strong Grid to ensure power systems are stable, efficient, and up-to-date. These are, for example, developing electric power systems for big cities, tourist destinations and industrial cities; developing or procuring state-of-the-art equipment for power systems, power systems planning; and learning how to increase power systems' capacities to enable buying electricity from alternative energy source trend which is becoming more demanding in the future and requires connection to low-voltage power systems. Further, PEA plans to create a headquarter test center to support research and innovation, as well as product quality certification in the future. The center will test and certify quality of equipment to use in power systems, and will support research and innovation of electrical equipment. It will foster cooperation with other domestic and international organizations, institutes and research bodies to advance PEA's innovation, facilitate exchange of resources and knowledge, in line with the framework and overall direction of PEA's strategy to promote and cultivate partnerships for research and development for innovation to drive its core and related businesses.

PEA appointed the Research Fund and Innovation Management Division to oversee the overall operations of PEA's fund for research and technology development. It provides funding in support of both internal and external research units, to further their studies, experiments, and the development of researches related to power systems. PEA's committee for the research and technology development fund has the responsibility to oversee the fund's various operations, such as by setting up various working groups, reviewing research proposals, considering the fund's rules revisions as appropriate, as well as planning for any obstacles or conditions involved in the work of fund recipient-research organizations. In 2017, a total of 59.41 million baht was disbursed to support various research and development projects according to the following allocated proportions. [103-2] [103-3]

Research and Development Projects in 2017	Budget (Baht)	Proportion (Percentage)
• Data Concentrator Unit (DCU)Prototype for the Advanced Metering Infrastructure (AMI) system - in partnership with King Mongkut's University of Technology North Bangkok	711,600	1.20
• Data Concentrator Unit (DCU)Prototype for the Advanced Metering Infrastructure (AMI) system - in partnership with Chulalongkorn University	702,965	1.18
• Scale-up cable spacer and spaced aerial cable preforming tool	929,876	1.57
• Prototype EV Charging Station according to CHAdeMO standard	1,916,533	3.23
• Enhancing the performance of Impulse Pump-as-Turbine	4,229,416	7.12
• Development and installation of energy conserving street lighting system on Koh Tao	190,630	0.32
• Comparative research on promotion of EV busses for Thailand low carbon society (bus fares)	13,886,532	23.38
• Nationwide expansion of the PEA GENIUS II automatic payment machine	3,904,444	6.57
• EV fast-charging station networks for Smart Grid project in partnership with King Mongkut's Institute of Technology Ladkrabang	7,874,560	13.26
• Impact assessment of EV fast-charging stations' effects on power systems	15,547,200	26.17
• Database development to support property management	1,540,000	2.59
• Smart microgrid management system in partnership with Chiang Mai University	7,973,680	13.42
Total	**59,407,436**	**100**

In addition, PEA also has research and development projects focusing on other important facets of power distribution, which were adopted for further quality and efficiency optimization. Examples include:

Prototype Development of PEA HiVE Platform, a home energy management system. The system aims to encourage electricity consumers' participation in Demand Response efforts both at present and in the future, and to promote the use of renewable energy in buildings, while also helping to lower energy costs for consumers.

The benefits of the PEA HiVE Platform include (1) providing a model platform for smart energy management (PEA HiVE Platform) that works perfectly in a local system, and supports cloud systems operation; (2) providing algorithms for efficient home energy management, compatible with the renewable energy production capacity such as through Solar PV Rooftop system; (3) determining a list of smart equipment for relevant units to further research on, for PEA related diversification opportunities; (4) developing PEA human resources to equip them with the basics and capacity to study and develop the PEA HiVE Platform; (5) rendering PEA Smart Home available as an experimental space for exchange or transfer of

technology, and as a compatibility testing site for equipment controlled by Internet of Things (IoT) and PEA HiVE Platform in the future.

Improving work processes to reduce non-technical loss for small-scale users by using innovative information technology program to manage electric unit consumption (U-CUBE). PEA records at least one-billion-baht worth of non-technical loss each year, which can be partly due to electric meter malfunctioning or illegal electricity use. The process for evaluation, request and reparation of multifunction involve several steps. In addition, there are up to 18 million individual users' electric meters. Given these conditions, PEA developed an information technology program to gather information about electric meters from various sources and establish a central database so that related parties have access to all the details. It also developed additional programs to support operations, for example (1) SCS - Check Meter program to support meter assessment work and record commands from the U-CUBE system; (2) mobile application for meter monitoring to record commands from U-CUBE when an inspector examines the meter at its installed location; (3) PTC e-form recorder to label the different kinds of issues with the electric meter and related tools, to enable swift analysis and troubleshooting. As a result, PEA was able to reduce its losses in the power systems, and to decrease its operational costs by 660 million baht in 2017.

Furthermore, PEA also recognizes the importance of providing opportunities for its personnel to apply their knowledge and capacity, including by using their skills and experiences to contribute to research for innovation in power distribution. Some notable research projects in 2017 include a bronze medal winner **"Detection Communication Signal Control SCADA"** and a special prize winner **"Electricity Phase Identification System"** from the 13th Taipei International Invention Show & Technomart (INST2017) in Taipei, Taiwan. Other prize-winning research also include **"Hotline Cuttable Tie Stick"** which won a silver medal and a special prize, and the **"Hydraulic Crimping Tool Checking Device"** which won a bronze medal at the Seoul international Invention Fair (SIIF 2017) in Seoul, Republic of Korea. The **"Solar Hero Application"** also won the People's Choice Award from the Smart Energy Hackathon Southeast Asia event. All these awards and accomplishment are a source of pride for PEA and all its personnel.

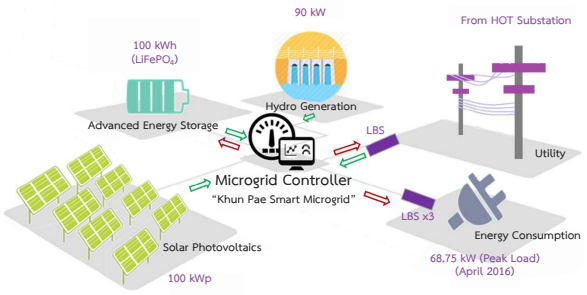
In addition, PEA established the PEA Innovation Center, in cooperation with Huawei Technologies (Thailand) Co., Ltd. The two organizations signed a Memorandum of Understanding on 20 November 2017, agreeing to build the PEA Innovation Center to promote education and support personnel training on electric power systems, and Information and Communications Technology (ICT), including the widespread technologies related to Smart Grid in Thailand. Thus, PEA Innovation Center will conduct researches and develop technologies that are efficient, reliable, and responsive to social and environmental contexts, providing energy conservation benefits and reductions in gas emissions for Thailand.

PEA Innovation Center is regarded as the first electrical innovation center in Thailand. It will be situated on the third floor of the LED building, at the PEA Headquarter. It will serve as a platform to conduct researches and experiments for electrical innovation. The innovation center will provide guidance for power systems development in conjunction with state-of-the-art ICT. In the first phase, it will invest in advancing the Power Line Communication (PLC) and the Internet of Things (IoT), while experimenting with information transmission technologies such as GPON and 3G/4G. Additionally, it will also include Internet Protocol (IP) to strengthen the stability of the networks connecting the various innovations. These endeavors are in line with PEA's policy to champion development of human resources through innovation and operational performance through technology in the PEA 4.0 era, to transform itself into "The Electric Utility of the Future".

Cooperation in Research and Development with Educational Institutions [103-2] [103-3]

PEA allocated resources toward research and development, to support the work implemented through educational institutions or research and development institutes in the country. The objective is to promote and support research and development of both existing and new technologies, to ensure continuous development. It aims to achieve the highest efficiency to decrease reliance on imported technologies, and to be able to apply those research findings to benefit PEA operations. In 2017, some noteworthy research and development projects include the following:

Research and development project on the management system of Smart Microgrid and power distribution lines in rural areas. PEA strives to develop electric power systems that are stable, sufficient, and accessible, with a high service standard. It aims to equip PEA's electrical grid with the capacity for electric power generated by renewable energy, and the MicroGrid energy management technology that will be available in the future. To this end, PEA provided financial support to Chiang Mai University to conduct a research and development project on the management system for very small hybrid electricity generation sources and power distribution lines in rural areas at Ban Khun Pae, Jomthong, Chiang Mai Province. The project site is intended to serve as a model for energy management modality that efficiently and reliably utilizes natural resources in the area, and to support the livelihoods and social wellbeing of rural communities. The objective of the project is to distribute electricity with stability and efficiency, to serve as a model for power distribution to rural communities, as well as a learning center, and to share the management model with educational institutions both domestic and international.



Based on the research conducted under this project, a management system for very small hybrid electricity generation sources and power distribution lines in rural areas was developed, comprising of

- MicroGrid Control System
- 100 kW Solar Photovoltaic System
- 90 kW Micro Hydroelectric System
- 100 kWh Battery Storage System
- 4 sets of Load Break Switch equipment
- Communication System

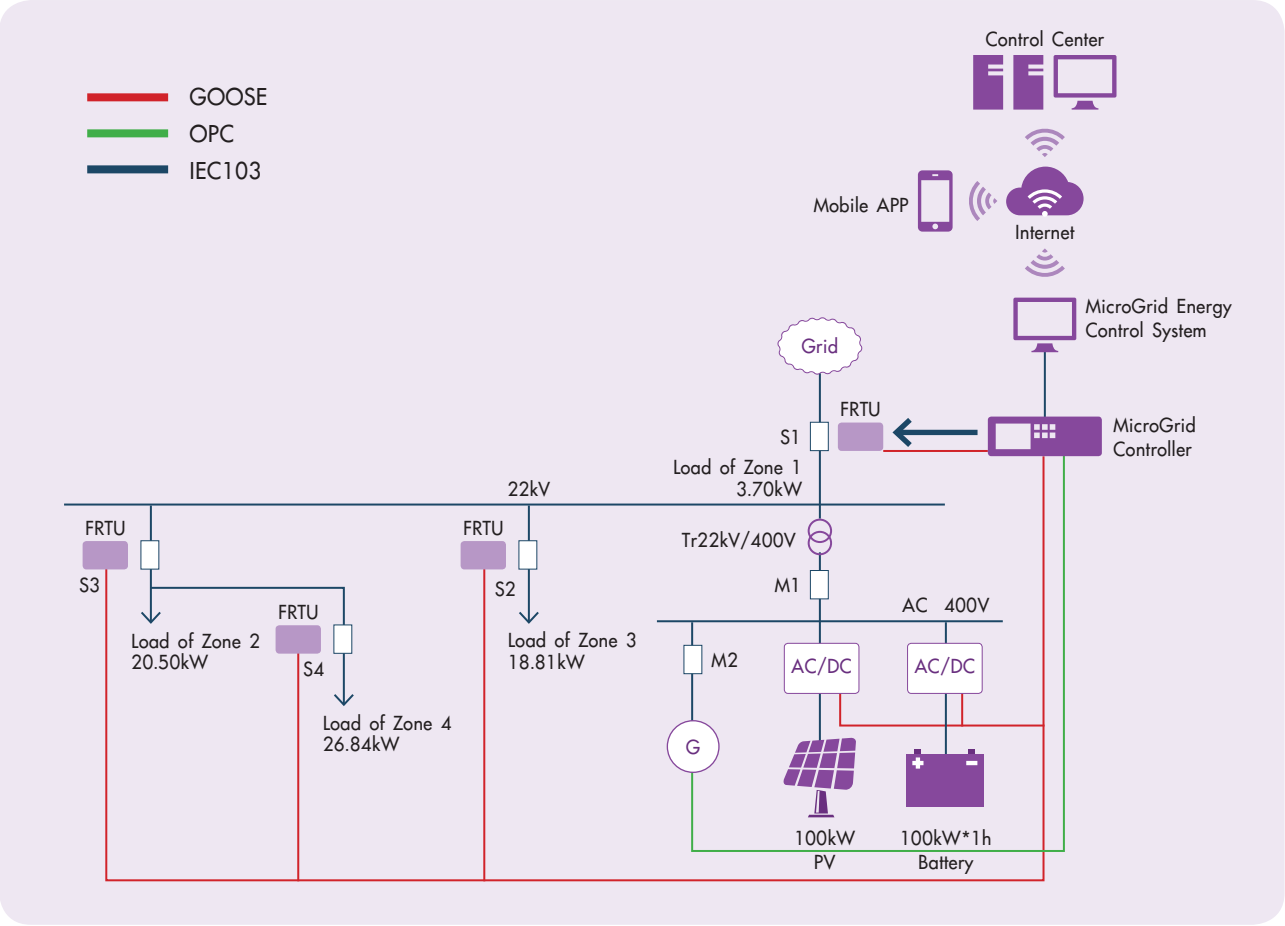


Illustration of the Management System of Smart Microgrid and Power Distribution Lines in Rural Areas

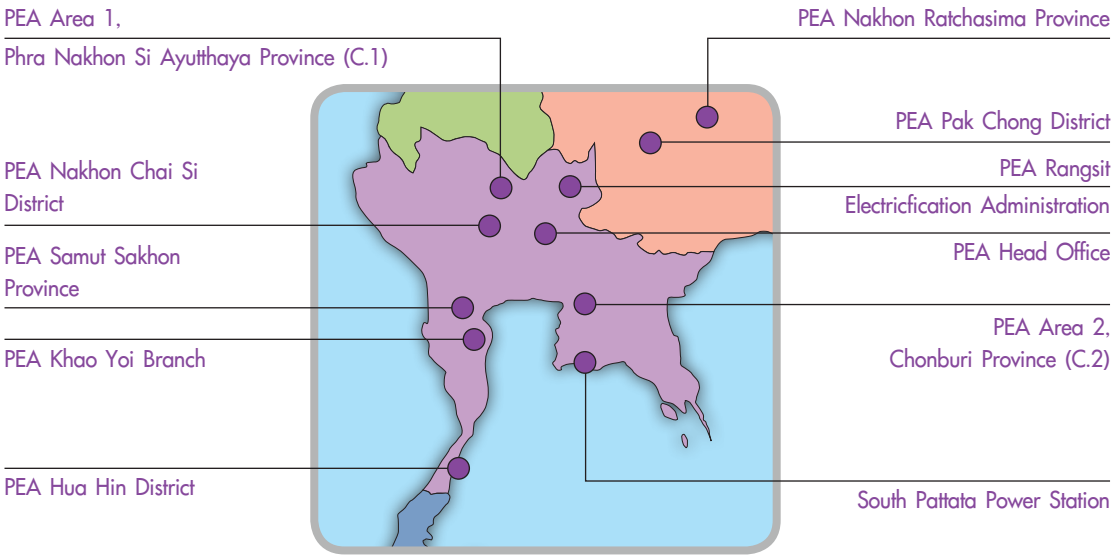
The project observed the function of the various parts in the system, such as looking at the PEA grid-connected power transmission to study the operations of the control system in managing the appropriate level of energy transmitted. Another scenario is islanding power distribution to observe the battery control processing, off-loading and disconnecting the energy source to keep the balance of the power distribution system. Other scenarios included switching from a grid-connected distribution mode to islanding, to control the generator and electric load and safely reconnect to PEA power distribution system; and Black Start power transmission operation to observe the start of transmission operation in the event that there was no electricity in the system before, to ensure stable distribution, etc. The research findings showed that the system is able to operate efficiently and sufficiently, according to the demands of rural communities and to uplift people's quality of life. It also found a suitable operational modality that can be applied to PEA's work and inform its strategy for planning power systems and operations to support PEA electric power systems in the future. Additionally, it serves as an example for replication to another area with similar usage pattern and conditions, to provide the people with access to energy that is readily and inexhaustibly provided by nature and also environmentally friendly.

Research project on networks of EV fast-charging stations for PEA Smart Grid. PEA implemented this project on EV technology and EV charging stations to support the usage of electric vehicles (EV) in Thailand in partnership with King Mongkut's Institute of Technology Ladkrabang, by conducting researches and public relations efforts simultaneously to provide people with an understanding of the EV technology which efficiently utilizes energy and is environmentally friendly.

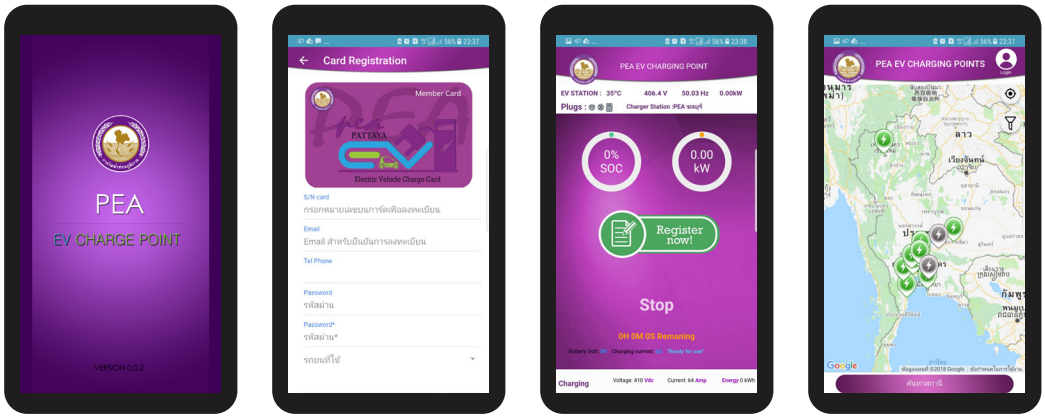
The project was initiated with an objective to find ways to plan the network and locations of the EV charging stations, as well as to establish EV charging station networks and create EV charging machines. It aims to install additional 4 EV charging stations and establish an EV charging station network connecting 5 stations, to render service to EVs, including large electric buses through both regular and rapid charging. The project promotes the development of PEA Smart Grid to support the development of advanced functions in the future. It serves as a measure to develop and adapt EV charging machines for other types of vehicles in the transport sector, and as a way to promote PEA's business in supplying electricity to EVs.

Under this project, networks were established with 11 EV fast-charging stations, situated on main routes to large cities and key tourist destinations, to support the EV usage that will rise in the future. It utilizes online networks and multi-standard EV chargers that can charge EVs in both the AC and DC modalities, according to international standards. The networks cover the five following routes:

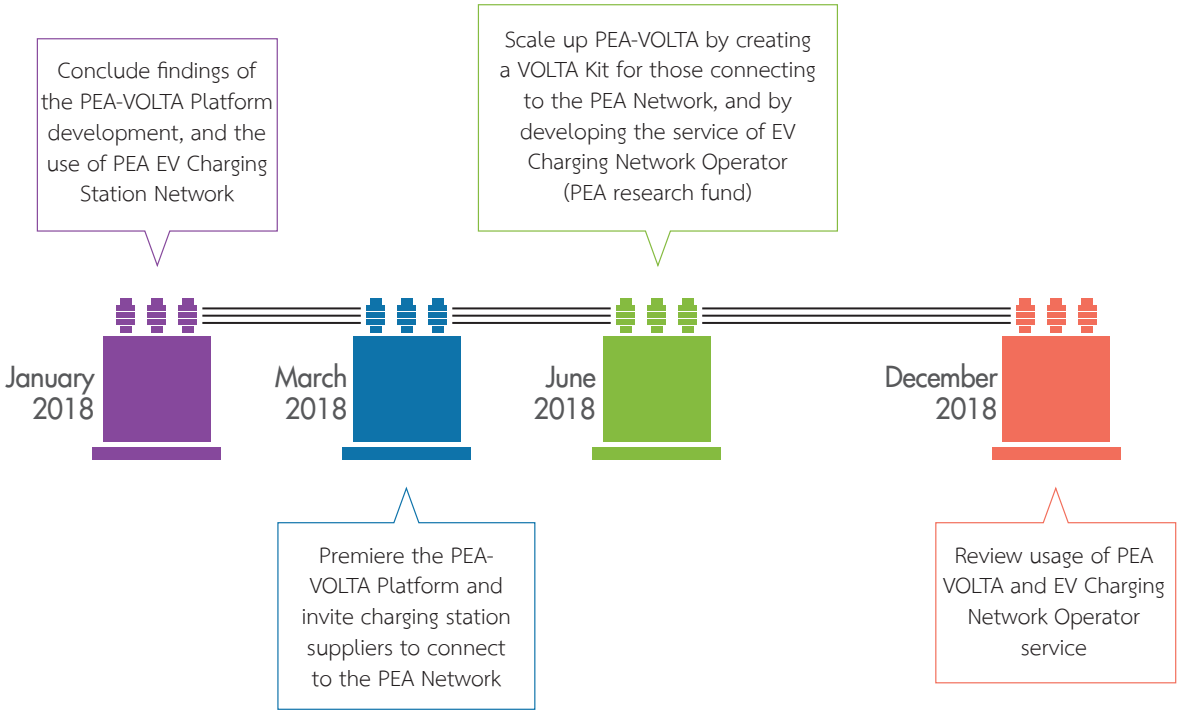
1) Northern route (Bangkok- Phra Nakhon Si Ayutthaya) with two stations, located at Rangsit and Ayutthaya
2) Southern route (Bangkok-Hua Hin) with three stations, located at Samut Sakhon, Khao Yoy, and Hua Hin
3) Eastern route (Bangkok-Pattaya) with two stations, located at Chonburi and South Pattaya
4) Western route (Bangkok-Nakhon Pathom) with one station in Nakhon Pathom
5) Northeastern route (Bangkok-Nakhon Ratchasima) with three stations, located at Pak Chong, Nakhon Ratchasima, and PEA Headquarter



An online network connects the EV charging stations to facilitate convenient operations, so that users can access information about station location, status identification systems, energy consumption, charging modalities and payment methods. Customers will also be able to report issues at the charging stations via the website or smart phone application.



The fast-charging station networks for the PEA Smart Grid is a system that promotes the use of EVs instead of pollution-causing fuels, in order to reduce air pollution in urban areas with heavy traffic, which is the main area exceeding air pollution standard limits. It also plans to support more EV charging in the future, and handle fuel shortages or rising prices. Furthermore, PEA developed the "PEA VOLTA Platform" which is an information system for charging stations, to help advance performance development of fast-charging station networks for the Smart Grid system, and to support the operation of EV Charging Network Operators in the future.



Society Sustainable Development

Exchange and Sharing

Save Your Life

On-the-Job Training

Education

Stand Alone System

Human Resources Management

The Provincial Electricity Authority emphasizes human resources management, which is regarded as a valuable and important mechanism that moves the organization's operations towards its vision, mission, and goals. In addition, it helps the organization to respond to business operations that need to be adjusted in accordance with both internal and external factors that are exponentially changing nowadays. PEA prioritizes recruiting knowledgeable and talented personnel who align with its business demands; managing and retaining employees; enhancing their knowledge and skills; cultivating their expertise that aligns with organizational values; overseeing their benefits and welfare as appropriate; and improving their occupational health safety, and environment on the basis of non-discrimination. All of these undertakings are carried out in accordance with PEA's good corporate governance, with the goal to increase efficiency in product and services development and to support the organization to thrive sustainably. [103-1]

Recruitment Employment and Placement Processes [103-2][103-3]

With regard to new employee recruitment, employment, placement, shortlisting, and retention processes, PEA carries them out in an open and transparent manner, disregarding factors involving race, religion and educational institutions. The organization focuses on hiring good and talented employees, including those who hail from different regions in the purpose that they can represent the diversity of thought, culture, and public opinion. In this regard, PEA analyzes and reviews its guidelines for new employee recruitment, employment, and placement. It also summarizes the vacancy rate of each position before it proceeds to announce job vacancies for new employees. Its recruitment processes can be divided into two categories as follows:

External Recruitment: PEA announces its job vacancies on its website at http://www.pea.co.th Written tests will be conducted according to the qualifications announced. Those who pass written tests will be required for an interview. If they pass the interview, they will be subject to a 3-month probationary period prior to being considered by each line manager as to whether or not they can carry out their duties efficiently. Provided that they meet all requirements, they will be officially recruited into PEA as an employee.

Internal Recruitment: PEA sends out a notification regarding job vacancies within the organization via Intranet, e-letters, and radio broadcasting. It conducts written tests and interviews, according to each candidate's required skills. Once they are shortlisted, PEA will subsequently mandate amendments to educational qualifications and position descriptions.

After employees go through these recruitment, employment and placement processes, PEA will proceed to comply with the employee retention guide so that they can work for the organization smoothly. The guide will be implemented in a wide range of activities and projects such as career advancement and talent management projects. In addition, PEA will seek to enhance their knowledge and ability; manage their compensation and welfare; provide them a platform to communicate and convey their opinions and grievances via PEA's various channels. In 2017, PEA had a total number of 954 new employee hires and 1,234 employee turnovers. The details classified by employee criteria and components are as follows:

New Employee Hire and Turnover Rates [401-1]

Employee Criteria and Components		New Employee Hires						Employee Turnovers					
		2015		2016		2017		2015		2016		2017	
		Number (Person)	%	Number (Person)	%	Number (Person)	%	Number (Person)	%	Number (Person)	%	Number (Person)	%
Numeric Changes		1,670	5.68	2,007	6.67	954	3.20	763	2.59	1,051	3.49	1,234	4.14
Gender	Male	1,397	4.75	1,430	4.75	671	2.25	602	2.05	851	2.83	253	0.85
	Female	273	0.93	577	1.92	283	0.95	161	0.55	200	0.66	981	3.29
Age	Age < 30 years	1,612	5.48	1,908	6.34	872	2.92	29	0.10	37	0.12	30	0.10
	Age 30 - 50 years	58	0.20	99	0.33	82	0.27	63	0.21	56	0.19	50	0.17
	Age > 50 years	0	0.00	0	0.00	0	0.00	671	2.28	958	3.18	1,154	3.87
Areas of operations	Head Office	148	0.50	358	1.20	228	0.76	184	0.63	208	0.69	196	0.66
	North	324	1.10	346	1.19	189	0.63	159	0.54	241	0.80	287	0.96
	Northeast	377	1.28	459	1.52	165	0.55	127	0.43	198	0.66	253	0.85
	Central	479	1.63	458	1.52	188	0.63	179	0.61	214	0.71	266	0.89
	South	342	1.16	386	1.28	184	0.62	114	0.39	190	0.63	232	0.78

Remark : The percentage outlined in the table was calculated in comparison to the total number of employees each year (total number of employees in 2015, 2016, and 2017 were 29,403, 30,108, and 29,835 respectively.)

In this regard, the causes of employee turnover can be divided into 7 categories: 1) retirement before 60 years of age, 2) retirement at 60 years of age,3) death, 4) dismissal/termination of employment, 5) resignation, 6) lay-off and 7) discharge or forced resignation. According to the 2017 employee turnover rate, these causes can be classified as follows:

Causes of Employee Turnover	Employee (person)
Retirement before 60 years of age	82
Retirement at 60 years of age	994
Death	80
Dismissal/Termination of employment	16
Resignation	52
Lay-off	4
Discharge or Forced resignation	6
Total	1,234

Employee Benefits and Welfare

PEA surveyed employee needs in order to use the survey results to create an employee benefits and welfare policy that responds to their various needs in different work areas and operations. In doing so, it leads to effective management and generates more organizational satisfaction and commitment among employees. In addition, PEA also allows employees to gather and organize the Labor Unity of PEA, so as to protect their rights to benefits and welfare.

The Labor Unity of PEA also provides advice to its members who are not treated fairly. It also acts as a conduit that follows up on employment conditions and benefits and grievances, as well as considers the appropriateness of employee welfare. The total number of employees who receive a wide variety of benefits and welfare stands at 100 percent. [102-41]

PEA provides benefits and welfare to employees and workers as follows:

Employee Benefits and Welfare [401-2]	Personnel		Remark
	Employees	Workers	
Severance pay or retirement funds	•		Reserved for retired employees
Overtime and holiday pay	•		Based on salary rate
Welfare funds	•		Reserved for membership employees
Funeral expenses	•	•	Based on salary rate
Medical expenses and paid sick leave	•	•	
Child benefits	•		
Paid annual leave as required by law	•		
Contributions	•		Reserved for membership employees
Per diem for domestic and overseas travel for temporary duty assignment (TDY)	•		Reserved for membership employees
House rental fee	•		Reserved for employees who receive house rental fee approval
Employee uniform expenses	•		Reserved for employees in specific positions
Pay for employees on duty during power outages	•		
Extra pay for employees on work shifts	•		Based on salary rate
Extra pay for hotline operators	•		Reserved for hotline operators
Extra pay for drivers	•		Reserved for drivers
Salary Promotion	•		
Welfare for special working area	•		Reserved for approved area
Medical expenses	•	•	Employees including parents, spouses, and children Workers including spouses and children
Children's tuition fees	•	•	
Maternity allowance	•		Reserved for female employees
Funds in support of ordination	•		Reserved for male employees
Relief funds in support of fire and other disaster victims	•		
Assistance funds for employees' electricity allowance	•		Based on salary rate
Risk allowance (The South)	•	•	Reserved for three southern most provinces
Loans	•		
Funeral service expenses	•		Reserved for membership employees
Shuttle bus services	•	•	Available for head office
Loans for children's tuition fees	•		

Employee Benefits and Welfare [401-2]	Personnel		Remark
	Employees	Workers	
Medical Care at PEA clinics	•	•	
Cellphone allowances for senior-level employees	•		Based on positions
Company cars	•		Based on positions
Combat pay	•		Granted to those who received combat pay before recruited into PEA
Professional fees	•		Reserved for certain positions
Assistance funds for criminal cases arising from the duties	•	•	
Uniform rights	•		
Rights to receive the royal decorations	•		Reserved for chief section position and the higher positions
Rights to use PEA's Child Development Nursery	•		
Recreational activities	•	•	

PEA emphasizes providing rights to employees who take paternity and maternity leave in compliance with the Children's Rights and Business Principles, which were developed by UNICEF, the UN Global Compact, and Save the Children. This is done to ensure safety for pregnant women and allow children to be looked after by parents in an appropriate manner.

Return to Work and Retention Rates after Parental Leave [401-3]

Reasons for Taking Leave	Number of Employees (person)					
	2015		2016		2017	
	Men	Women	Men	Women	Men	Women
Total number of employees who were entitled to parental leave	21,969	7,434	22,309	7,799	22,002	7,833
Total number of employees who took parental leave	209	154	268	155	355	194
Total number of employees who returned to work after parental leave ended	209	154	268	155	355	190
Total number of employees who returned to work after parental leave ended and who were still employed 12 months after their return to work	n/a	n/a	208	135	268	155
The return to work rate[1] for employees who returned to work parental leave ended (percentage)	100	100	100	100	100	98
The retention rate[2] for employees who returned to work after parental leave ended who were still employed 12 months after their return to work (percentage)	n/a	n/a	99.52	87.66	100	100

Remark : (1) Return to Work Rate = (number of employees returning to work after parental leave/number of employees, by gender, that used their entitlement for parental leave) x100

(2) Retention Rate = (number of employees who returned to work after parental leave ended who 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) x100

Furthermore, PEA also has a non-financial benefits policy covering other aspects such as providing shuttle bus services, hygienic cafeteria, nursing station, library, access to soft loans, areas for exercise and recreation. It also improved communication channels to provide information regularly and ensure quality communication, so that employees are widely aware and understand their various rights and benefits.

Non-discrimination [103-2][103-3]

PEA recognizes the importance of non-discrimination and had thus established clear procedures to practice such principle in the Corporate Governance Handbook 2017. Beyond selection and recruitment, as well as transparent and non-discriminatory professionalization processes, PEA also established a fair and non-discriminatory procurement and selection process for its suppliers. This includes disseminating full and factual information to prevent misunderstandings that lead to unfair competition between relevant suppliers. Further, PEA management and staff are expected to provide quality service equally to all kinds of customers, to treat everyone with fairness and non-discrimination. They shall take note of concerns and provide support before, during, and after the service. They shall first and foremost consider the health, hygiene and safety of consumers in their operations, as well as be equally responsive to all concerns and suspicions, treating them with attentiveness and transparency. PEA expects its personnel to treat all parties with fairness, non-discrimination, without prejudices, and provide protection to anyone lodging complaints or suspicions.

Furthermore, PEA requires the committee, executive, and employees to comply with the Regulation of the Office of the Prime Minister on giving or Accepting of Gifts by Government Officials B.E. 2544, and the morals and core professional ethics which PEA had established. Thus, PEA personnel are not to request, accept or promise to provide any gifts, meal receptions or any benefits beyond the value that the law stipulates, and are prohibited from exhibiting any dishonest intentions that may lead to selective treatment and conflict of interest within the organization. As such, there were no complaints regarding any kind of human rights violations following PEA's operations in 2017. [406-1]

Employee Training and Education [103-2][103-3]

PEA provides capacity building for its employees at all levels and in all positions, according to the competency gap. This covers engineering, new technologies, management, improving quality of life and governance to cultivate a competent and happy workplace (through work-life balance), and with organizational commitment. PEA seeks to increase its personnel's capacity in terms of knowledge, skills, attitude, and behavior. It does so by providing in-class training, focusing on practice and on-the-job training, following the 70:20:10 learning model. Further, PEA operates in accordance with ISO 10015, a quality management standard with guidelines for training and personnel development. It entails various learning activities in line with human resources development plan and other relevant aspects such as requisition for learning and development of various skills as determined by human resources, supervisors, and high-level management. It addresses the following aspects: organization core competencies, strategic challenges, and how to achieve the organization's workplan in the short and long terms, improving the organization's operational results, changes in technology and innovation, business ethics, client orientation, knowledge transfer from departing and retiring employees, encouraging the application of new knowledge and skills in work operations, contributing to the organization's economic value added, and etc. The Human Resources Department is the main responsible party in analyzing and preparing workplans and their implementation, following learning and development processes according to various aspects of PEA's Human Resources Development plan to be included as part of training curriculum and other relevant activities. These considerations must include the following

5 perspectives: 1) developing a professional workplace, 2) developing employees with leadership and management skills, 3) developing employees' potential, 4) developing a workforce with balanced physical, mind, and soul wellbeing, and 5) developing a workplace that is responsible toward society and values governance.

Furthermore, PEA also encourages its personnel to exchange knowledge and expertise among themselves. It gathers information and expertise into a database and organizes training seminars and exhibitions to facilitate the knowledge exchange. It enables its employees to apply the knowledge gained to enhance their work performance. In 2017, PEA provided capacity building activities according to its training and human resources development plan for 2017, covering seven aspects across 220 courses. This also includes courses that are beyond policy plans with urgent necessity as clarified in meetings as follows

Employees Training and Education Courses for 2017 [404-2]

PEA Employees Training and Education courses

Executive Management Development Courses	Managerial Courses	Engineering Courses
• Executive Educations Program • Smart Manager • Pre-management Course	• Logistics and Supply chain • Corporate Governance for PEA Sustainability • Negotiation Techniques	• Electrical Engineering • Electric Power Systems Planning • Unmanned Substation Management • Cyber Security for SCADA System and Network • Connecting high voltage power lines (22-33 kV) using hot stick technique
Foreign Language Courses	**Other Courses**	**Special Training Courses**
• English Camp for ASEAN Economic Community (AEC) • Burmese Language	• Safety Officers at the Supervisory Level for Hotline Operations	

Average Hours Employees Training [404-1]

Information on employee training	2015	2016	2017
Average Hours of Employees Training (hrs./person/year)	29.48	36.16	40.89

Number of Employees Received Training per Year

Information on Employee Training	2015	2016	2017
Number of Employees who Received Training, by Gender (Person/Year)			
Men	n/a	n/a	18,048
Women			4,782
Number of Employees who Received Training, by Position Level (Person/Year)			
Management level	n/a	n/a	4,835
Expert level			3,163
Operation level			14,832

Training and Education Courses in 2017

Training Course	Training Budget (Thai Baht)	Number of Employees Trained (person)	Training Hour per Person (hour)
Training Courses within the Plan	232,371,374.52	22,387	24.51
Training Courses beyond the Plan	95,784,324.55	29,430	16.38
Total	**328,155,699.07**	**51,817**	**40.89**

Beyond knowledge and skills development training for employees, PEA also conducted evaluations for development and learning outcomes according to accepted standards and comparable organizations, along with reviewing the criteria for evaluation, establishment of key performance indicators to assess the effectiveness of learning and development outcomes.

In 2017, PEA categorized its employees into 5 groups, namely 1) Executive, 2) Middle Management, 3) First Line Management, 4) Operation 1, and 5) Operation 2. It then applied different evaluation criteria accordingly as follows.

1. Evaluation of the organization's overall learning and development is a survey assessing the satisfaction toward the effectiveness of learning and development system in line with the human resources development plan. The efficiency evaluation of direct learning and development as determined by the annual human resources development plan, according the widely-recognized Kirk Patrick model, is divided into the following 4 levels:

1) Reaction Evaluation
2) Learning Evaluation
3) Behavior Evaluation
4) Results Evaluation

2. Activity-based evaluation involves using designed activities to evaluate employees' capacity, to measure their knowledge and understanding in real working context. These activities include

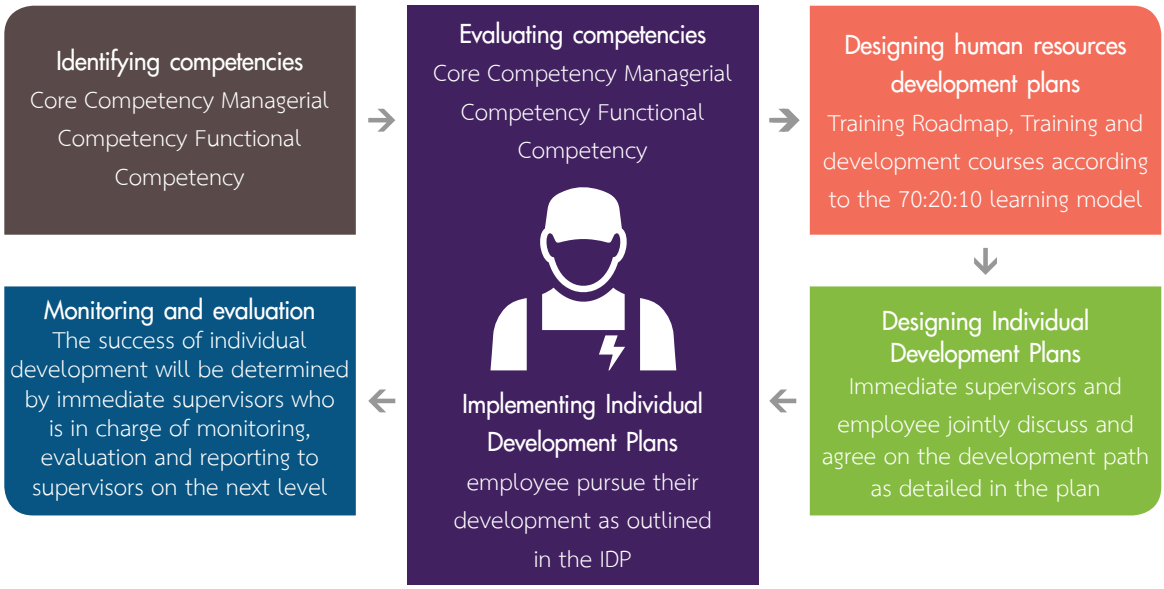
1) Competitive activities, such as annual operational skills competition
2) Capacity building activities, such as outstanding employee contests, outstanding PEA, and outstanding work department
3) Research and innovation promotion activities, such as the PEA Conference and Innovation (PEACON) which is the event giving employees an opportunities to present achievements at academic and innovation conferences such as the PEA Conference and Innovation (PEACON) event.

3. Analysis of employee learning and development system's effectiveness to inform the training evaluation result by individual level, by course level, and by various level of evaluation.

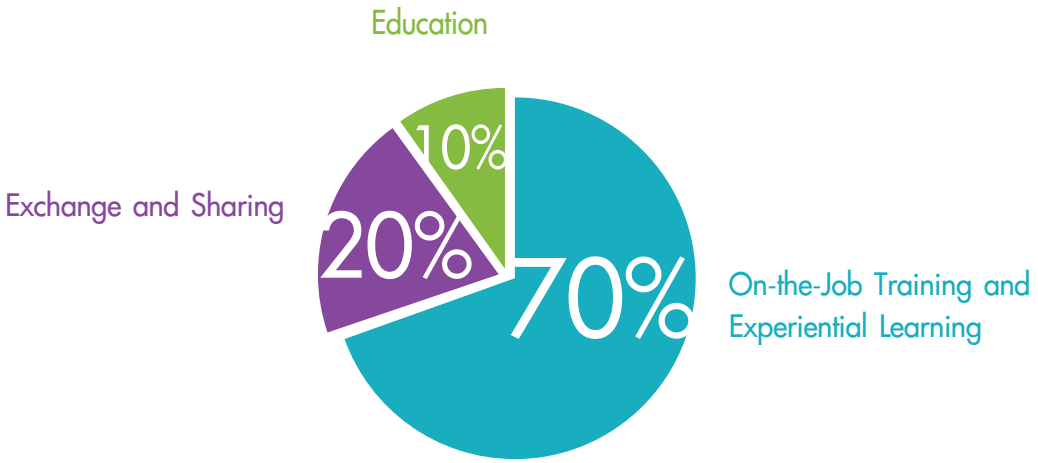
Beyond training to develop employees' knowledge and capacity, PEA also evaluates them to inform supervisors and those evaluated of their operational results, which can serve as key information for other considerations such as improving operational results/procedures or tools for operational support, rewards, and designing appropriate compensation. Furthermore, operational evaluation results also help identify any gaps between the goals established and the real operations that take place. This is an important piece of information to determine rationales, whether at the individual level such as competency and working knowledge, or at the organizational level such as working procedures or

tools for operational support. In 2017, 100% of all employees underwent such evaluation. [404-3]

In addition, PEA creates Individual Development Plans (IDP) for its employees. It is an operation following the competency evaluation which includes Core Competency (CC), Managerial Competency (MC), and Functional Competency (FC). The evaluation results are used to inform each employee's IDP to equip each employee with the knowledge, skills and behavior according to the competencies required, and to advance the capacity of both the employee and the organization.



Overview of Competency Management System



Learning for Competency Development According to 70:20:10 Model

Occupational Health and Safety [103-2][103-3]

PEA values the occupational health, safety and environment at work. Hence, it continues to improve workplace conditions to ensure safety, sanitation and welfare, and also established total 208 Occupational health, safety and environment committees to cover all operational areas. These are formal joint management-worker health and safety committees, consisting of 50% representation from either management and worker groups. Of the total PEA's staff and employees, all 100% have the right to participate as a representative in the committees. [403-1]

The Committees have the following key roles: deliberating and determining the occupational health, safety and environment policies, preparing safety plans, reviewing projects and training programs regarding occupational safety, and surveying occupational safety operations. Furthermore, there is a safety unit in charge of the operations and monitoring the implementation of the aforementioned policies. In 2017, PEA had established key workplans and projects on occupational safety such as continuous inculcation and dissemination of PEA Safety Culture in work operations, targeting management and field operations employees in all groups and levels. Officers and Electrical Office Work Dispatcher received safety training, occupational health and safety management system (TIS 18001), training for safety officers at the supervisory level, evaluation on occupational safety for all employees and workers, procuring various safety tools and equipment, and etc. The objective is to minimize accidents at all levels to achieve "Zero Accident" occurrence. It also aims to ensure that its employees recognize the importance of safety, are able to perform their duties according to occupational health, safety and environment legal requirements, standards and regulations, as well as contribute to public advocacy on safe use of electricity.

PEA uses proactive occupational health approach to respond to the occupational health, safety and environment policy. It organizes a health risk assessment for its personnel, controls risk from various establishments, as well as assesses and regularly monitors the occupational environment to allow for appropriate prevention and mitigation measures as needed.

Further, PEA conducted a satisfaction survey among its personnel regarding work environment and found issues with working desks set up and prolonged inappropriate sitting positions which contribute to Office Syndrome risks. Following the overall employee analysis, PEA organized trainings to provide information and encourage behavioral changes toward self-care. For instance, PEA organized activities to improve work stations according to ergonomic principles. Afterwards, it was determined that employees' risks of having Office Syndrome decreased by 86.11 percent and found that those who did adjust their work stations according to ergonomic principles reported 7.38 percent less work-related backaches. Furthermore, PEA organized a broadcasted program called "Move Body @ 3 P.M." to promote exercise in the workplace every Wednesday at 15.00 to help employees nurture good health in the long term. [403-3]

Regarding health and sanitation, PEA organizes annual health check-ups and health screening according to risk factors, for instance the annual lead poisoning blood test for personnel involved in publishing. The result of annual health checks revealed that there are PEA personnel at risk of Non-Communicable Diseases (NCDs) which caused by daily habits such as diabetes, high blood pressure, cardiovascular diseases and obesity especially those with BMI above healthy standards. Therefore, PEA provided training to influence their attitude and behavior to take care of their health.

Furthermore, PEA reported statistics on accidents, injuries and occupational diseases, including work-related fatalities among employees in 2017 revealed that 18 personnel faced work-related injuries, and there were 3 work-related fatalities, according to the details below.

Rates of Injury, Occupational Diseases, Lost Days and Work-Related Fatalities due to Employee Operations [403-2]

Type of Injury, Occupational Disease, and Work-Related Fatalities		Number of Reported Case	Number of Lost Day
Injuries			
• Injury	Head Office	-	-
	North	-	-
	Northeast	4	103
	Central	6	164
	South	2	5
• Disability	Head Office	-	-
	North	-	-
	Northeast	-	-
	Central	-	-
	South	-	-
Fatalities			
• Work-Related Fatalities	Head Office	-	-
	North	-	-
	Northeast	-	-
	Central	1	6,000
	South	-	-

Remark : Injury refers to damages to body parts resulting from force or external factors whether physical or chemical, and can be intentional or unintentional, but do not ultimately cause disabilities.
Disability refers to losing organs or the capacity of organs or limbs, or even mental balance resulting in an inability to work.

Information	Unit	Area					Total
		Head Office	North	Northeast	Central	South	
Injury Rate (IR)	Number of people per 200,000 working hours	0.00	0.00	0.06	0.11	0.04	**0.05**

Remark : The figure was calculated by referencing the International Labour Organization (ILO)'s standard, ILO-OSH 2001, whereby "day" refers to calendar days, and lost days are counted starting the day after the accident onwards.

Rates of Injury, Occupational Diseases, Lost Days and Work-Related Fatalities due to Worker Operations [403-2]

Type of Injury, Occupational Disease, and Work-Related Fatalities		Number of Reported Case	Number of Lost Day
Injuries			
• Injury	Head Office	-	-
	North	2	45
	Northeast	-	-
	Central	-	-
	South	1	1
• Disability	Head Office	-	-
	North	-	-
	Northeast	-	-
	Central	-	-
	South	-	-
Fatalities			
• Work-Related Fatalities	Head Office	-	-
	North	-	-
	Northeast	-	-
	Central	2	12,000
	South	-	-

Remark : Injury refers to damages to body parts resulting from force or external factors whether physical or chemical, and can be intentional or unintentional, but do not ultimately cause disabilities.
Disability refers to losing organs or the capacity of organs or limbs, or even mental balance resulting in an inability to work.

Information	Unit	Area					Total
		Head Office	North	Northeast	Central	South	
Injury Rate (IR)	Number of people per 200,000 working hours	0.00	0.19	0.00	0.13	0.09	**0.09**

Remark : The figure was calculated by referencing the International Labour Organization (ILO)'s standard, ILO-OSH 2001, whereby "day" refers to calendar days, and lost days are counted starting the day after the accident onwards.

Based on the information on injury, occupational diseases, and work-related fatalities detailed above, PEA had investigated and determined causes of these incidents and taken into consideration the lessons learned to inform the development of occupational health, safety and environmental management to reduce risks of accidents and damages that may occur, as well as to build personnel's confidence in occupational safety in their operations.

Organizational Satisfaction and Commitment

PEA values its labor relations, such as regarding remuneration and different kinds of welfare they are entitled to receive, regular skills development, occupational health, safety and environment, as well as creating a work environment which promote positive relationship with supervisors and colleagues in order to improve personnel work life quality, cultivating organizational commitment and satisfaction.

In 2017 PEA conducted an organizational satisfaction and commitment survey, with responses 86.16 percent of all employees and workers (survey conducted in October 2017). It also hosted a focus group meeting with employees and workers to verify the survey results, as well as to solicit any additional insights regarding factors affecting their satisfaction, well-being and commitment toward the organization. Analysis of personnel's organizational satisfaction and commitment showed positive trend in all aspects when compared to results from 2016, as illustrated below.

Factors	Employee (average)	Worker (average)	Overall Personnel (average)	
			2016	2017
1. Satisfaction	**4.37**	**4.45**	**4.28**	**4.38**
1.1 Job Satisfaction	4.23	4.34	4.17	4.25
1.2 Organizational Satisfaction	4.50	4.55	4.39	4.50
2. Commitment	**4.49**	**4.51**	**4.39**	**4.49**
2.1 Well-being	4.40	4.46	4.34	4.41
2.2 Sense of belonging	4.52	4.49	4.40	4.51
2.3 Motivation and dedication	4.54	4.58	4.42	4.54

Nonetheless, PEA continues to provide for its personnel to its full capacity and strives to improve work processes to maintain the increase in personnel's satisfaction, confidence and organizational commitment. This is to ensure that all PEA personnel achieve higher standards of well-being, safety and quality of life, and ultimately contribute to building PEA as a healthy organization.

Employee Benefit Obligations and Retirement preparation [201-3][404-2]

PEA comprehensively prepares its personnel before their retirement, taking into account their physical, mental and social transition, as well as retirement benefits to ensure compliance with the State Enterprise Labour Relations Act B.E. 2543. This encompasses severance pay upon retirement, compensation for unused leave days, gifts, and leave days upon retirement, and etc.

In addition, PEA established the PEA Provident Fund, according to the Provident Fund Act B.E. 2530, on October 30, 1996, as part of its welfare for retiring employees. Employee members can choose to make payment towards the fund at rates between 3-15 percent of their salary, while PEA contributes an additional portion of 9-11 percent of the employees' salary. The Net Asset Value (NAV) of the fund, as of December 31, 2017, is 38,806.30 million Baht. Payments were made to 1,076 retirees in 2017, amounting to 3,851.38 million Baht in total. The fund enables the beneficiaries to support their living costs following their retirement.

Furthermore, PEA implemented its program for skills management and lifelong learning, and advocacy on savings and investment for happy retirement. To this end, the PEA Provident Fund committee worked together with the provident fund management division to promote financial management among its members through saving and investment, and to ensure that members have good knowledge about investing their savings in the provident fund, as well as to understand the rationale for selecting appropriate investment channels according to their contexts and ensure quality of life and sufficient resources in their retirement. In 2017, PEA provided trainings to its provident fund members across the country, in all 12 PEA Areas and Head Office. In total, 6,025 provident fund members participated, 5,661 of which are from PEA Area Offices, and another 364 members from the Head Office. Members can participate through various channels such as PEA Fund network coordinator training (536 members in total), 2017-2021 retirees training (1,002 members in total), Q&A session with PEA Fund members (1,303 members in total), information session for staff with less than six years of experience with PEA batch 1/2017 (1,615 fund members in total), and batch 2/2017 (1,567 fund members in total). In addition, PEA also communicates proactively by increasing channels for members to access the information. It designated the PEA Fund coordinators and PEA Fund coordinators network across the country, and leverages information technology to render communication channels such as the PEAFUND application, website, and Facebook. It also supports PEA Fund personnel in receiving further training to build their capacity regarding finance, investment, public relations, and information technology to equip them with the skills needed, and to advocate and disseminate knowledge efficiently.

Providing Responsible Customer Service

The Provincial Electricity Authority places importance on responsibly distributing electricity to customers so that electricity is accessible, as well as providing quality service and emergency responses to electricity shortages. With an a wareness electricity is necessary and important to daily life. It's not only elevating the quality of life of individuals, but also societies since everyone needs various uses of electricity. Our customer service model scheme for 2017 - 2021 was made to improve service, covering the process from requesting for electricity to cancelling the service, managing client information, developing channels of payment for electricity service, making channels of public relations communications and customer complaint and suggestions. This conforms to the organization's strategy of being a Customer-Centric Organization, focused on bringing exemplary customer care and service in accordance with client expectations. This customer care is brought through systems of technologically-advanced innovations which will satisfy customers and enable them to reap the highest amount of benefits from the regional electricity works. [103-1]

Access to Electricity [103-2][103-3][203-2][EU26]

The Provincial Electricity Authority is a state enterprise responsible for distributing electricity nationwide, except for the provinces of Bangkok, Samut Prakan and Nonthaburi. We understand that electricity is an important factor in developing the economy, therefore we are committed to distributing it to the citizens in our area of jurisdiction, whether urban or rural. Our Remote Rural Household Electrification Project (RHEP) is aimed to provide electricity to all households in all 74 provinces, a project in accordance with the Ministry of Interior's plans.

Currently, 19,360,779 households or 99.99% of villages nationwide have electricity. The Provincial Electricity Authority has provided electricity through various channels such as electricity poles, underground cables, underwater cables, and solar cells. Only 0.23% of households nationwide do not have electricity. In these cases, these households may be in restricted areas that require permits from appropriate state agencies, such as areas within protected forests, national parks, military areas, or areas where electrical systems cannot be expanded since they falls outside of the criteria of the Provincial Electricity Authority.

Information to Electricity Access	2015	2016*	2017
Number of villages with electricity	80,032	74,297	74,304
Number of villages nationwide	80,056	74,304	74,297
Number of households with electricity	20,642,491	21,071,007	21,464,395
Number of households nationwide	20,721,003	21,133,640	21,513,363

Remark : The number of villages is from the Provincial Affairs Bureau, Department Of Provincial Administration as of December 2016, which are decreased from 80,056, the number from the 3rd quarter trimester of the same year. That number is from the Division of Registration Technology Development and Administration from the Department of Provincial Administration Registration, part of the Department of Provincial Administration.

In each year, residents move or immigrate, the Provincial Electricity Authority must always be increasing our electrical grid so people in every region can have access to electricity, especially in areas of dense, permanent residences with year-round accessible transportation routes, communities with growth potential, and not located in a restricted area. We give importance to electricity access although expanding the grid to some regions results a loss of profit. In 2017, The Provincial Electricity Authority expanded the electrical grid to cover an additional 393,388 households.

Electricity use is also in increasing demand since most of the population in agricultural work tends to use technology and machinery more to increase efficiency in planting and increasing crop yield. They want to reach set standards of crop yield whilst streamlining the agricultural process and cutting costs. PEA has worked to increase the electrical grid to agricultural areas, the first phase of which as from 2009 to 2014 and included building high voltage distribution systems, low voltage distribution systems, installing transformer distribution systems, and electricity meter systems. A total of 73,308 agricultural households participated, more than was expected. Therefore, PEA made a second phase of the project from 2016 to 2020. In 2017, the number of households who participated in the project and received electricity in their region was 8,150 or 20.07% of the amount of total agriculturalists expected for the entire project.

Participating agriculturalists, divided by region	2009 - 2014 (Phase 1)	2016 (Phase 2)	2017 (Phase 2)	Target numbers for 2016 - 2020
North	23,509	-	2,509	15,841
Northeast	32,449	-	5,018	18,568
Central	7,269	41	340	4,410
South	10,081	18	283	1,781
Total	**73,308**	**59**	**8,150**	**40,600**

Providing Quality Electricity Service [103-2][103-3]

PEA provides electricity for up to 19,352,657 people nationwide, whether they live in industrial sites or districts, city municipalities, sub-district municipalities that are business areas, special areas, or rural areas. Therefore, an important mission is to provide continuous and stable electricity. The Provincial Electricity Authority sets up a committee to oversee electrical system stability. The committee president is the deputy head of operations and maintenance, who is in charge of creating policies, guiding the general direction of work, following along with the System Average Interruption Frequency Index (SAIFI) and System Average Interruption Duration Index (SAIDI). The president also oversees measures that maintain indexical statistics so that they stay within the range of state enterprise performance evaluations and service quality standards set by the Energy Regulation Commission, which coincide with service regulations of operating electric power distribution systems set in a 2016 regulation.

In 2017, PEA helped to increase electricity efficiency and stability though the following programs: the first phase of a program to develop the receiving and distribution systems, a program to improve and develop power stations, creating a system to monitor electricity meters with the U-CUBE program, and the Big Patrolling And Cleansing For Strong Grid program for the distribution systems. PEA also improved a real-time system that updates meter information in the SAP IS-U and GIS systems, which supports data from various systems, through creating a U-CUBE electricity distribution that defines which activities and operations are executed according to the plan.

Our operations in 2017 found that the System Average Interruption Frequency Index (SAIFI) was 4.50 times/housohold/year, a 12.96% decrease from 2016. However, if we only look at the 12 major cities under our jurisdiction, the SAIFI is only 1.232 times/housohold/year. The time used to remedy the interruptions (SAIDI) averaged at 118.70 minutes/housohold/year in 2017, a 22.48% decrease from 2016. The SAIDI in the 12 major cities is only 16.528 minutes/housohold/year.

Index of Electrical System Stability (SAIFI & SAIDI)

Data	SAIFI* (times/household/year) [EU28]			SAIDI** (minutes/household/year) [EU29]		
	2015	2016	2017	2015	2016	2017
Nationwide	5.79	5.17	4.50	185.97	153.13	118.70
12 major cities: Chiang Mai, Phitsanulok, Lopburi, Khon Kaen, Ubon Ratchathani, Nakhon Ratchasima, Rangsit, Pattaya City, Samut Sakhon, Hua Hin, Phuket, and Hat Yai	2.034	1.568	1.232	32.402	21.182	16.528

Remark : *SAIFI (System Average Interruption Frequency Index) (times/household/year) is the rate of how many times electrical service was interrupted

**SAIDI (System Average Interruption Duration Index) (minutes/household/year) is the rate of how long electricity interruptions lated

Emergency and Disaster Management and Response [103-2][103-3][EU21]

PEA has a Business Continuity Policy and has set up a Business Continuity Management Committee (BCM Committee) to manage the organization's overall business continuity. Every sector has prevention and preparedness plans in case of emergencies through the Business Continuity Management System (BCMS) which also covers mitigation of the disaster's effects with effective responses. The BCMS is to be improved and tested through the ISO22301 standards and will be continually practiced until it becomes part of the company culture. Sectors will evaluate threats to create Incident Management Plans (IMP) that take into account various risk factors such as fires, floods, storms, sabotage, storms, earthquakes, riots, disease outbreaks, tsunamis, chemical spills and so on.

Developing the BCMS according to the ISO22301 standards will effectively improve disaster management and response so that electrical distribution is continuous. For example, to prevent electrical poles falling during summer storms, the wires will detach when they are overloaded beyond capacity, rather than having the whole pole fall down. Research will be implemented to increase resistance poles' against wind. Flood-prone areas that stay flooded for periods of time, damaging assets and/or lives will have the electricity meters raised farther up from the ground. There are also plans in place in case a group of rioters storm Provincial Electrical Authority head office.

Business Continuity Management

Business Continuity Management Policies

- Update business continuity management policies
- Clarify business continuity management structure

Informing Oneself about the Organization

- Create clear disaster and emergency response plans
- Study/adjust important operation process determination in onder to restore in the appropriate period of time

Create and Develop Emergency and Disaster Response Plans

- Study/adjust the Incident Management Plan (IMP)
- Study/adjust the Business Continuity Plan (BCP)

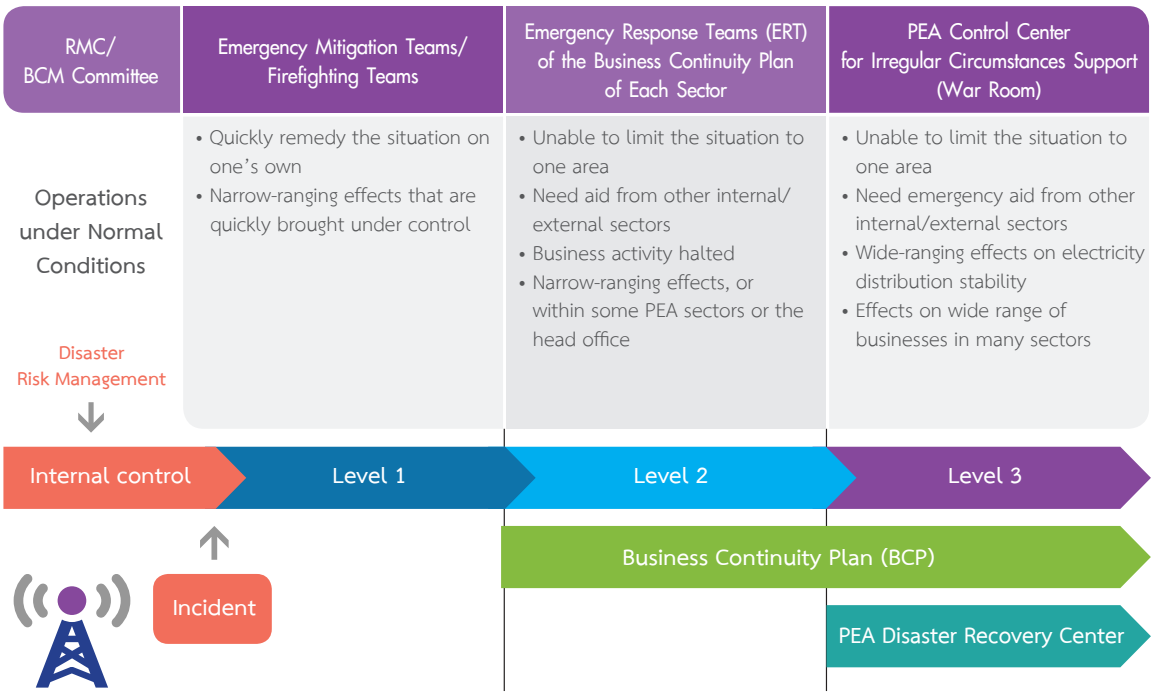
Practicing and Drilling the Business Continuity Plans

- Do both tabletop exercises and drills of the IMP/BCP plans
- Practice with important clients, stakeholders, and other external agencies
- Continually evaluate, adjust, and improve the Business Continuity Plan
- Conduct internal evaluations of whether the ISO 22301 standards are met
- Continually adjust the system to increase efficiency and effective disaster and emergency response

Creating a Company Culture

- Hold workshops on business continuity for newly-established sectors
- Hold meetings to discuss, study, improve, and practice Business Continuity Plans with every sector, including the head office and regional offices
- Disseminate information about the BCM through various channels

Structure of PEA Emergency and Disaster Response

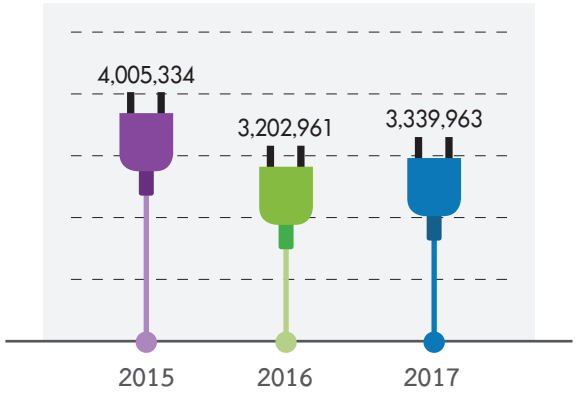


In 2017, PEA developed the BCMS in accordance with ISO22301 standards, with all personnel informed of the process so that the plan can be successfully executed. PEA head office held a meeting informing other regional offices (PEA Areas and PEA Grade 1-3) about the BCMS and ISO22301 standards, educating the executives and employees and drilling the Incident Management Plan (IMP) in case of disasters and the Business Continuity Plan (BCP) to restore working functions within the designated time. The ISO22301:2012 standards were also planned to be expanded to the 4 regional offices: (1) PEA Area 3 (North), Lopburi province (N.3), (2) PEA Area 3 (Northeast), Nakhon Ratchasima province (NE.3), (3) PEA Area 1 (Central), Phra Nakhon Si Ayutthaya province (C.1), PEA Area 1 (South), Phetchaburi province (S.1), and (4) PEA Grade 1 : PEA Nakhon Sawan province, PEA Phetchaburi province, and PEA Rangsit branch.

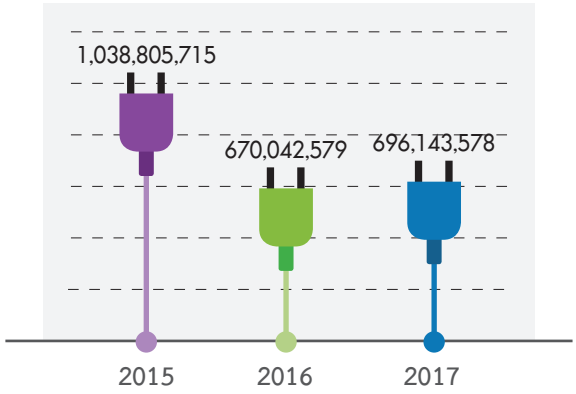
Free Electricity Program [103-2][103-3][203-1]

PEA has a free electricity program for residential sectors with a 5(15)Ampere electrical meter, where the residents are not juristic persons and electricity use is under 50 units for at lease 3 months in a row (counting to the present month). To decrease social inequality, the Energy Regulatory Commission (ERC) has distributed the cost of this free electricity program to medium, large and specialized enterprises as well as non-profit organizations and temporary electricity users.

Number of Electricity Users Receiving Free Electricity Subsidies (by household)



Amount of Free Electricity Subsidie Consumption (by unit)



Remark :

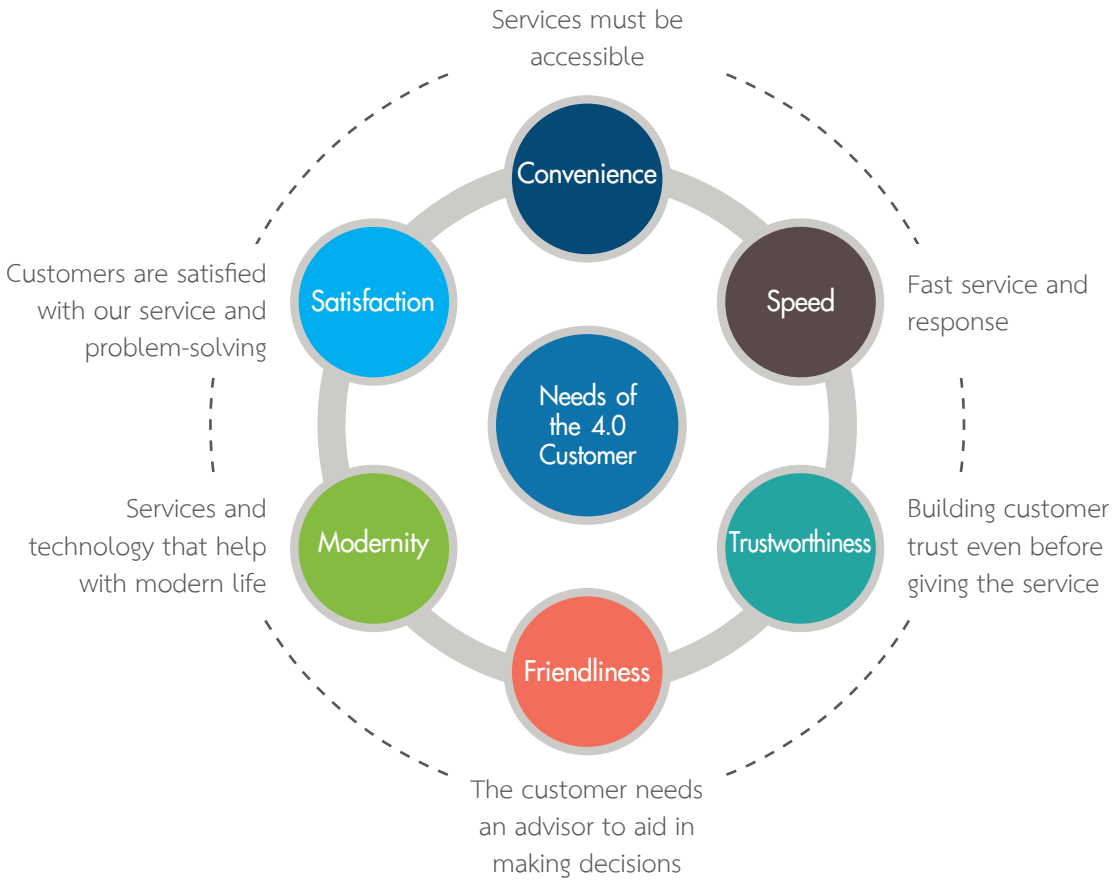
- An Energy Regulatory Commission (ERC) regulation enacted on May 10, 2012 allowed for residential sectors with a 5(15) Ampere electrical meter and electricity use under 50 units per month have the right to use free electricity, starting from June 2012.
- An Energy Regulatory Commission (ERC) regulation enacted on September 29, 2012 stated that users of free electricity must not be juristic persons and use under 50 units per month for at least three months (countion to the present month), starting from January 2016.
- The number of free electricity users is yearly average.

Customer Privacy Management [103-2] [103-3] [418-1]

In 2017, PEA distributed electricity to 19.35 million people nationwide with 132,398.67 million units of electricity, or 83.94% of all electricity users nationwide. Residential sectors used 31,332.56 million units, commercial sectors used 32,108.36 million units, industrial sectors used 65,000.02 million units and other sectors used 3,957.73 million units. Therefore, it can be stated that the PEA has the largest electricity customers base in the country. We place great importance on keeping and managing customers information according laws such as those in the Official Information Act B.E. 2540, the Electronic State Transactions Act B.E. 2544, and a B.E. 2553 regulation about electronic transactions and measures to protect personal data of government sectors. According to these, government sectors must ensure that the security of personal information of customers, whether in terms of accessibility or information networks, organizing the information into a ready-to-use system, making an offline system in case of emergency situations where electronic access is not available, and periodically evaluating risk of the information to prevent violations of rights. Our adherence to the law resulted in PEA getting zero complaints about privacy violations or loss of information in regards to customers information in 2017.

Service and Customer Relationship Management

Provincial Electricity Authority prides itself on providing customers with excellent service standards. PEA is continually being updated and providing customers service with convenience, speed and appropriate information system in order to support customer service operation and respord quickly and effectively to the needs of the 4.0 customers.



PEA has created a working committee for customer service that is in charge of creating an effective customer service master plan in accordance with organization policy. The 2017 – 2021 plan focuses on developing products for customer satisfaction, upgrading the level of service, and creating customer rapport and lasting relationships, as per the following.

Product and Service Development to Respond the Need and Expectations of Customers

1. **Customer Service Development**

   1.1 Development of Customer Service by Responding to Voice of the Customer (VOCs) feedback

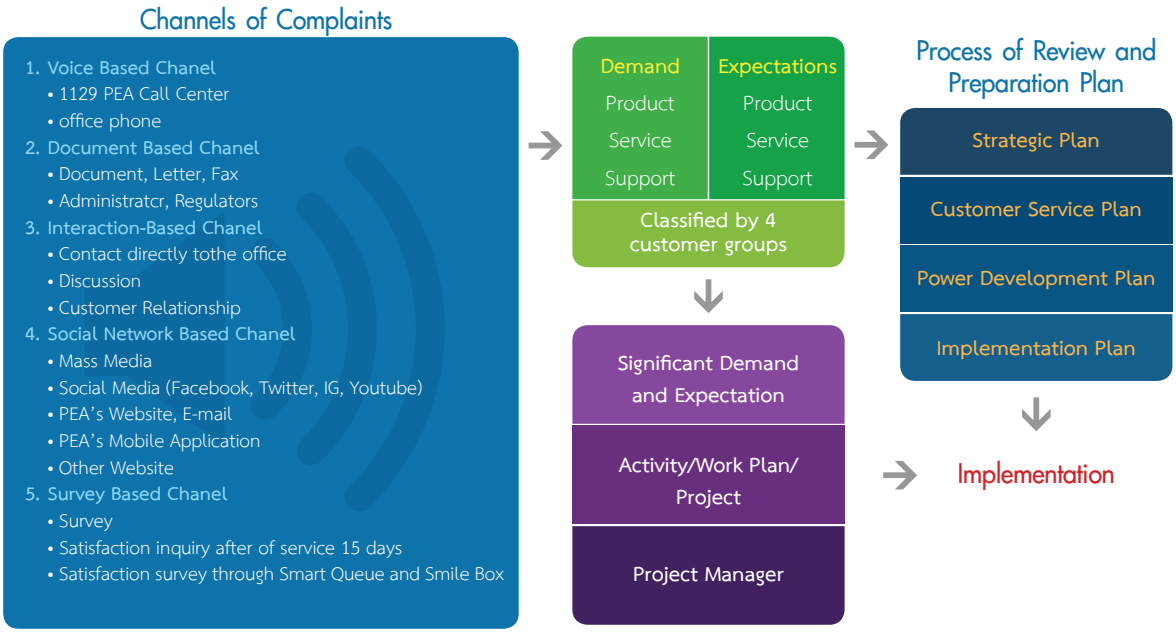
   PEA has developed many channels of listening to customer feedback, including from past customers, current customers, rival companies' customers and customers with future potential in order

to know about customer expectations and to better channels development. Our VOCs response committee collects information on VOCs and directs them to workers every trimester. Annually, we integrate these VOCs to adjust our ranking of customer expectations.

If customer expectations change majorly in a year, then responsible sectors must take them into consideration immediately.

In 2017, the VOCs output showed that PEA received feedback from all 4 groups of customers and in all 3 dimensions, regarding: products, service, and sponsorship, resulting in an outcome that reached our goals. PEA's VOCs evaluations show that our VOCs process is still appropriate at every step, in accordance to and integrated with the processes in other organizations and sectors involved.

The Process of Collecting Information from Customers



1.2 Customer Complaint Management [103-2]

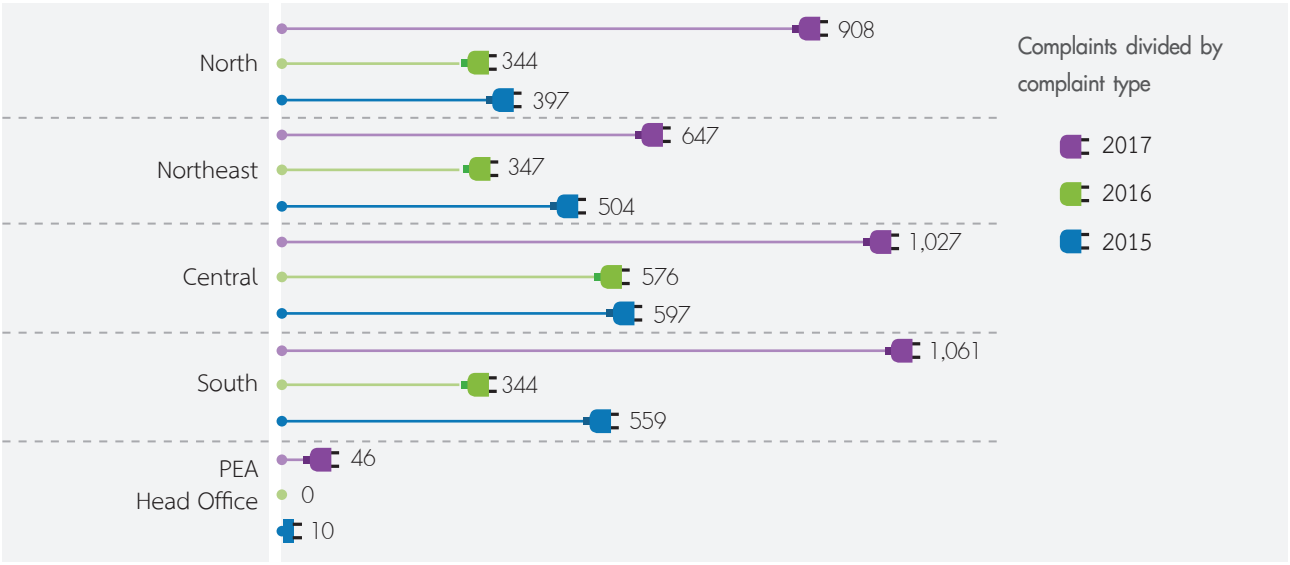
PEA has a clear customer complaint management process. Responsible sectors must follow the handbook on improving complaints to PEA that details the steps, the responsible parties, and the important factors regarding a case, in order to adhere to PEA's standards and to maximize customer satisfaction. Channels that customer can send complaints, suggestions, requests, reports, and compliments to the PEA are the following:

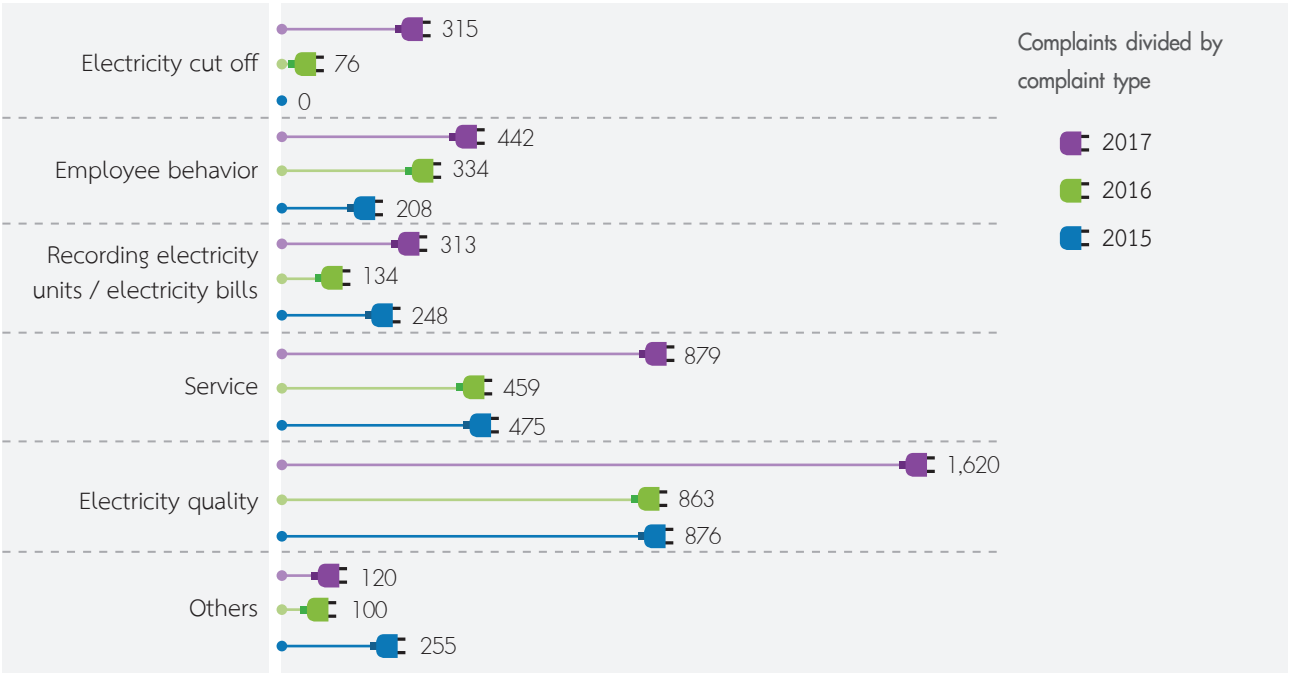
1) 1129 PEA Call Center
2) Government sectors such as the Damrongdhama Center of the Ministry of the Interior, the Office of the Prime Minister (www.1111.go.th)

3) Through the media, social media such as printed media, TV, radio, online, and PEA website (www.pea.co.th)
4) Direct petitioning at the PEA office

In 2017, there were a total of 3,689 complaints, increasing 1,723 complaints (87.64%) compared to 2016.

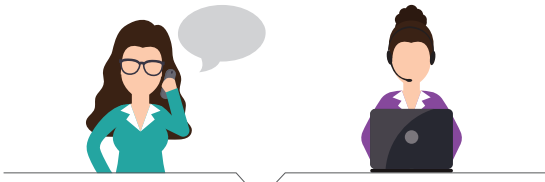
Customer Complaints in 2015 - 2017





Remark : Complaints that fall in the Others category include: having no electricity, broken electricity poles, unsafe equipment, irregular electricity meters, hanging wires or wires hanging at a lower height than standard.

Although the number of complaints have increased from the previous year, PEA has more effectively handled them by referring to the handbook (1st revision) in order to systematically manage them throughout the whole organization. There has even been a new PEA - VOCs System, an information database that effectively and quickly receives complaints, records responses and solutions. The PEA - VOCs system quickly forwards complaints to related sectors throughout the country. The sector that receives the complaint then must resolve the complaint within a time period according to this PEA complaint resolution process:



1 The VOCs sector records the complaint into the PEA - VOCs System.

2 The system sends a SMS to management and system administrators in the affected area.

3 When the related sectors are informed about the complaint through the PEA - VOCs system, the affected customers will be contacted within 5 days after PEA receives the complaints. This process is overseen by the director of complained sector and adheres to the Service Level Agreement (SLA).

4 After the issue is resolved, the customer must confirm it in the complaint form. If the complaints is a letter, it must be answered by a written response within 30 days after the complaints are resolved.

5 After the related sectors resolve corrects the complaint, they must report and record the results in the PEA - VOCs information system.

In order to follow up on and evaluate the results of resolving consumer complaints, PEA has surveyed the how efficient our complaint responses were, counting ones that were filed within 30 days after the complaint was resolved. In 2017, PEA responded to 99.38% of all complaints. We also surveyed the customers for their satisfaction levels after their complaints were resolved and calculated statistics analyzing the complaints, obstacles, and solutions before presenting them to administrators every quarter. This allowed related sectors to improve based on the data.

Customer Complaints	2015	2016	2017
Total number of customer complaints	2,062	1,966	3,689
Number of responses to customer complaints within 30 days	1,880	1,800	3,666
Percentage of customer complaints that received responses within 30 days	91.17	91.56	99.38

2. Supporting the Important Customers Transactions

2.1 Improving Service Systems to Increase Ease of Doing Business

PEA adjusted the services to increase "Ease of Doing Business" for more speed and convenience for commercial and industrial customers. In 2017, PEA improved the facilitation process for regional commercial electricity use through the following methods:

1. Decreasing working process customer touchpoints for requesting electricity. In the case that there is an existing 380V distribution system with a 22 - 33 kV system, an outside line does not need to be installed (the installed transformer must not be over 250kVA). The process used to have 7 steps but was decreased to 4 steps.

Original Process	Improved Process
1. Receive complaint 2. Inspect and determine costs 3. Inform customers of costs, fees, details of the electricity installation process, and necessary documentation 4. Receive request for electricity use 5. Construction process 6. Check to see if standards are met 7. Install meter. Electricity ready for use	1. File electricity request, inspect documents 2. Inspection/electricity design/cost estimation/ informing customers of costs 3. Pay for costs of increasing range of electricity and electricity usage fees. Wait as electricity system is constructed. 4. Install meter. Electricity ready for use.

2. Decreasing the electricity request process from 35 working days to 25 calendar days

PEA has increased the efficacy of the PEA Doing Business model (Phase 3) of electricity requesting for PEA Grade 1 - 3 and PEA Branches nationwide. These were the following results of 2017.

PEA Doing Business Results from April to December 2017

Meter Size	Time Period of Processes (by case)				Total Number of Customers (by case)	Days of Service for Every Customer (by day)	Average of Time Given to Each Customer (days/case)
	Within 10 days	Within 11 - 20 days	Within 21 - 25 days	More than 25 days			
1. Meter 3 Phases 4 Wires 380/220V 30 (100)A Without additional installation of pole for meter installation	211	17	4	0	232	1,050	4.53
2. Meter 3 Phases 4 Wires 380/220V 30 (100)A Without additional installation of pole for meter installation	19	31	16	4	70	1,102	15.74
3. Meter 1 Phase 2 Wires 220V With power transfomer	17	18	22	8	65	1,149	17.68
4. Meter 3 Phases 5 Wires 380/220V With power transfomer	102	163	82	4	351	4,926	14.03
Total	**349**	**229**	**124**	**16**	**718**	**8,227**	**11.46**

2.2 Developing more Bills Payment Channels

PEA is always develop convenient, fast, and effective methods of paying electricity bills to support the customers' needs. These are many channels of PEA electricity bill payment as the following:

1) At the PEA office, PEA shop, PEA Mobile Shop and PEA automatic deposit machine: There are 6,965,832,875 users (53.92%).
2) The authorized agent of PEA: There are 757,886,594 users (5.87%).
3) Bank accounts or credit cards: There are 943,456,181 users (7.30%).
4) Payment Service Agents: There are 3,921,357,754 users (30.35%).
5) Mobile Application: There are 248,145,546 users (1.92%).
6) Website: There are 795,631 user (0.01%).
7) Top-up machines: There are 47,231,654 users (0.37%).
8) PEA Mobile Application: There are 29,082,149 users (0.23%).
9) PEA e-Pay: There are 5,876,757 users (0.05%).

3. Applying Information and Technology to Develop Innovation of Product and Service

3.1 Sending Electricity Bills through Smart Invoices

PEA sends Smart Invoices through SMS, email, and automatic fax to satisfy customers who need a fast way to pay bills. Residential and smaller-scale customers are notified by SMS. Commercial and industrial customers are informed by email and automatic fax.

3.2 Requesting electricity through the internet

PEA also provides Customer Online Service (COS), providing a 24-hour one stop service where customers can request electricity through PEA website (www.pea.co.th).

3.3 Services Development through Smartphone Mobile Applications

According to VOCs feedback, customers want PEA to create more channels of receiving and paying the electricity bills, requesting electricity use, sending complaints and suggestions, and receiving updates information through mobile applications. Therefore, PEA developed an application called "PEA Mobile"with functions that display the current month's electricity bill, show previous months' bills, report electricity outages, send in suggestions and complaints, calculate electricity bills, locate the nearest service center, receive PEA news and so on.

However, continued VOCs feedback showed that the PEA Mobile missed a function that allowed customers to pay their electricity bills. Therefore, at the end of 2017, PEA developed the application called "PEA Smart Plus" to be able to support for bills payment through credit cards and internet banking. PEA Smart Plus supported customers' needs, including requesting electricity, resetting meters in the case that bills are overdue, and paying for overdue bills.

Currently there were 506,772 users who have downloaded PEA Smart Plus, and there were 118,136 users who upgraded from PEA Mobile to PEA Smart Plus.

Developing Information Technology System through the PEA Smart Plus (Mobile Application)

Important Features of PEA Smart Plus Application

3.4 Improving Channels of Communication and Public Relations [103-2] [103-3]

PEA has developed fast and modern channels of communication and public relations that receive instant feedback from customers. Currently, PEA has these following channels to communicate information about the organization and electricity use.

The 1129 PEA Call Center is an important channel for the PEA in communicating and disseminating information all 24 hours that allows public relations, making announcements, and giving advice and knowledge to customers and citizens, such as safely using electricity, the dangers of electricity, how to save on electricity costs, and so on.

At present, the 1129 PEA Call Center has been developed to be even more modern and technologically advanced. PEA increased the number of callers to 90 telephone lines, with both voice and non-voice channels through phone, fax, IVR self service, web chat, email, and social media channels such as the official PEA Facebook and Twitter. This allows PEA to continually and efficiently respond to customers and fulfill to their needs. Language support (Burmese, Cambodian, and Malay) has also been added in addition to Thai and English for integration into the ASEAN Economic Community and to reach international standards of service. PEA already supports Burmese and Malay languages as a pilot project in some PEA areas. Moreover, PEA has a plan to use an automated-reply chatbot in 2018 to satisfy customers who use social media through mobile phones.

According to customer evaluations of the 1129 PEA Call Center in 2017, PEA found that the numbers of users are increasing in every year, with 99% of them repeat users. The importance of the call center as a service center is reflected in the 94.66% satisfaction rate

4. 2017 Customer and Market Research Project [102-43]

One of PEA's objectives is to be a customer-centric organization. We conducted various researches and surveys on customer service and market research in 2017 in order to develop the operations and strategies to better satisfy the customers and build better relationships with them. In 2017, PEA conducted a survey with a sample group of 5,400 customers divided into 8 aspects: (1) the overall satisfaction with the organization, (2) product quality, (3) service quality, (4) value and pricing, (5) organization image, (6) organization loyalty, (7) corporate social and environmental responsibility and good governance, and (8) dissatisfactions with the organization. The results for the survey are as follows:

1. Survey on the overall satisfaction with the organization was 4.34
2. Survey on satisfaction with product quality was 4.34
3. Survey on satisfaction in services quality was 4.27, divided into 11 subcategories
   - 3.1 Regarding channels of receiving electricity bills: 4.31
   - 3.2 Regarding channels of paying for electricity bills: 4.40
   - 3.3 Regarding channels of complainits' reporting: 4.08
   - 3.4 Regarding channels of reporting electricity irregularities/outages/blackouts: 4.04
   - 3.5 Regarding channels of announcing outages in advance: 4.39
   - 3.6 Regarding requests for electric service: 4.19
   - 3.7 Regarding meter-related services: 4.21
   - 3.8 Regarding transfering electric user account and Guarantee: 4.22
   - 3.9 Regarding refunding electric insurance's Guarantee: 4.25
   - 3.10 Regarding the environment of the PEA head offices/branches: 4.14
   - 3.11 Regarding customer relations activities: 4.37
4. Survey on satisfaction with value and pricing: 4.10
5. Survey on organization image: 4.13
6. Survey on organization loyalty: 4.29
7. Survey on corporate social and environmental responsibility and good governance
   - 7.1 Regarding corporate social and environmental responsibility: 4.09
   - 7.2 Regarding good governance: 4.08
8. Survey on dissatisfactions with the organization: 3.32

Enhancing all-around Service Quality, Creating Customer Rapport, and Making Lasting Consumer Relationships

1. Improving Service Centers to Create a Good Organization Image

PEA aims to provide fast and modern service with an appropriate information technology system, as well as improving our physical of the office where we have contact with our customers in the Front Office as well as in the Back Office, our internal working areas. Doing so will modernize PEA save on energy, and provide a good image of the organization. The Smart Customer Service committee is in charge of improving the efficiency of PEA service centers, namely:

1.1 Smart Front Office

1. PEA Offices were improved to look modern, beautiful, and had consistent aesthetics. In 2017, PEA met the target goal to improve 48 office branches.

2. PEA Shops are Front Offices in malls and are open out of after hours and on the weekends to service customers who cannot pay for electricity bills or request for electricity within office working. In 2017, there were 90 PEA shops. Moreover, PEA plans to open 131 PEA shops within the year 2021.

3. PEA Mobile Shops are mobile Front Offices that service customers who live far from the PEA offices. PEA modified 52 old PEA vehicles to be PEA Mobile Shops.

Region	Regional	Number of PEA Mobile Shop (vehicles)	Number of Customers (by case)
North	PEA Area 1, Chiang Mai Province (N.1)	5	41,845
	PEA Area 2, Phitsanulok Province (N.2)	5	222,255
	PEA Area 3, Lopburi Province (N.3)	7	353,092
	Total	**17**	**617,192**
Northeast	PEA Area 1, Udon Thani Province (NE.1)	5	88,491
	PEA Area 2, Ubon Ratchathani Province (NE.1)	5	311,219
	PEA Area 3, Nakhon Ratchasima Province (NE.1)	5	242,028
	Total	**15**	**641,738**

Region	Regional	Number of PEA Mobile Shop (vehicles)	Number of Customers (by case)
Central	PEA Area 1, Phra Nakhon Si Ayutthaya Province (C.1)	5	192,711
	PEA Area 2, Chonburi Province (C.2)	5	412,049
	PEA Area 3, Nakhon Pathom Province (C.3)	5	233,927
	Total	**15**	**838,687**
South	PEA Area 1, Phetchaburi Province (S.1)	1	6,385
	PEA Area 2, Nakhon Si Thammarat Province (S.2)	3	15,319
	PEA Area 3, Yala Province (S.3)	1	6,729
	Total	**5**	**24,433**
Total in all 4 Areas		**52**	**2,126,050**

1.2 Smart Back Office

1. PEA constructed 25 new sub branches and renovated 18 existing sub branches, which will be completed within the 1st quarter of 2018.
2. PEA also installed new 87 servers with the Smart Invoice system for new electricity users. PEA are also in the process of purchasing more Smart Invoice Servers through an e-market, with the purchase complete by the 1st quarter of 2018.
3. Testing the PEA Smart Display system's touchscreen as well as connecting it to a customer satisfaction assessment system for people who use the Smart Queue and Smile Box services. PEA Smart Display shows customer satisfaction levels through the Customer's Smile Feedback program.

1.3 Smart Green Office

In 2017, PEA sent 29 offices to participate in the Smart Green Office program, in compliance with that year's measures for all of our provincial offices to meet the Green Office standards put forth by the Department of Environmental Quality, Ministry of Natural Resources. All 29 offices have been certified as Green Offices by the Department of Environmental Quality, even every office received G Gold awards.

Region	Regional	Number of Awarded Electricity Authority Offices (by branch)
North	PEA Area 1, Chiang Mai Province (N.1)	2
	PEA Area 2, Phitsanulok Province (N.2)	3
	PEA Area 3, Lopburi Province (N.3)	2
	Total	**7**

Region	Regional	Number of Awarded Electricity Authority Offices (by branch)
Northeast	PEA Area 1, Udon Thani Province (NE.1)	2
	PEA Area 2, Ubon Ratchathani Province (NE.2)	5
	PEA Area 3, Nakhon Ratchasima Province (NE.3)	1
	Total	**8**
Central	PEA Area 1, Phra Nakhon Si Ayutthaya Province (C.1)	2
	PEA Area 2, Chonburi Province (C.2)	2
	PEA Area 3, Nakhon Pathom Province (C.3)	4
	Total	**8**
South	PEA Area 1, Phetchaburi Province (S.1)	2
	PEA Area 2, Nakhon Si Thammarat Province (S.2)	2
	PEA Area 3, Yala Province (S.3)	2
	Total	**6**
Total in all 4 Areas		**29**

1.4 Certification as a Government Easy Contact Center (GECC)

PEA became a candidate for a Government Easy Contact Center (GECC) certification in 2017 with our 136 access points. A total of 125 points had been awarded so far, or a rate of 91.92%.

1.5 Meeting the "2.0 Transparent Provincial Electricity Authority" Standards

PEA was pushing for our entire organization to reach transparency standards. In 2017, PEA passed a transparency evaluation and received certifications from The Governor of PEA.

Region	Regional	Number of Certified Offices (by branch)
North	PEA Area 1, Chiang Mai Province (N.1)	93
	PEA Area 2, Phitsanulok Province (N.2)	88
	PEA Area 3, Lopburi Province (N.3)	70
	Total	**251**
Northeast	PEA Area 1, Udon Thani Province (NE.1)	114
	PEA Area 2, Ubon Ratchathani Province (NE.2)	115
	PEA Area 3, Nakhon Ratchasima Province (NE.3)	85
	Total	**314**
Central	PEA Area 1, Phra Nakhon Si Ayutthaya Province (C.1) Province	70
	PEA Area 2, Chonburi Province (C.2)	62
	PEA Area 3, Nakhon Pathom Province (C.3)	48
	Total	**180**
South	PEA Area 1, Phetchaburi Province (S.1)	52
	PEA Area 2, Nakhon Si Thammarat Province (S.2)	79
	PEA Area 3, Yala Province (S.3)	69
	Total	**200**
Total in all 4 Areas		**945**

2. Improving Service Quality Standard

2.1 Developing the One Touch Service Electricity Request System

PEA developed the One Touch Service electricity request system to satisfy customers' needs for quick service, as shown in the following model:

1. Use the GIS map (PEA Map) to identify the location
2. Link to the citizen registration database with the Smart Card Reader
3. Adjust processes for quick service for citizens
   - Receive requests and pay within 15 minutes
   - Installing meters in the city area within 24 hours (distance must be no more than 10 km from the office)

PEA's Service System Development
"One Touch Service"

1

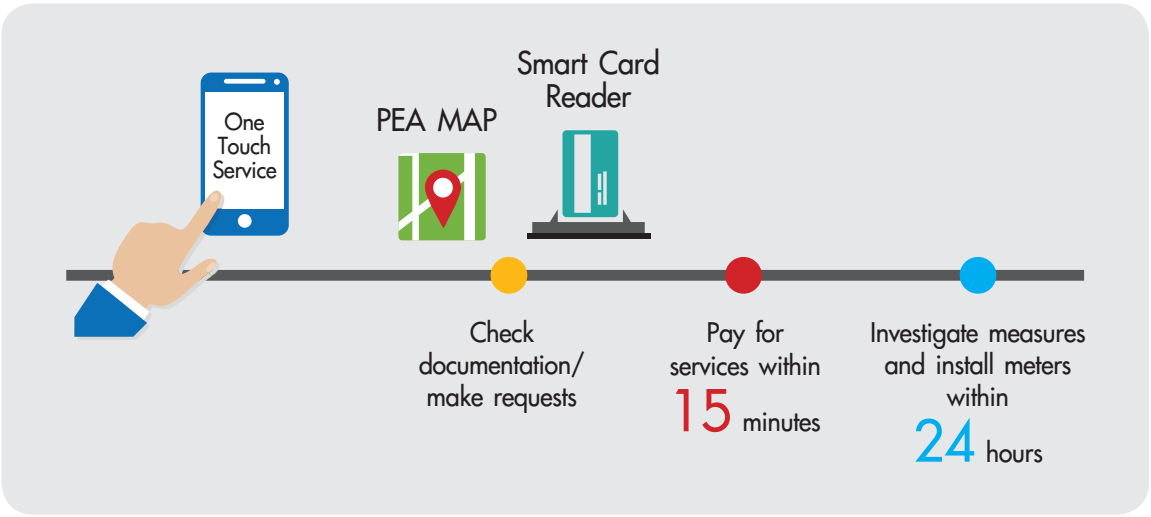
Use the GIS map (PEA Map) to identify the lacation where to install meters rather than through on-site inspection

2

Link to the citizen registration database with the Smart Card Reader. Only the citizen ID Card is used for the transaction.

3

Adjust requesting a meter under 30 Amps electricety processes for quick service for citizens by:



PEA currently offers One Touch Service at all of our offices, branches, and sub branches. We plan to improve the process of requesting a low-voltage electricity grid increase of less than 200 m and installing a meter under 30 amperes, which is processed and paid for within 30 minutes.

2.2 Integration of Services with the Front Manager

Through VOCs, PEA found that customers have the expectation of fast, convenient, cordial, and friendly service from employees in the service center. Therefore, PEA set up a program to manage customer expectations in the Front Office using a Front Manager in the service center to correctly and appropriately

deal with customer issues. The Front Manager's roles and range of authority is clearly delineated in a Front Manager handbook and test-implemented in PEA offices in the central region. The Front Manager received positive feedback because they could service customers well, so PEA plans to implement their use all over the organization in order to provide service excellence.

Integrating Service Work through the Front Manager (FM)

"The Front Manager is a person in charge of customer care in the Front Office"

- Manages service employees for readiness
- Correctly and appropriately deals with customer issues
- Acts as a representative for the customer through coordination, advising and informing the customer of rules and regulations
- Provides convenient services for the customer
- Evaluate customer service and analyze any problems that happen

Manage public relations and points of contact with customers

Payment for services

Receive customer requests and complaints

Meter-related services

3. Creating Good Relationships with Customers

3.1 Creating Good Relationships with Customers through Key Account Management

The Key Account Management (KAM) program strives to create good relationships with customers, aimed at high-value customers important to Provincial Electricity Authority. We integrate strong customer rapport by assigning specific service employees to them. Nevertheless, the KAM program must be continually improved to produce a consistent level of service. The program must also develop tools to manage customer information to improve customer relationships and to effectively link to the VOCs system.

Responsibilities towards Communities around Electric Power Transmission and Distribution Systems and Operating Areas

The demand for electricity has been steadily growing and the trend is likely to continue following the ever-changing lifestyles and expansion of business sector. Hence, it is extremely important to expand the power system network and improve its efficiency in order to meet the demand of electric power users. Meanwhile, constructing power systems for purposes of network expansion and efficiency improvement must be carried out on the basis of safety and must take into consideration the impacts on communities and those surrounding power transmission and distribution construction sites. Therefore, PEA proceeds with each step mindfully from the construction of power substations and electricity grids to their maintenance by putting in place clear measures and practices for agencies and employees to abide by. For example, PEA builds relations with the community to raise their awareness of safe electricity use and any dangers that might come with it. These are done to bring about safety and mitigate risks and dangers that might happen to those in the communities surrounding operating areas. [103-1]

In addition, when it comes to the installation of PEA's devices whether in the cases of new installations or maintenance, PEA inspects and assesses design, quality and safety standards, the operations of which were performed on 100 percent of all products and services. These were carried out in order to allow electricity users to receive quality products and services, including their own safety. [416-1]

Communication on Safety with Communities, Society and Electricity Users [103-2]

In addition, to receiving news or consultations or submitting inquiries via PEA's channels of communications such as 1129 PEA Call Center, Facebook, PEA Mobile Application and Website, PEA designated a budget for media production through radio and television to promote safety practices including constructing, cutting tree branches, installing cables or billboards outside buildings adjacent to high voltage posts. These aforesaid activities are likely to often cause operational risks. Residents can contact PEA staff to install conductor covers before they proceed with any kind of operation, as well as to advise the public on how to use electricity safely and to prevent risks entailed by its misuse.

PEA's Working Procedure in any Area

Strengthening the Community to use Electricity Safely [103-2] [103-3] [413-1]

PEA has built relations with communities surrounding power transmission and distribution sites to listen to their problems and concerns, and take into consideration any impacts that affect them in those areas. These community relations-building activities allow the organization to be exposed to important information or feedback needed to analyze and assess social and environmental impacts. In addition, PEA remains vigilant about the problems that might occur. Examples of those problems are dangers from transformers installed in communities; from high trees crossing over electrical wires, high voltage power lines crossing over houses, electrical leakage in flooded areas, and faulty electricity usage record. PEA also promotes safety precaution for electricity use in order to be able to improve, fix, and develop its operations more efficiently. Furthermore, it doubles as another important channel in which PEA can provide clarification to communities about its operations and disseminate knowledge about electricity use to them simultaneously. In 2017, PEA built relations with a total of 89 communities nationwide through several important projects as follows:

The Communities Using PEA's Electricity Safety Project

PEA has been implementing this project for 5 consecutive years since its inception in 2013 to share useful knowledge with public and private organizations, educational institutions, and community leaders about electricity use in order to minimize risks of accident from electricity misuse. The project also aims to educate students at the level of high vocational certificate and technical diploma in electrical power technology about inspecting and improving power systems in the community area to ensure safety in areas under PEA's responsibility.



In 2017, PEA had selected disaster-prone communities by considering the necessity and urgency areas where were Chao Phraya River watershed and the areas where floods occur frequently within 5 zones under PEA's responsibility: North region - PEA Area 1, Chiang Mai province (N.1), PEA Area 2, Pitsanulok province (N.2), PEA Area 3, Lopburi province (N.3); Central region - PEA Area 1, Phra Nakhon Si Ayuttaya province (C.1), and PEA Area 3, Nakhon Pathom province (C.3). Three communities from each region were selected (amounting to 0.28 percent of PEA's entire operational units that have community relations-building outreaches). PEA also allocated 1,920,000 baht to organize training for 600 students, with 40 students from each of the 15 participating institutions. In addition, power systems in 17,935 households were inspected. The details are shown in the table below.




Students and Households Participating in the Project

Project Participation	2014	2015	2016	2017*
Number of Participating Educational Institutions (Institution)	308	308	308	15
Number of Participating Students (Person)	7,725	7,765	7,700	600
Number of Households Inspected (Household)	309,000	309,750	312,150	17,935

Remark : * Safe Community with PEA Electricity Use specified the 3-year time frame (2014-2016) for project operations by collaborating with 900 institutions. Inspect and improve power systems in a total of 900,000 households. However, when the project came to a close in 2017, PEA recognized the productivity of this project and asked that it continue to proceed even with different operational goals. It identified areas with urgent needs. Therefore, the 2017 statistics plummeted when compared to the previous year.

Encouraging 74 Communities to Use Electricity Safety Project

PEA has proceeded with the project by selecting 74 nationwide communities that are within the areas under PEA's responsibility. These are disaster-prone areas or areas where disasters such as fires and floods occur frequently. PEA allocated 150,000 baht for each community to organize trainings on safe and economical electricity use. The project also provided other services and inspected domestic electronic appliances such as fuses, protective devices, light bulbs, electrical wires, power outlets, and underground cable systems. These undertakings are carried out by expert staff members in an effort to equip communities with a better understanding of safe use of electricity.

In this regard, under this aforementioned project, PEA has designated a committee on occupational safety, health, and environment tasked with inspecting, monitoring and dealing with problems and effects that arise from disasters. They remain closely vigilant about other problems that might pose danger to communities. The committee also plays a role in attending to safety issues in other projects relevant to the organization both externally and internally, so as to keep risks and loss of life and property to a minimum. More importantly, the committee raises the level of safety for both electricity users in the communities and PEA's personnel.






Corporate Social Responsibility Activities

The Provincial Electricity Authority (PEA) emphasizes engaging and developing communities by carrying out a variety of activities to promote the well-being of communities and society. In 2017, several projects were organized as follows:

PEA Renewable Energy for Drought Mitigation Project

PEA recognized the importance of aiding farmers facing drought. Most of the farmers used diesel and electric water pumps for agricultural purposes. In certain areas, there was not enough electricity that meets their needs. As a result, PEA initiated the infrastructure development project for communities in order to promote the well-being of farmers. In addition, it proceeded to promote clean energy for agricultural sufficiency by providing solar-powered water pumps and using metal posts as a foundation on which a stand-alone solar system is installed and directly linked to electric motors and piston pumps. This was done to pump water from natural or underground sources for use in agricultural activities carried out in PEA's areas of responsibility. PEA used a budget of 1,208,115 Baht to install solar-powered water pumps for farmers in 1 remote site where the distribution of electricity was not possible. There were 10 sites where solar-powered water pumps were installed in order to build on PEA's weir building project that helped to decrease the volume of water flowing downstream. Furthermore, there was 1 site where solar-powered water pumps were installed in schools for water supply, so as to enable farmers to save fuel costs used in pumping water for agricultural activities and to grow plants continuously.











Mobile Medical Service

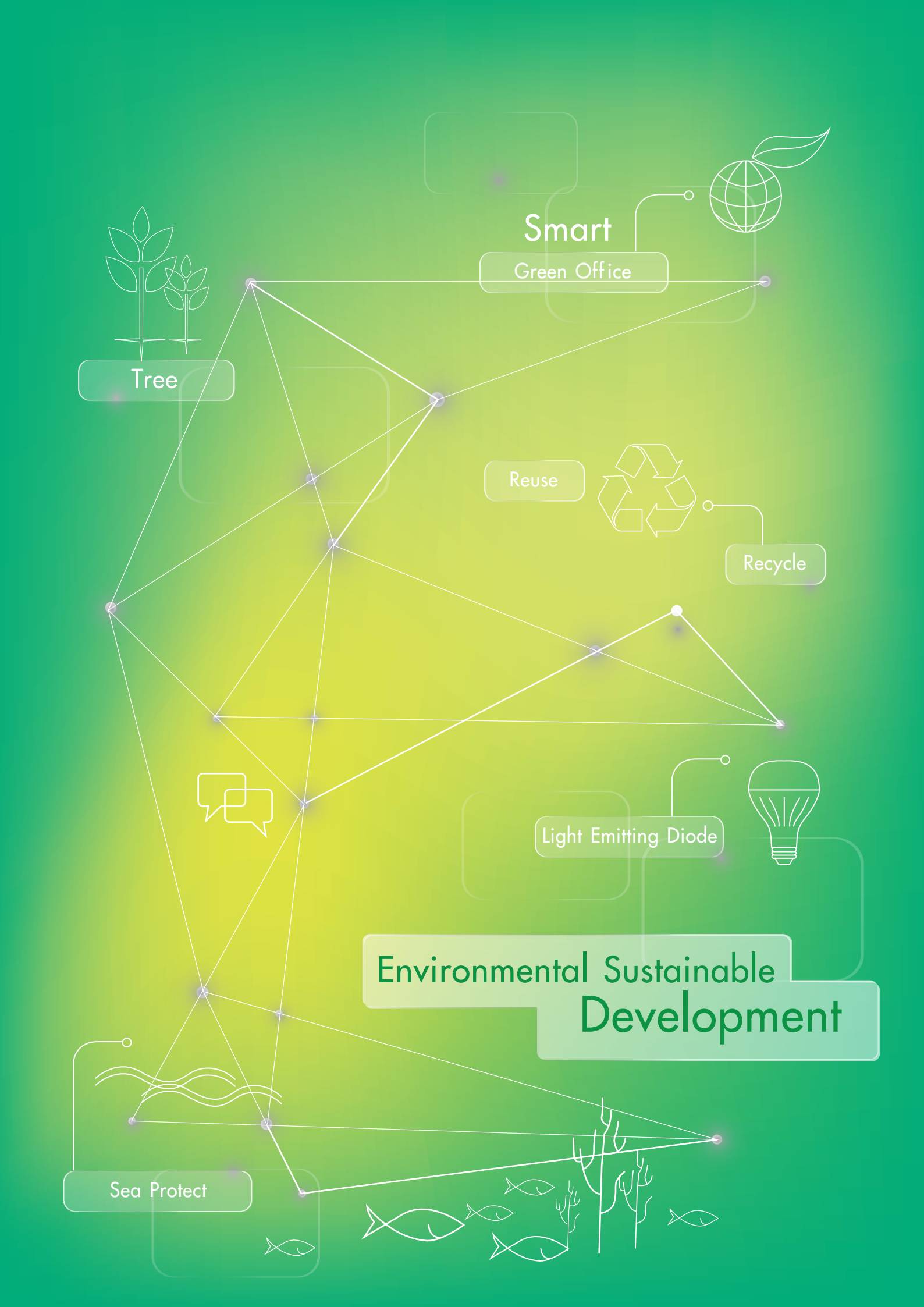
PEA collaborated with Saeng-Saiki Hetrakul Foundation, Daily News Newspaper, and students of National Defence College of Thailand batch 27 to organize mobile medical units every year to provide health services to treat basic illnesses, e.g. ear, dental, and digestive disorders, trigger fingers, and finally eye tests where prescription glasses are provided for free. In 2017, PEA organized 11 mobile medical unit trips nationwide and provided services to 35,875 citizens.




PEA Save for Life: Cerebral Stroke Prevention

PEA along with the Neurological Research Foundation under Royal Patronage held knowledge-sharing activities to promote better quality of life and to raise awareness of stroke risks. The check-up clinic was set up to assess the risks of having a stroke and to advise people on how to treat the illness and prevent recurrences. In 2017, the activity was organized five times in the areas of PEA's head quarter office and 4 regional offices, utilizing a total of 1,600,000 baht.

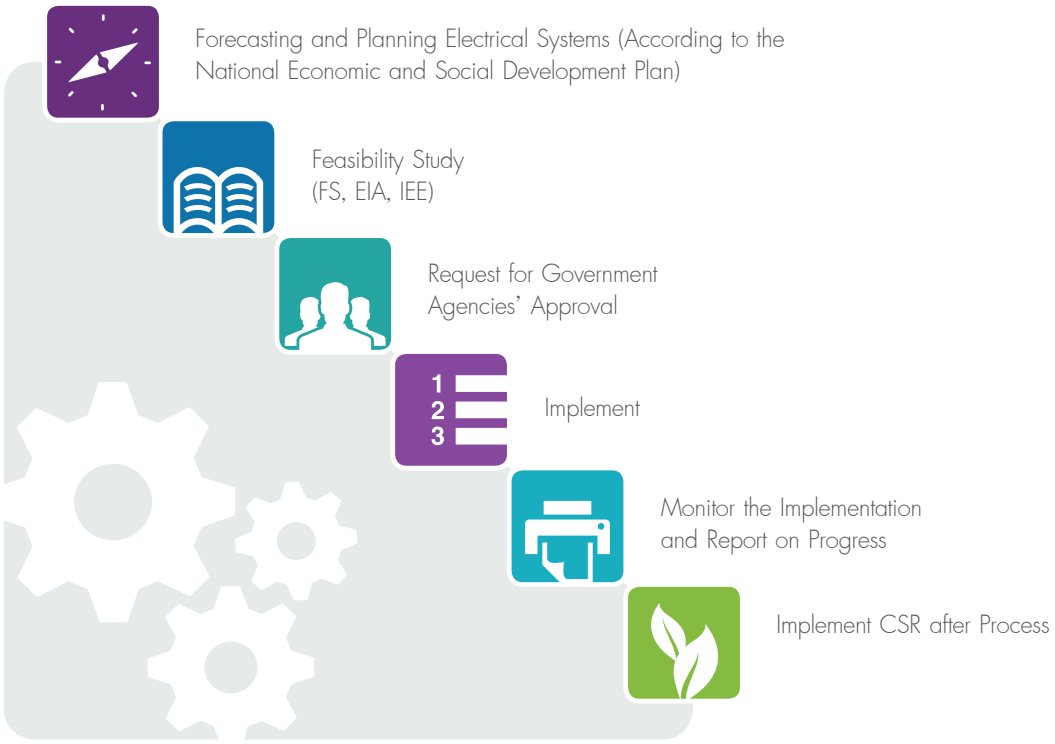




Smart
Green Office
Tree
Reuse
Recycle
Light Emitting Diode
Environmental Sustainable
Development
Sea Protect

Electric Power Systems Construction with Consideration of Environmental Impacts

The Provincial Electricity Authority (PEA) values the construction of electric power systems with consideration of environmental impacts. It seeks to carry out a wide range of operations in compliance with pertinent legal and environmental regulations, both at the national and international level. This ranges from the design phase to obtaining due permission prior to construction that may encroach on restricted areas (such as national parks and class 1 watersheds), and to monitoring the power distribution system to ensure consistency, maintenance, as well as stringent environmental monitoring and management. Its management procedures are as follows: [103-1] [103-2]

Environmental Management in Business Operations



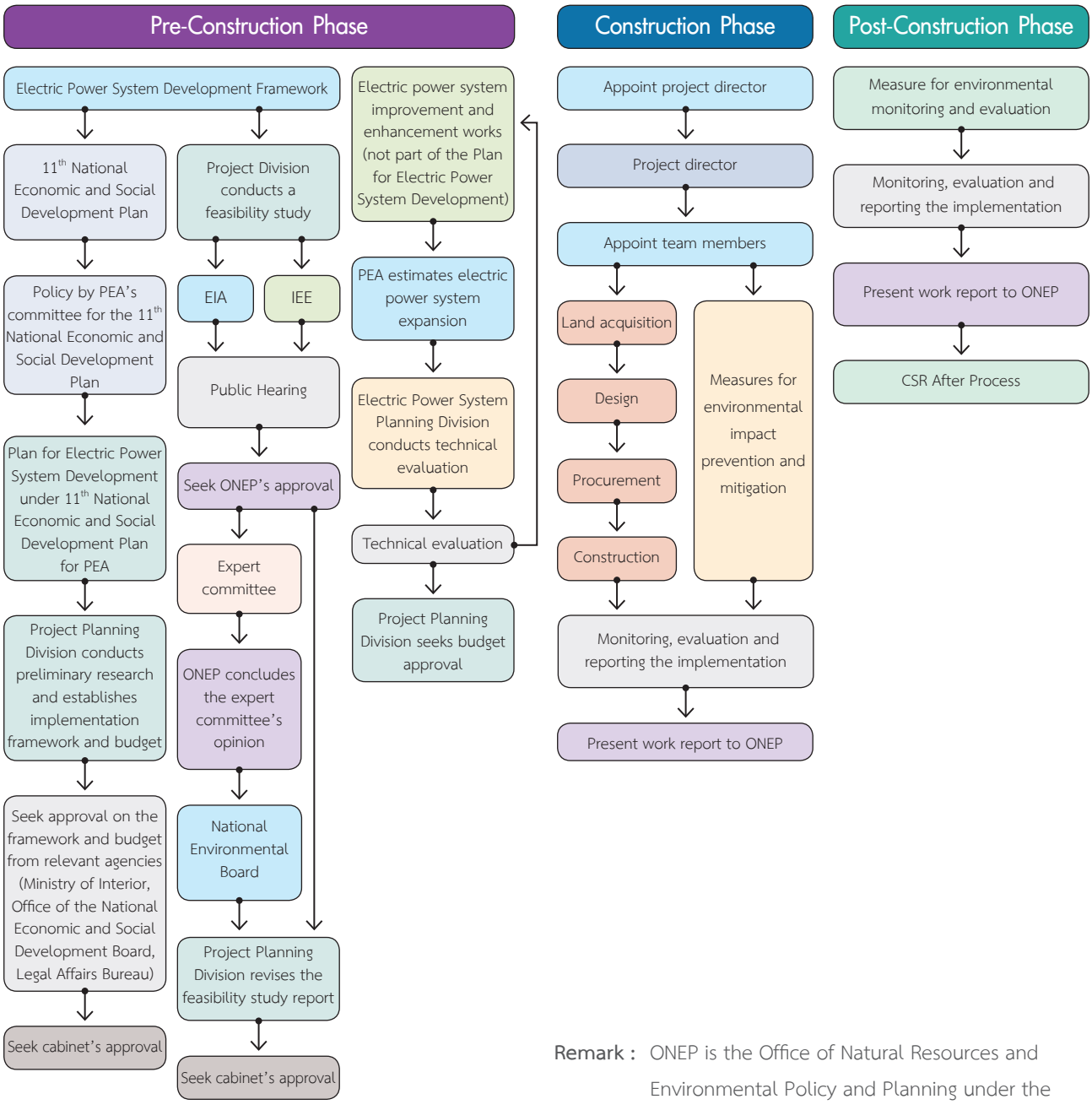
Remark : - Feasibility Study (FS) is an analysis of the viability of different factors (such as technical, investment, social and environmental) in a project.

- Environmental Impact Assessment (EIA) is an analytical report used to anticipate both positive and negative environmental impacts that result from the development of a project or an important mission. It is used to prescribe preventive and corrective measures for environmental impacts and to help decide whether or not to proceed with the project.
- Initial Environmental Examination (IEE) is a report detailing preliminary environmental impacts that might arise from a proposed project.

Procedures for the Construction of Electric Power Systems [103-2] [103-3]

Due to the fact that electricity is a basic national public utility, the construction of electric power systems requires big budgets and may also entail significant environmental and social implications. Therefore, it is extremely necessary to analyze both the positive and negative effects of each project in the pre-construction phase, during the construction phase, and after the construction phase. The details of the procedures for PEA's electric power systems can be summarized as follows:

Procedures for Protecting the Interests of the Stakeholders in PEA's Electric Power Systems Projects



Remark : ONEP is the Office of Natural Resources and Environmental Policy and Planning under the Ministry of Natural Resources and Environment.

Prior to launching the construction of electric power systems, PEA requires a feasibility study and conducts an Environmental Impact Assessment (EIA) report and an Initial Environmental Examination (IEE) report, so as to inspect and anticipate the environmental impacts that might occur. In addition, PEA puts in place measures for putting those impacts to rest in advance of the launch of the project. PEA must present an operational performance report throughout the construction phase to the Office of Natural Resources and Environmental Policy (ONEP) tasked with monitoring and inspecting required measures for environmental impacts in accordance with the EIA report. This process also goes hand in hand with the guidelines for strengthening the nation's economy and for promoting sustainable development and better quality of life.

PEA strictly follows pertinent regulations such as the National Environmental Quality Act B.E. 2535. It must also seek approval from all the relevant government agencies and the cabinet prior to launching any construction project.

For the construction of power substations, transmission and distribution systems, PEA applies its standards made in line with engineering and safety principles. Additionally, PEA also cites the existing national and international standards in the design of its power substations, transmission and distribution systems; for instance, the International Electrotechnical Commission (IEC), Institute of Electrical and Electronics Engineers (IEEE), and The Engineering Institute of Thailand (EIT).

PEA operates in strict compliance with all indications listed in the Environmental Impact Assessment (EIA) and with environmental laws, ranging from air quality monitoring, particulate matter measurement, noise level measurement, electric and magnetic fields measurement to measurement of water pollution and effluents that result from its operations. PEA strives to keep these impacts within the permitted range and determines safety measures and practices for all projects to follow rigorously throughout their implementation, for example:

- Standard for constructing electrical systems of all voltage levels
- Regulation by the Department of Civil Aviation regarding painting or installing devices for warning purposes along the power lines and buildings
- Regulations by the Department of Highways regarding electric pole installation and conductor stringing, the spacing necessary between power lines and traffic surface. This also includes the installation of underground cables
- Other regulations on the spacing between the underground cables and other public utilities, to determine and incorporate the distance required into the design and installation of underground cables
- Regulations by the Marine Department on acquiring permission to install cables, buoys and warning signs for submarine cables.
- Standard for alarm devices used in roadside operations to alert and protect passersby on the maintenance route; the use of standard warning signs such as those for high and low voltage cables.

In addition, for every case of system expansion or maintenance, there would be coordination with relevant agencies and the surrounding communities in order to routinely inform them of the project's details and development through a variety of channels of communication. For example, the project would set up a sign to notify beforehand the delivery time of large electrical appliances in the project area, as well as of the delivery route in order to mitigate traffic congestion. In addition, PEA proceeds to trim and prune trees by using tree surgeons, under its "Tree Doctors" project. They regularly tend the trees growing close to power lines in distribution hotspots, such as 115 kV transmission lines and high and low transmission lines, so as to avoid power outages caused by trees.

Hence, in 2017, there was no grievances regarding environmental concerns stemming from its procedures for the construction of electric power systems. Based on the monitoring outcome, all the environmental impacts were within permitted range (such as air quality monitoring, particulate matter measurement, noise level measurement, electric and magnetic fields measurement to water pollution and effluent measurement). In addition, there were no monetary and non-monetary penalties that result from environmental compliance violations. [307-1]

Management of Environmental Impacts in Office Buildings

PEA has implemented the "Green Office" initiative of the Department of Environmental Quality Promotion and the Ministry of Natural Resources and Environment in its organization and announced the Green Office policy on April 24, 2017 in order to promote and support all offices within PEA to utilize resources in a more environmentally friendly, cost-effective, and efficient manner, as well as to possess good environmental management and raise the office standards so that they are more environmentally friendly. These were carried out to reduce greenhouse gas emissions, mitigate environmental impacts, and prepare the offices to achieve international environmental standards by raising awareness about the economical use of energy and resources with maximum benefit and efficiency. PEA also campaigned to reduce waste, promote recycling, and reduce greenhouse gas emissions from all activities and operations in offices; encouraged and communicated with executives, employees, workers, and citizens to be cognizant of environmental problems; campaigned to procure products and services that are environmentally friendly; promoted the routine maintenance of areas of operations so that they look pleasant. PEA has a target aimed at expanding the scope of the operations under the Green Office Development Project to include all area offices in 74 provinces. [102-11] [103-1] [103-2]

Furthermore, PEA also designated a sub-committee to proceed with the Smart Green Office Project chaired by the Assistant Governor of Corporate Social Responsibility Function who is responsible for driving the operations of the Green Office Initiative in line with the Green Office criteria. This initiative ensures all activities within offices are carried out in an environmentally friendly manner; for example, reducing the use of electricity, fuel, and water, promoting the management of reuse and recycle; reducing and eliminating the use of hazardous products and chemicals within offices, all of which were done to mitigate pollution to the environment and reduce greenhouse gas emissions. In terms of procuring materials and devices, offices must consider accommodating environmentally friendly products (such as products with green labels, green basket labels, energy efficiency No. 5 labels, and high efficiency labels). With regard to employment within offices, it is essential that PEA choose quality individuals or external agencies with environmental standards, so as to align itself with the Green Office criteria. The Green Office criteria are divided into 7 categories, with the following scoring rubrics as follows:

Assessment Criteria in line with Green Office Standards

Assessment Criteria	Sub-Topics for Operations
Category 1 Organization Management	1. Environmental policy 2. Identification of topics and assessment of environmental problems and use of resources 3. Environmental laws and other related requirements. 4. Designation of power, duties, and responsibilities. 5. Revision by administration department
Category 2 Operations of Green Office	1. Communications and Environmental workshops 2. Meeting and organizing exhibitions 3. Cleanliness and order within offices 4. Transportation and travel 5. Preparedness and response to emergencies
Category 3 Use of energy and resources	1. Use of energy 2. Use of water 3. Use of other resources
Category 4 Waste and Wastewater	1. Management of waste in offices 2. Management of wastewater in offices
Category 5 Indoor and Outdoor Environment	1. Air in offices 2. Light in offices 3. Noise 4. Pleasantness
Category 6 Green Procurement	1. Procurement of products that are environmentally friendly 2. Environmentally friendly employment
Category 7 Continuous Improvement	1. Projects and activities 2. Management of greenhouse gas emissions

- A score of 90% and above will yield a Green Office gold certification (Outstanding).
- A score between 80% - 89% will yield a Green Office silver certification (Very good).
- A score between 60% - 79% and above will yield a Green Office bronze certification (Good).

PEA has participated in the Green Office Initiative of the Department of Environmental Quality Promotion under the Ministry of Natural Resources and Environment since 2014. 69 PEA nominated offices have been certified as environmentally friendly and have received gold certifications (outstanding). These gold certifications were awarded to 4 offices in 2014, 12 offices in 2015, 24 offices in 2016, and 29 offices in 2017. In 2018, PEA set the operational plans for the Green Office Project by nominating 30 area offices nationwide to participate in the assessment in order to be certified in accordance with the Green Office standards.

Based on the abovementioned commitment, PEA managed to reduce 4,990.89 tCO2e of its greenhouse gas emissions by its offices between 2014-2017. [103-2] [103-3]

Energy Conservation [103-2] [103-3]

As a state enterprise directly responsible for energy and environment, PEA has goal to become an exemplary model of energy conservation within office buildings in an effort to promote the image of the environmentally friendly organization. In addition, it strives to become a model contributing to the reduction of operating costs associated with the nation's generation and importation of energy, as well as to raise employees' quality of life, all of which are aligned with PEA Strategic Plans (2014-2023) focused on saving energy and improving PEA's offices to become Smart & Green Offices. Hence, the Green Office criteria were brought into play in accordance with LEED (Leadership in Energy and Environmental Design) standards, created by the U.S. Green Building council (USGBC). These standards are widely recognized and globally implemented in the organization's energy conservation guidelines. PEA chose practices in line with LEED for Existing Building: Operations and Maintenance (O&M) standards, which consist of the assessments of the physical and management components of buildings. These assessments will result in the adjustments made to building operations as follows:

- Manage lawns and areas outside buildings in order to reduce air and noise pollution and maintain a balance in ecosystems and surroundings.
- Manage air quality inside the buildings in order to promote the health of occupants and minimize the rate of sickness.
- Proceed with environmentally friendly sanitation in order to minimize the use of chemicals that is dangerous to building occupants and environment. Enhance air quality within buildings.
- Manage solid waste in order to reduce the amount of waste and promote the use of various materials and devices in an efficient manner. ·
- Procure environmentally friendly building materials in order to minimize the environmental impacts resulting from the utilization of these materials into buildings.
- Educate the usage of environmentally friendly pests in order to minimize the use of chemicals that is dangerous to building occupants and environment and maintain a balance in ecosystems.
- Build interior designs that are environmentally friendly in order to maintain the air quality within buildings.
- Manage energy in order to inspect energy efficiency within buildings.

In 2017, 2 PEA Offices were certified as "Green Office" in accordance with LEED standards: PEA Office in Pathum Thani (Gold Level) and PEA Office in Nong-Ya-Sai District (Certified Level). PEA still has a goal to nominate more offices so that they can also be certified as "Green Office in accordance with LEED standards in 2017; for example, PEA office in Nakhon Pathom province (Silver Level) and PEA office in Chon Buri province (Certified). As a result, there will be a total of 4 pilot PEA offices, with a plan to expand to all area offices nationwide.

Aside from what is mentioned above, PEA has designated a working committee on energy management and a committee tasked with assessing the head office's energy management since 2015, in an effort to efficiently administer energy management and strictly operate in line with energy saving measures both at the head office and all area offices by emphasizing the energy with the amount of consumption that generates effects of significant implications. Such energy includes electric power and vehicular fuel. As a consequence, there are awareness-raising activities about energy conservation in order to change the personnel's behavior in the hope that they can use resources economically and cost-effectively. There are also maintenance checks on all vehicles based on their mileage and specified plans. In addition, electrical devices in office buildings are changed to energy-saving devices such as the installation of LED (Lighting Emitting Diode) bulbs that has been carried out since 2013.

Amount of Electrical Consumption Conserved by Changing to LED Bulbs

Building Opted for LED Bulbs	Amount of Electrical Consumption Conserved (Kilowatt-hours per year)				
	2013	2014	2015	2016	2017
LED Building	230,000	230,000	230,000	230,000	230,000
Buildings 1 2 3 and others	-	802,148	802,148	802,148	802,148
12 Area Offices Service Buildings	-	3,864,000	3,864,000	3,864,000	3,864,000
Rangsit Warehouse	-	-	-	48,162	48,162
Buildings under 12 Area Offices	-	-	-	4,427,270	4,427,270
Total	**230,000**	**4,896,148**	**4,896,148**	**9,371,580**	**9,371,580**

Remark: The Amount of Electrical Conserved (Kilowatt-hours per year) = The amount of LED bulbs installed X the amount of electric power saved per bulb (kilowatt) X 8 hours used X 250 days per year

In 2017, PEA put in place an energy conservation plan under **the Energy-Saving LED Bulbs Replacement Project** aimed to replace the light bulbs with 1,021 LED bulbs in PEA head office, saving 77,585 kilowatt-hour per year and using a budget of 845,760 Baht. **The Building 3 Air-Conditioning Efficiency Enhancement Project** was organized to replace 3 chillers that had been used for more than 22 years in air-conditioning systems, saving 519,500 kilowatt-hour per year and using a budget of 55 million Baht. **The Roof-Mounted Solar Panel Installation Project** was organized to install solar panels on top of LED Buildings, SCADA Buildings, Buildings 3 and Building 10, saving 459,900 kilowatt-hour per year and using a budget of 18.1 million Baht. **The SCADA Building's Centralized Air-Conditioning Improvement and Efficiency Enhancement Project** was organized to replace low efficiency chillers of 50 tons of refrigeration (TR) that have been used for more than 15 years with higher efficiency chillers of 130 TR, saving 242,000 kilowatt-hour per year and using a budget of 3.9 million Baht. All of these projects are in the procurement stages and will have been carried out in 2018.

In this regard, the above mentioned management of energy efficiency resulted in PEA's use of electricity totaling 119,439,445 kilowatt-hour per year (429,982.002 gigajoule per year) and fuel totaling 20,617,062 liter (750,873.398 gigajoule per year), all of which are calculated to be 1,180,855.40 gigajoule per year as far as the total energy consumption within the organization is concerned. [302-1]

Amount of Electricity and Fuel Consumption within Organization [302-1]

Information		2015	2016	2017
Amount of Electricity Consumption			**Unit (Kilowatt-hour)**	
Head Office	Target	-	-	12,756,314
	Result	13,484,854	13,746,028	13,893,915
North	Target	-	-	23,364,437
	Result	23,794,448	25,177,195	24,040,517
Northeast	Target	-	-	23,890,330
	Result	24,331,999	25,743,890	24,980,302
Central	Target	-	-	32,804,829
	Result	33,389,828	35,350,031	34,509,155
South	Target	-	-	21,646,531
	Result	21,611,894	23,326,003	22,015,557
Total	**Target**	**-**	**-**	**114,462,441**
	Result	**116,613,023**	**123,343,148**	**119,439,445**
Amount of Fuel Consumption			**Unit (Liter)**	
Head Office	Target	-	-	1,235,541
	Result	1,117,041	1,287,022	1,321,134
North	Target	-	-	4,226,295
	Result	4,000,300	4,402,391	4,431,051
Northeast	Target	-	-	5,056,503
	Result	5,094,566	5,267,191	5,008,753
Central	Target	-	-	4,763,732
	Result	4,420,888	4,962,221	5,103,593
South	Target	-	-	4,494,902
	Result	4,356,025	4,682,189	4,752,530
Total	**Target**	**-**	**-**	**19,776,973**
	Result	**18,988,819**	**20,601,014**	**20,617,062**

Remark : - 1 kilowatt-hour is equivalent to 0.00360 gigajoule and 1 liter of fuel is equivalent to 0.03642 gigajoule. The information is obtained from the Department of Alternative Energy Development and Efficiency, Ministry of Energy.

- The amount of fuel outlined in the table is the total combined amount of benzene fuel and diesel fuel. The data have not been divided into category; however, they reveal the proportion in which diesel fuel was used more than benzene fuel with significant implications. Therefore, a diesel fuel converter was used to calculate the amount of energy used.

Management of Effluents and Hazardous Waste

PEA managed the effluents and hazardous waste within office buildings, power transmission and distribution systems. There are many types of effluents and waste such as deteriorating power transformers, deteriorating electricity meters, and disease-ridden waste from PEA medical clinics within office buildings. Should there be any leakage or improper disposition, they might affect the occupational health and safety of those in communities surrounding PEA's operation areas. [103-1]

With regard to the management of power transmission and distribution devices, PEA will assess, check, and select the devices whose conditions meet the standard criteria stipulated by relevant agencies. Those criteria are divided into the following:

- Repairable materials and devices such as electricity meters and transformers will be repaired and restored back to the condition where they are readily available for reuse.
- Unrepairable materials and devices such as transformers' iron cores, copper windings, and leftover parts of electrical wires from distribution systems will be sold or provided to external agencies so that they can dispose of them properly.
- Separated materials and devices available for use in other areas such as high-voltage bushings and low-voltage transformers will be used as substitute spare parts and concrete products. For instance, electrical posts that have not expired will be reused. Expired/defective posts will be sold to the others to use in farming, bridge construction, and low-voltage power line communication. Moreover, these posts can be used to generate benefits for communities, society and environment; for example, building weirs and making artificial coral reefs.

In addition, there are routine maintenance checks on these materials and devices in accordance with work plans, so as to prolong their lifetime, as well as to reduce the amount of effluents stemming from defective devices. These checks include cleaning electrical devices such as insulators in areas adjacent to the sea, or in areas where salt is concentrated, or in areas where dust is dense in the air. This is done to prolong their lifetime and make the health index database of electrical devices such as reclosers, in an effort to proceed with replacement plans before they become defective. [103-2] [103-3]

For effluents and hazardous waste within office buildings, campaigns were organized to encourage the use of papers on both sides. These papers will be dispatched to schools for the blind so that they can use them as embossed braille documents (third side). With regard to general waste, PEA rallied a campaign to sort it according to its type: wet waste, general waste, recycled waste, and hazardous waste. The disease-ridden waste from medical clinics at the head and district offices will be separated from general waste in the hope that they will be lawfully disposed of by responsible private agencies. In 2017, the hazardous waste generated by electric power systems and office building can be summarized as follows: [103-2] [103-3]

Amount of Effluents and Hazardous Waste Generated by Electric Power Systems and Office Buildings [306-2]

Disposition Method	Deteriorating Meters (Meter)	Deteriorating Transformers (Liter)	Disease-Ridden Waste from Medical Clinics (Kilogram)
Recycle	-	15,000	-
Reuse	5,110	39,000	-
Landfill	-	-	-
Other	65,500	-	1,140
Total	**70,610**	**54,000**	**1,140**

Remark : Other disposition methods refer to sale the wastes to external agencies or recipients who can dispose wastes properly in accordance with law.

Environmental Awareness and Conservation

PEA puts emphasis on environmental awareness and conservation, especially when it comes to mitigating environmental impacts, conserving energy, and supporting the conservation of natural resources. In 2017, PEA moved ahead with a variety of projects as follows:

PEA Save Water, Build Weirs Project

PEA initiated the "Save Water, Build Weirs" project in 2010 in order to store water for communities to use for consumption and agricultural purposes. In addition, it could alleviate drought, rehabilitate nature, and promote better quality of life for citizens. It can also prevent flash floods in areas adjacent to water sources. PEA built weirs for communities across Thailand by using faulty and damaged concrete materials such as electric poles and concrete piers. In 2017, 65 weirs were built in PEA's service areas nationwide, benefiting 14,755 households and irrigating about 243,685 Rai of land for agricultural purposes. PEA has a plan to build 16 weirs in cooperation with the Utokapat Foundation under the Royal Patronage of H.M. the King, so as to accommodate citizens' needs and alleviate the hardships that communities face in several areas in 2018.

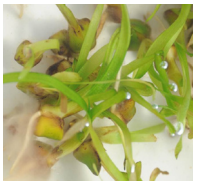
PEA Plant Trees, Save the Forest Campaign

PEA launched a campaign to encourage its employees and citizens from all 4 regions in which it operates to plant trees. The campaign was implemented in 6 areas: PEA Area 1, Chiang Mai Province (N.1), PEA Area 1, Udonthani Province (NE.1), PEA Area 2, Chonburi Province (C.2), PEA Area 3, Lopburi Province (N.3), and PEA Area 1, Phetchaburi Province (S.1). In 2017, a total of 46,500 trees were planted over 283.5 Rai of land, reducing 683.55 tons of carbon dioxide equivalent (tCO2e) of greenhouse gas emission. In 2018, PEA has continuously put forth reforestation plans in areas where PEA's electric systems are expanded, as well as other areas of responsibility nationwide.










PEA's Communities Revived the Marine Environment of Thailand Project

Following submarine cable laying to Mook Island, Trang province in 2011, PEA has initiated and implemented its seagrass artificial reef planting project continuously, resulting in the plantation of 103,000 seagrass plants and artificial reefs. In 2017, PEA proceeded to plant 4,000 seagrass plants on Yong Ling Beach, Ban Nam Rap Community, Bang Sak sub-district, Kantang district, Trang Province. This was done to restore the marine natural nursery and the rich environment to the area.

PEA's Greenhouse Gas Emissions Account

Resulting from PEA's operations such as power generation, vehicle use, electricity use, electricity transmission and distribution losses, and Sulfur hexafluoride (SF6) leakage, PEA emitted 4,324,915.14 tons of carbon dioxide equivalent (tCO2e) in 2017. Thus, PEA launched projects and activities to encourage reduction in greenhouse gas emission. The projects involve power generation from renewable energy, use of diesel oil with blends of biodiesel, efficiency improvement for diesel power plants, LED light bulb replacement, efficiency improvement for use of power within universities, and counseling services for power management in business and industrial sectors. These projects helped reduce the emission of 44,507.37 tCO2e within the organization and 5,120,785.02 tCO2e outside the organization.

PEA Bring Elephants Home Project

In 2017, PEA implemented this project in order to support Elephant Reintroduction Foundation by releasing 4 elephants into the Sap Langka National Forest, Kuttaphet sub-district, Lam Sonthi district, Lop Buri Province. PEA also built artificial salt licks as a substitute food source in place of other natural food sources that are not sufficient for the needs of elephants and wild animals. This was also done to prevent elephants and wild animals from decimating citizens' agricultural areas, which may cause damage to crops or put elephants or wild animals in danger. In addition, it generates an equilibrium in nature, which makes forest ecosystems more complete. PEA had proceeded to create a total of 110 artificial salt licks from 2014 to 2017.

PEA LED Project

PEA has launched this project since 2014 to improve lighting systems and to promote reduction in energy consumption by replacing light bulbs in archaeological sites, important tourist spots in communities and fishing boats with LED bulbs. In 2017, PEA successfully improved lighting systems in 3 additional sites: Phrathat Renu temple in Nakorn Panom Pronvince, Phra That Nong Bua temple in Ubon Ratchathani Province, and the ceremonial grounds around the Thao Suranari Monument (Ya mo) in Nakorn Ratchasima Province. Nowadays, there are improvements made to lighting systems in a total 20 sites: Sothonwararam Worawihan temple in Chachoengsao Province, Phra Boromathat Chaiya Ratchaworawihan temple in Surat Thani Province, Chao Mae Lim Ko Niao Shrine in Pattani Province, Chaiyathararam temple (Chalong temple) in Phuket Province, Ayutthaya Historical Park (Mongkhon Bophit temple) in Phra Nakhon Si Ayutthaya Province, Phra That Na Dun in Mahasarakam Province, Phetchabura Buddha in Phetchabun Province, Phra Pathom Chedi temple in Nakhon Pathom Province, Mahathat Woravihara temple in Phetchaburi Province, Pha Sorn Kaew temple in Petchabun Province, Phra That Cho Hae temple in Prae Province, Phra Borommathat temple the Royal Monastery in Kampaeng Phet Province, Phra Borommathat temple in Tak Province, and Phra Mahathat Kaen Nakhon temple in Khon Kaen Province, Phrathat Renu temple in Nakorn Panom Province, Phra That Nong Bua temple in Ubon Ratchathani Province, and the ceremonial grounds around the Thao Suranari Monument (Ya mo) in Nakorn Ratchasima Province.

From its operational performance from 2014 to 2017, PEA reduced energy use in a total of 278,715.52 units, as well as reduced 152.35 tons of carbon dioxide equivalent (tCO2e).

Awards of Pride

Due to its commitment to developing electric power supply businesses and other pertinent businesses on the basis of responsibility with a focus on adding value to the organization and society and moving them towards sustainable development, the Provincial Electricity Authority received awards that are reflective of the success of its efforts in several areas. The awards that brought pride to the organization and personnel at all levels can be summarized as follows:

Outstanding State Enterprise Award 2017 for outstanding information disclosure and transparency from the State Enterprise Policy Office (SEPO).

Outstanding State Enterprise Award 2017 for Corporate Social and Environmental Responsibility Activities from the State Enterprise Policy Office (SEPO).

Sustainability Report Award 2017: Outstanding level from the Thai Listed Companies Association, the Securities and Exchange Commision, and the Thaipat Institute.

Honor Award for Outstanding Official Information Center conferred upon 46 PEA Information Centers that passed high-quality assessments conducted by the Office of the Official Information Commission under the Office of the Permanent Secretary, the Prime Minister's Office.

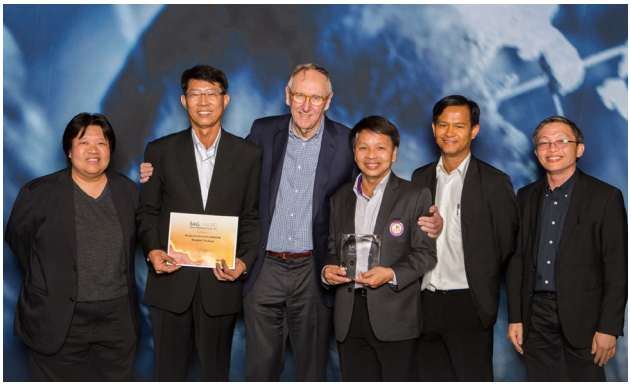
- **Excellent Award for "State Enterprise with Development Excellence in Incorporating Integrity and Transparency Work Plans in 2017** from the Office of the National Anti-Corruption Commission (NACC)
  - **Transparency (Excellent Level) Award** from the Office of the National Anti-Corruption Commission (NACC).
  - **Corruption-Free (Excellent Level) Award** from the Office of the National Anti-Corruption Commission (NACC).

- **Safety Award for Zero Accident Campaign 2017) Gold Level** presented by the Ministry of Labor.

- **Standard Green Office Building Award for Leadership in Energy & Environmental Design Existing Buildings:** Operations and Maintenance (LEED EBOM) 1 Gold level Award and 1 Certified level Award presented by the U.S. Green Building Council (USGBC).

- **Green Office Award 2017: Excellent Level (G Gold)** conferred upon 29 PEA offices certified as being environmentally friendly from the Department of Environmental Promotion, Ministry of Natural Resources and Environment.

- **Award for Government Easy Contact Center (GECC)** - 125 PEA offices received the certification for the services provided by GECC from the Office of the Prime Minister in 2017.



Special Achievement in GIS Award (SAG Award) 2017 at the ESRI USER Conference 2017 in the U.S.

Thailand HR Innovation Award 2017: Silver Level conferred by Thailand's Productivity Institute in association with the Personnel Management Association of Thailand (PMAT) and the National Institute of Development Administration (NIDA).

1 Silver Medal, 1 Bronze Medal, and Special Award for inventions from the Seoul International Invention Fair (SIIF2017) in Seoul, Korea.

Bronze Medal and Special Award for inventions from the 13th Taipei International Innovation Show & Technomart (INST2017) in Taipei, Taiwan.

2 Gold Medals from the International Quality & Productivity Convention 2017 at the city of Padang in Indonesia.

"IPv6 Excellence Awards 2017"in honor of the agencies that provided basic Internet networks and services that have accommodated IPv6 for 3 consecutive years presented by the Ministry of Digital Economy and Society (MDES).

Honor Award for being a "Role Model" for his involvement in promoting good governance and anti-corruption efforts within the organization in 2018. (Mr. Surasak Trithan, PEA Deputy Governor in Human Resources) from the Office of the National Anti-Corruption Commission (NACC).

Award given to an individual with honest and ethical behavior in 2017 (Mr. Surasak Trithan, PEA Deputy Governor in Human Resources) by the Office of the National Anti-Corruption Commission (NACC).

"Role Model" Award for reducing, relinquishing, and removing the use of foam food containers for the good health of Thai citizens in 2017 (Mr. Sermsakool Klaikaew, PEA Governor) from the Department of Health, Ministry of Public Health.

GRI Content Index [102-55]

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	102-3 Location of headquarters	10			
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	103-3	Evaluation of the management approach	22-26, 36-42			
GRI 205: Anti-corruption 2016	205-2	Communication and training about anti-corruption policies and procedures	38	Total number and percentage of employees that the organization's anti-corruption policies and procedures have been communicated to, broken down by employee category Total number and percentage of business partners that the organization's anti-corruption policies and procedures have been communicated to, broken down by type of business partner Total number and percentage of employees that have received training on anti-corruption, broken down by employee category	Information unavailable	The complete disclosure of information will report on the next reporting period
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GRI Standard	Disclosure		Page number(s) And/or URL(s)	Omission		
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GRI 306: Effluents and Waste 2016	306-2	Waste by type and disposal method	119	Total weight of non-hazardous waste, with a breakdown by the following disposal methods	Information unavailable	The complete disclosure of information will report on the next reporting period
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GRI Standard	Disclosure		Page number(s) And/or URL(s)	Omission		
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GRI 404: Training and Education 2016	404-1	Average hours of training per year per employee	73	Average hours of training that the organization's employees have undertaken during the reporting period, by gender and employee category	Information unavailable	The complete disclosure of information will report on the next reporting period
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GRI Standard	Disclosure		Page number(s) And/or URL(s)	Omission		
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GRI 416: Customer Health and Safety 2016	416-1	Assessment of the health and safety impacts of product and service categories	104			
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GRI Standard	Disclosure		Page number(s) And/or URL(s)	Omission		
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PEA SDGs Content Index

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Sustainable Development Goals (SDGs)	Business Theme	GRI disclosure/Indicator	Page Number (or Link)
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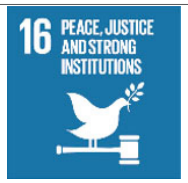	Anti-corruption	205-2 205-3	38 42
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The Survey of Reader's Opinion about PEA Sustainability Report 2017

1. Involvement with PEA

- ◯ Customers/Clients
- ◯ Regulator
- ◯ PEA Employees
- ◯ Trading Partners
- ◯ Collaborators
- ◯ Suppliers
- ◯ Citizens
- ◯ Press
- ◯ Educational Institutions
- ◯ Communities around areas of responsibility
- ◯ Others (Please Identify .....)

2. Objectives for reading this report

- ◯ To familiarize yourself with PEA.
- ◯ To study/follow up with PEA's CSR activities
- ◯ To study and research
- ◯ Others (Please identify .....)

3. Your satisfaction level towards PEA sustainability report 2017

3.1 Report content

• Understand PEA's overall operations	◯ High	◯ Medium	◯ Low
• Cover material topics of interest	◯ High	◯ Medium	◯ Low
• Contain complete information that makes you understand PEA's sustainable development in economic, social and environmental dimensions	◯ High	◯ Medium	◯ Low
• Contain sufficient information for awareness and decision-making purposes	◯ High	◯ Medium	◯ Low
• Contain clear information	◯ High	◯ Medium	◯ Low

3.2 Report content presentation

• Easy to understand	◯ High	◯ Medium	◯ Low
• Beautiful report design	◯ High	◯ Medium	◯ Low
• Satisfied with overall report content presentation	◯ High	◯ Medium	◯ Low

4. Does this report completely address topics in which you are interested?

- ◯ Complete
- ◯ Incomplete. Need additional information (Please identify topics or issues in which you are interested and wish to have included in the next report.)

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5. Opinions and other suggestions for the development of a sustainability report.

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6. Your channels of access to PEA sustainability report 2017

- ◯ PEA's website
- ◯ Site Visits to PEA
- ◯ Postal delivery
- ◯ Seminars/Exhibition
- ◯ Information/distribution within PEA's organization
- ◯ Others (Please identify .....)

The Provincial Electricity Authority (PEA) would like to take this opportunity to thank you for your cooperation.
Information obtained from your questionnaire is deemed extremely helpful to the development of PEA's sustainable development, as well as the improvement of the following sustainability report.

You can submit your questionnaire via 2 channels.

1. By yourself or through postal service:

Corporate Social Responsibility Department, Provincial Electricity Authority (PEA)
Head Office: 200 Ngamwongwan Road, Ladyao Sub-district, Chatuchak District, Bangkok 10900
Telephone: 02-590-9916 Fax: 02-590-9919

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