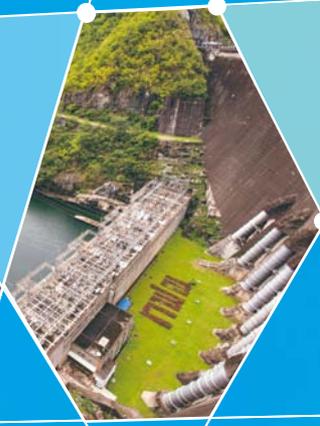


*Caring  
and Sharing*



# Sustainability Report 2014

## Electricity Generating Authority of Thailand

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## How to Read this Report

EGAT Sustainability Report 2014 was published with an aim to present to all stakeholders the organization’s performance on economic, environmental, and social impacts towards the goal of sustainable development. The topics and contents of our reporting encompassing the aspects and boundaries of sustainable development were prepared following the guidelines of GRI G4 Sustainability Reporting Guidelines & Electric Utilities Sector Supplement. For the information on operational and financial performance, please find them in EGAT Annual Report 2014.

# Vision

‘To be a world-class leading organization in the electric power industry’

EGAT has a vision to be an internationally leading organization in electricity business with a goal to be a leading organization in the following five key aspects;

- Good corporate governance,
- A high performance organization,
- Operational excellence,
- An organization of national pride, and
- Financial viability.



## Mission



- Generate, acquire, transmit and sell bulk electric energy via the transmission network.
- Produce lignite for the lignite-fired power plant and sell lignite by-products for industrial uses.
- Provide energy-related services to external companies and private power plants.
- Invest in electricity and energy-related businesses through subsidiaries and affiliates – the EGAT Group.

## Corporate Culture

### Committed to the Organization

EGAT people are all committed to the organization, performing their duties with good faith, loyalty, skill and diligence for the same unified goal to drive the organizational growth and safeguard the interest of EGAT and the nation.

### Striving for Excellence

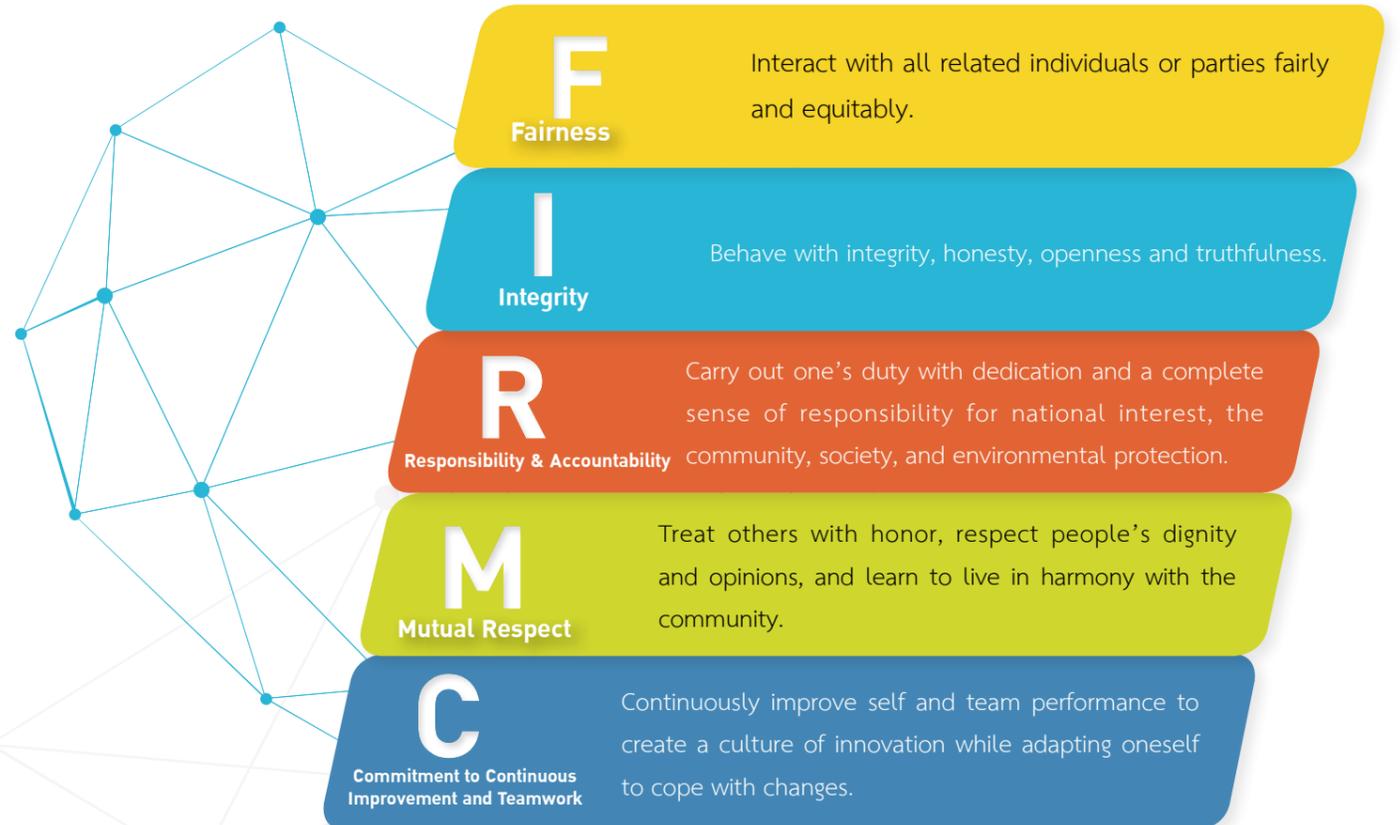
All employees work with sound and farsighted planning, diligence and determination and always give due consideration on safety and the interest of the country, society and environment. All are committed to continuously developing themselves for improved competence and work performance to ensure high quality, efficiency and excellence of their work that earns EGAT trust and acceptance from the public and domestic as well as international agencies and organizations.

### Upholding Moral Integrity

EGAT praises and supports the employees with integrity and ethically sound conduct as well as the employees who dedicatedly act in the interest of the nation. EGAT is determined to prevent, by all means, an abuse of power and misconduct in the organization. It is also committed to equitable treatment of all employees and stakeholders.

## Core Values

EGAT's core values of FIRM-C are established for all employees to uphold them as pathway of working which will lead to the development of the corporate culture as well as the particular identity of EGAT employees. The FIRM-C core values will further drive EGAT towards a world-class leading organization in the electric power supply industry. Description of such core values are as follows.



During 2014, EGAT put a focus on the launching of a campaign to encourage all employees to practice the organization's core values, the responsibility and accountability or R in particular. The statements of R-core value are publicized organization wide through such forms of media as, on the table cards in the meeting and conference rooms at EGAT Headquarters, and on the Vitamin R bottles distributed during the meetings of EGAT executives. The R-core value statements are also regularly disseminated over the Intranet, and to all employees via electronic mails.



## Message from the Governor



“ We fully recognize that, for EGAT to grow sustainably into the future, we have to always keep the stakeholders in mind and operate with responsibility. We are determined to make our organization a National Pride. ”

I am proudly presenting this Sustainability Report to disclose essential information of the organization to the stakeholders. Over the past year, the Board of Directors and executives of the Electricity Generating Authority of Thailand (EGAT) jointly reviewed and prepared the EGAT Corporate Plan (2015 - 2025) in order to formulate key strategies in driving EGAT to achieve its vision of becoming a world-class leading organization in the electric power industry, belonging to the global top quartile.

The EGAT Corporate Plan essentially specifies the social responsibility strategies and goals which will develop the organization into a state enterprise which is Thailand's National Pride by 2021 and a state enterprise of internationally recognized global sustainability by 2025.

Major events in 2014 affecting energy security of the country were the stoppage of the supply of natural gas from the Republic of the Union of Myanmar and the Malaysia-Thailand Joint Development Area, Block A-18. EGAT coordinated with the Ministry of Energy, the PTT Public Company Limited, the Metropolitan Electricity Authority and the Provincial Electricity Authority, in making preparations for the crisis. An exercise was carried out for an energy emergency situation plan and an operation and communication plan. Electricity generation and transmission were put on alert around the clock. All parties were requested to reduce their power consumption. As a result, electricity generation and transmission could be operated as normal.

In terms of prevention and solving of corruption problems, EGAT has prepared a Corruption Prevention and Suppression Plan and conducts fraud risk assessment as well as internal monitoring and auditing every year.

On the occasion of the 60<sup>th</sup> Birthday Anniversary of Her Royal Highness Princess Maha Chakri Sirindhorn on April 2, 2015, EGAT collaborated with government agencies, network parties in the public and private sectors and the media, in launching two projects in honor of the Princess. One was the EGAT Reforestation Project in honor of Her Royal Highness Princess Maha Chakri Sirindhorn under which forests in headwater areas, community forests and mangrove forests, covering a total area of 13,000 rai, were restored. The other was the Wankaew Project under which visual acuity service was rendered and eyeglasses were presented free-of-charge to 60,000 persons with visual problems.

This year was indeed a year of pride for EGAT. Achievements in various areas yielded results as EGAT was given many awards, such as the 2013 NACC Integrity Award, the State Enterprise of Great Pride Award, the 2014 Thailand Energy Award in the Category of Energy Conserving Organizations for promotion of energy conservation and alternative energy, a Distinguished Award in the Mass Media Category for the EGAT website, the 2014 CSR-DIW Award, the 2014 Green Mining Award, the 2014 Silver Asian Power Award in the Gas Power Project of the Year Category, the 2014 EIA Monitoring Awards, and the Green Office Award (Gold). Such awards reflect EGAT's firm determination to have good corporate governance with social and environmental responsibility.

Our major challenges in the next 3 - 5 years are still centered around building confidence among the public, communities and opinion leaders in our actions to look after impacts on the quality of life and the environment. EGAT places importance to listening to opinions and encouraging participation as well as effective communication with the stakeholders and to operating with international standard social responsibility.

We fully recognize that, for EGAT to grow sustainably into the future, we have to always keep the stakeholders in mind and operate with responsibility. We are determined to make our organization a National Pride and to pursue our resolution to generate electricity for the happiness of Thai people and for perpetual national electricity security.

*Soonthai Kumnoonsate*

(Soonthai Kumnoonsate)

Governor

Electricity Generating Authority of Thailand

# Organizational Profile

Electricity Generating Authority of Thailand (EGAT) is a state enterprise in the category of electricity under the supervision of the Ministry of Energy. It was established under the Electricity Generating Authority of Thailand Act, B.E. 2511 (1968) on May 1, 1969 to provide electricity to the public. Its primary mission is to generate, acquire, transmit and sell electric energy to the Metropolitan Electricity Authority (MEA), the Provincial Electricity Authority (PEA) and direct customers, in accordance with the cabinet resolution, and to conduct electricity-related businesses, including the production and sale of lignite.

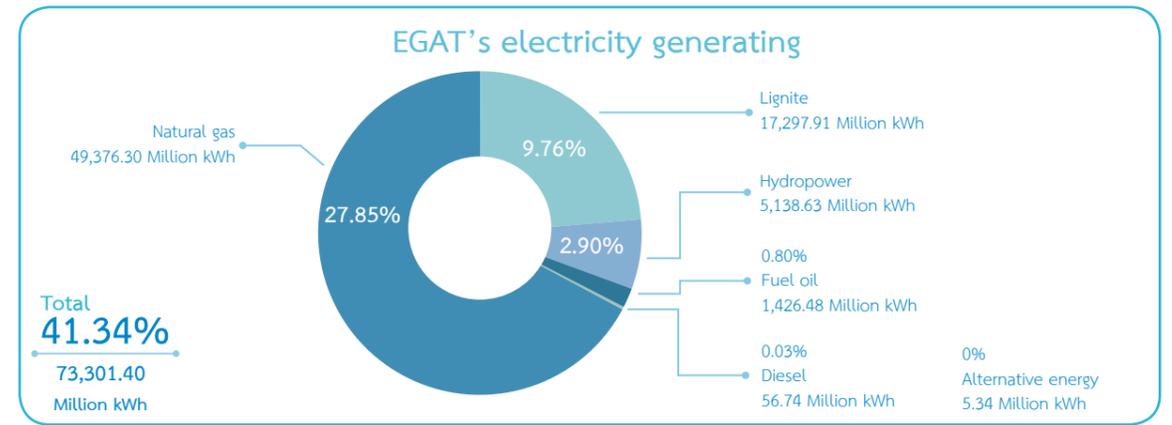
Under the present electricity business structure, EGAT is the sole generator, transmitter and purchaser of electricity. It also regulates and controls electricity generating and distributing systems nationwide to ensure international standards. There is an Energy Regulatory Commission (ERC) to regulate and set rules and regulations as well as electricity prices for fairness to consumers and independent power producers.

EGAT's head office is located in Bang Krui district, Nonthaburi province and five dispatching centers (two in Nonthaburi province, one in Phitsanulok province, one in Khon Kaen province and one in Krabi province).

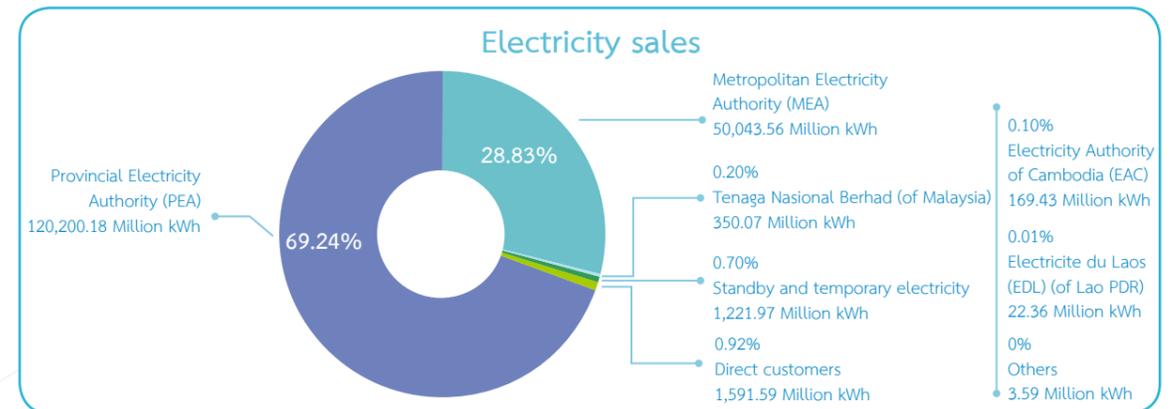
EGAT generates high-voltage electricity for sale to PEA, MEA and eight direct customers via its high-voltage transmission line network connecting its high-voltage substations to substations of PEA, MEA and the direct customers in accordance with the electricity sale and purchase contract terms and the Grid Code specified by the ERC. High-voltage electricity distributed to customers is managed through EGAT's National Control Center (NCC) and the Regional Control Centers (RCC) for the Central Region, the North, the Northeast, the South and the Metropolitan Area, to ensure it conforms to standards and specifications.

In 2014, EGAT's 41 generating facilities provided a combined installed capacity of 15,482.13 MW, accounting for 44.66 percent of the country's system installed capacity. Additional capacity was derived from power purchase from independent power producers (IPP), small power producers (SPP), companies in the EGAT Group, and electric utilities in neighboring countries.

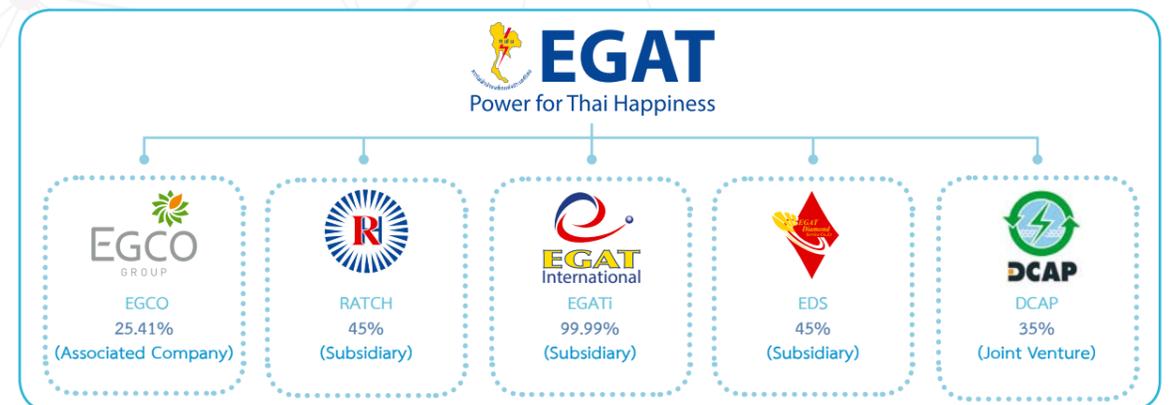
Details	Installed capacity (MW)	Percentage of total capacity
1. Installed capacity from EGAT's generation fleet, comprising:	15,482.13	44.66
- 23 hydropower plants	3,444.18	9.94
- 3 large-sized thermal plants	3,647.00	10.52
- 6 combined cycle plants	8,382.00	24.18
- 8 small-sized renewable energy power plants	4.55	0.01
- 1 diesel power plant	4.40	0.01
2. Power purchase from 8 domestic independent power producers (IPPs) and three companies in the EGAT Group.	13,166.70	37.98
3. Power purchase from 59 small power producers (SPPs) in the category of firm power purchase agreements.	3,614.60	10.43
4. Power purchase from four electric utilities located in Lao PDR and in Malaysia, through the HVDC Thailand-Malaysia Transmission System.	2,404.60	6.93



Presently, EGAT's transmission systems have 69, 115, 132, 230, 300 and 500 kV transmission lines with a total length of 32,526.99 circuit kilometers, 213 high-voltage substations, 572 distribution points for various voltages and a total transformer capacity of 88,461.44 MVA.



Apart from generating electricity, EGAT also engaged in telecommunications, power plant engineering and construction businesses, as well as businesses dealing with by-products from electricity generating. It also renders power plant operation and maintenance (O&M) service to private companies and Lao PDR. In addition, it expanded the business scope and invested in five companies in the EGAT Group; namely,

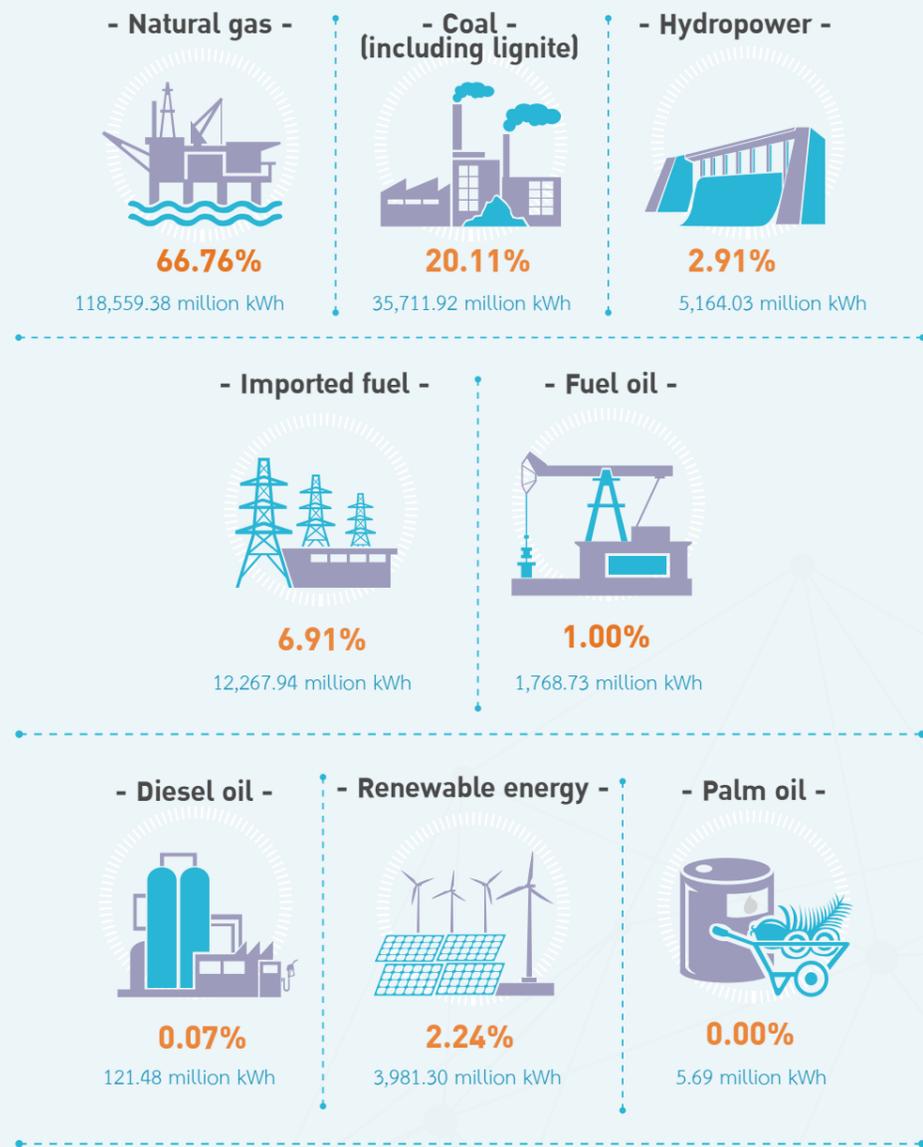


In 2014, EGAT generated revenues from its operation (excluding revenues from fuel acquisition) totaling 544,281,218,264.06 Baht and net profit totaling 38,116,898,124.42 Baht. Remittance to the Ministry of Finance totaled 19,211,962,847.81 Baht.\*

\* Data as of March 27, 2015 (being audited by the Office of the Auditor General of Thailand).

# Fuel Consumption for Electricity Generation

EGAT has managed and diversified the utilization of fuel for power generation in efforts to secure the stability of power supply system while ensuring the reasonable electricity prices. EGAT's proportion of fuel diversification is as follows.



# CSR Strategic Directions

The State Enterprise Policy Office (SEPO) has developed a policy for all state enterprises to adopt the principles of social responsibility addressed in the International Standard ISO 26000 as key strategies for the implementation of their social and environmental activities.

EGAT has responded to such policy by revising and formulating a Master Plan for corporate social responsibility implementation following the ISO 26000. The master plan incorporated the following key strategic themes.

- 
**Enhance the sustainability of electricity generation by**  
 Focusing on the promotion of energy efficiency and conservation, the development of renewable energy power plants, and the development of community-based power plants.
- 
**Nurture a good relationship with the public and actively engage with the stakeholders by**  
 Putting emphasis on the building of good relationships with the society at large as well as the groups of stakeholders.
- 
**Connect the role of corporate social responsibility to all employees at an individual level by**  
 Focusing on the development of volunteering spirits among employees through their participation in social campaigns and activities.
- 
**Develop the competency of core business processes towards the international standard level by**  
 Emphasizing the operations of CSR in process embedded with social and environmental responsibility in line with the International Standard ISO 26000, and the implementation of social and environmental projects which contribute to the well-being of communities, the society, and the environment.

These key strategic themes are transferred from a corporate level to all command lines, and are also linked with the corporate strategic directions and the objectives included in EGAT Corporate Plan. For instance, in 2014, these strategic themes were linked to the organization's present strategy – to be an organization with due care for the society, communities, and the environment. A number of CSR action plans were prepared to cater each strategy and the results of the execution of these plans were required to be reported to EGAT's Corporate Governance Committee on a quarterly basis and to the Board of Directors on a half yearly basis.



We think, create,  
share and contribute.

Caring for, and contributing to, the well-being of local communities and the society at large

Throughout 45 years of operations, EGAT has relentlessly placed prime importance on the power generation and transmission which is the “heart” of the country’s economic and industrial development. From dawn to dusk, electricity becomes the breath of living a modern daily life. We at EGAT give all our hearts and souls to fulfill a mission in producing electricity to “power the happiness of all Thais”. We always “care” about the well-being of life in local communities. We are also willing to share our knowledge which contributes to the development of young people and the society at large, and create an economic and environmental balance for our country and at a global scale today and forever.

## CSR Performance and Achievements in 2014

Performance and achievements	2012	2013	2014	Page
Electricity generation from clean energy	8,442.90 million kWh	5,936.00 million kWh	3,981.30 million kWh	41
Clean Development Mechanism (CDM) project				
- Power plants under joint development project	7 projects	6 projects	8 projects	53
Pilot projects under Thailand Voluntary Emission Reduction Program (T-VER Program)	-	2 projects	2 projects	54
Carbon footprint projects	-	1 project	4 projects	50 - 51
Power plants, hydroelectric dams and lignite mines certified with the international standard ISO 14001 for implementing the environmental management systems	25 locations	27 locations	27 locations	54
Power plants passing the assessment of CSR-DIW, developed by the Department of Industrial Work	18 locations	20 locations	21 locations	90
Outstanding power plants and operating units which adopt the occupational health and safety standard	28 locations	29 locations	36 locations	90
Certification for the reduction of CO <sub>2</sub> emissions in office building	Thor.102 Building (awarded for energy conservation for two consecutive years)	Thor.102 Building (awarded for energy conservation for three consecutive years)	Thor.100 Building	43
Electrical appliances bearing the No.5 energy-efficient label (cumulative)	19 products	21 products	24 products	32
Achievement of the Demand-Side Management (DSM) implementation (cumulative)	CO <sub>2</sub> emission reduction by 10 million tons carbon dioxide	CO <sub>2</sub> emission reduction by 11 million tons carbon dioxide	CO <sub>2</sub> emission reduction by 12.3 million tons carbon dioxide	34
Reforestation project in the vicinity of Sirikit dam in commemoration of Her Majesty the Queen's 80 <sup>th</sup> birthday anniversary	1,000,000 trees; 1,000,000 vetiver seedlings; 880 check dams	1,000,000 trees	Reforestation in 5,000 rai of headwater areas (1,000,000 trees) 500 rai of community forests (100,000 trees) 1,000 rai of mangrove forests (710,000 trees)	72
Research financing	22.8 million Baht	199.15 million Baht	187.37 million Baht	35 - 37
GRI reporting	GRI G3 (B level)	GRI G3 (A level)	GRI G4 ("in accordance" - Core)	95
EGAT Learning Center	-	-	1 location in operation	100

[G4-2, G4-14]

## Significant Impacts, Risks and Opportunities

For EGAT, accomplishing the mission and attainment of the set objectives are of utmost importance. The COSO-Enterprise Risk Management (ERM) has been adopted and used as an important tool in building confidence for success, within an acceptable risk framework. In addition, the approach of the Ministry of Finance's State Enterprise Performance Appraisal (SEPA) has been adopted for use so that the same standard applies throughout the entire organization. The risk management process is linked to the organization's strategies outlined in the Corporate Plan. In addition, an Annual Risk Management Plan is developed and the results of risk management are monitored and reported to the committees in charge on a quarterly basis. There is also an Enterprise Risk Management Committee tasked with overseeing executions of the risk management framework to ensure adequacy and efficiency.

The Enterprise Risk Management Committee also reviews the risk management policy and disclosure of risk management information to the regulators and the public. Internal and external risk factors which may potentially impact the organization are assessed and used as input in the strategy formulation process in order to adjust strategic goals to suit the current situation. The committee also assesses the risks which may affect the attainment of the strategic goals in four areas: 1) strategies and competition 2) finance 3) operation and 4) compliance, to ensure that all aspects of the mission are covered. This includes risk management with impacts on society, communities and the environment. Risk management plans are put in place for every level in order to keep the organization's risks at acceptable levels.

EGAT's Risk Management Plan for 2014 could successfully reduce risks which might have affected the organization's sustainability down to an acceptable level. EGAT mapped out a corporate communication plan to offer opportunities for communities to get to know and understand its operations, at the same time publicizing various projects and events. Examples were the LED Lamp Design and Making Contest and EGAT's alternative energy development projects, such as the Biomass Power Plant Development Project in Thap Sakae district, Prachuap Khiri Khan province and Mae Moh district, Lampang province. As regards the coal-fired power plant development project, EGAT planned public hearing sessions to listen to opinions of the people and stakeholders of the Khlong Rua Coal Seaport Project. The purpose was to take the expressed opinions and recommendations into consideration for taking preventive and corrective measures, as well as environmental and health impact monitoring measures sustainably suitable for communities' needs. Units responsible for risk management will follow up on the matters and report the risk management results to the Enterprise Risk Management Committee.

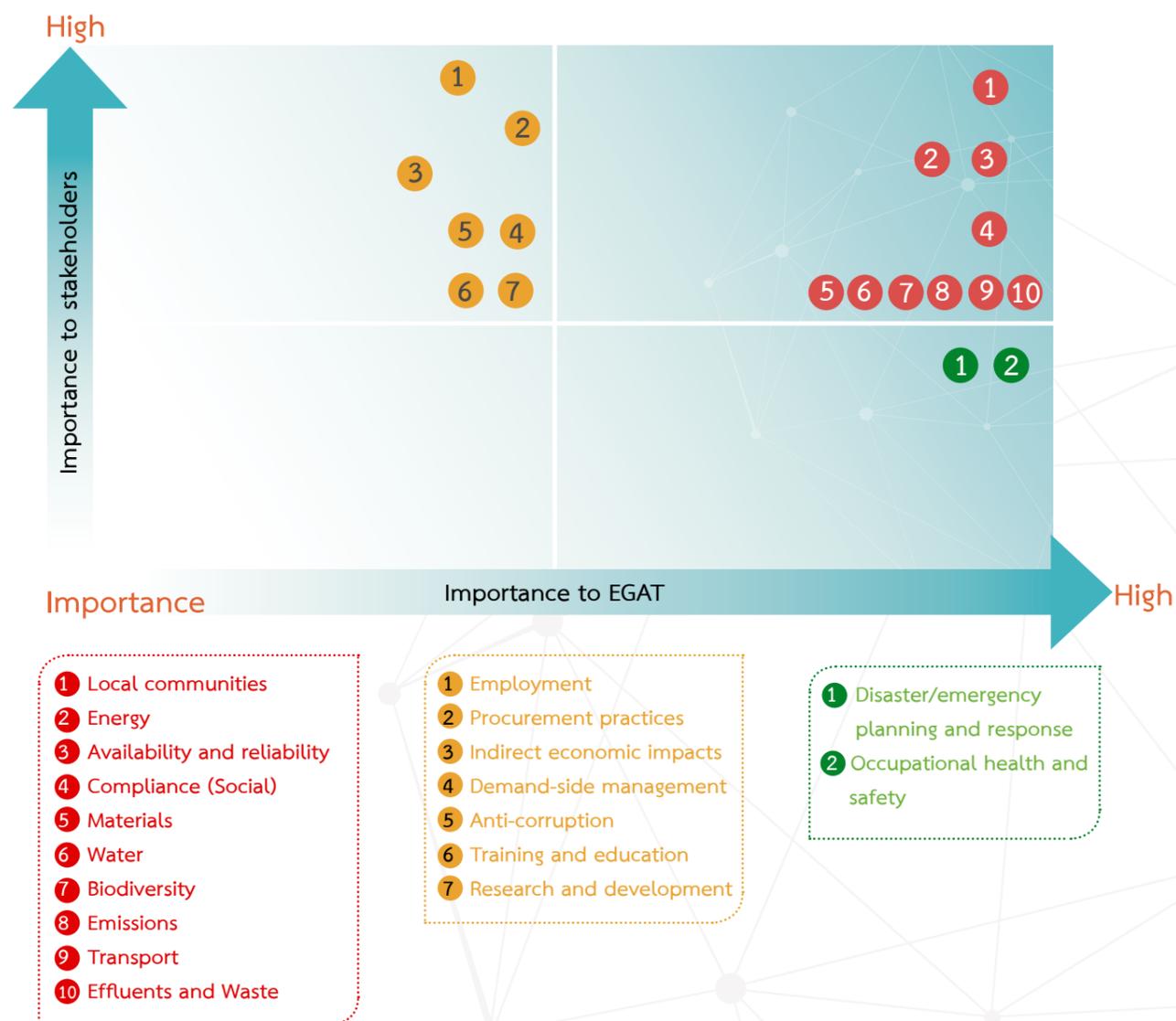
# Materiality Analysis

## The Steps Taken in Order to Define the Specific Content of the Report [G4-18]

EGAT, by the Social Affairs Division, and representatives of the relevant departments held meetings to discuss the preparation of EGAT Sustainability Development Report 2014 to analyze material Aspects, as described below:

- **Identification of Material Aspects** by considering the organization profile and comprehensive impacts of its operation on all stakeholders.
- **Prioritization** by considering economic, social and environmental significance, from the organization's perspectives (based on its vision, strategy and strategic direction) and from stakeholders' perspectives (based on information from stakeholder engagement such as the results of surveys on stakeholders' relationship, satisfaction, and acceptance of EGAT's operations).
- **Validation** EGAT, by the Social Affairs Division, presented the result of the shortlisting of material Aspects to a meeting attended by the representatives of the relevant departments and the organization's executives responsible for sustainability.

## Material Aspects [G4-19]

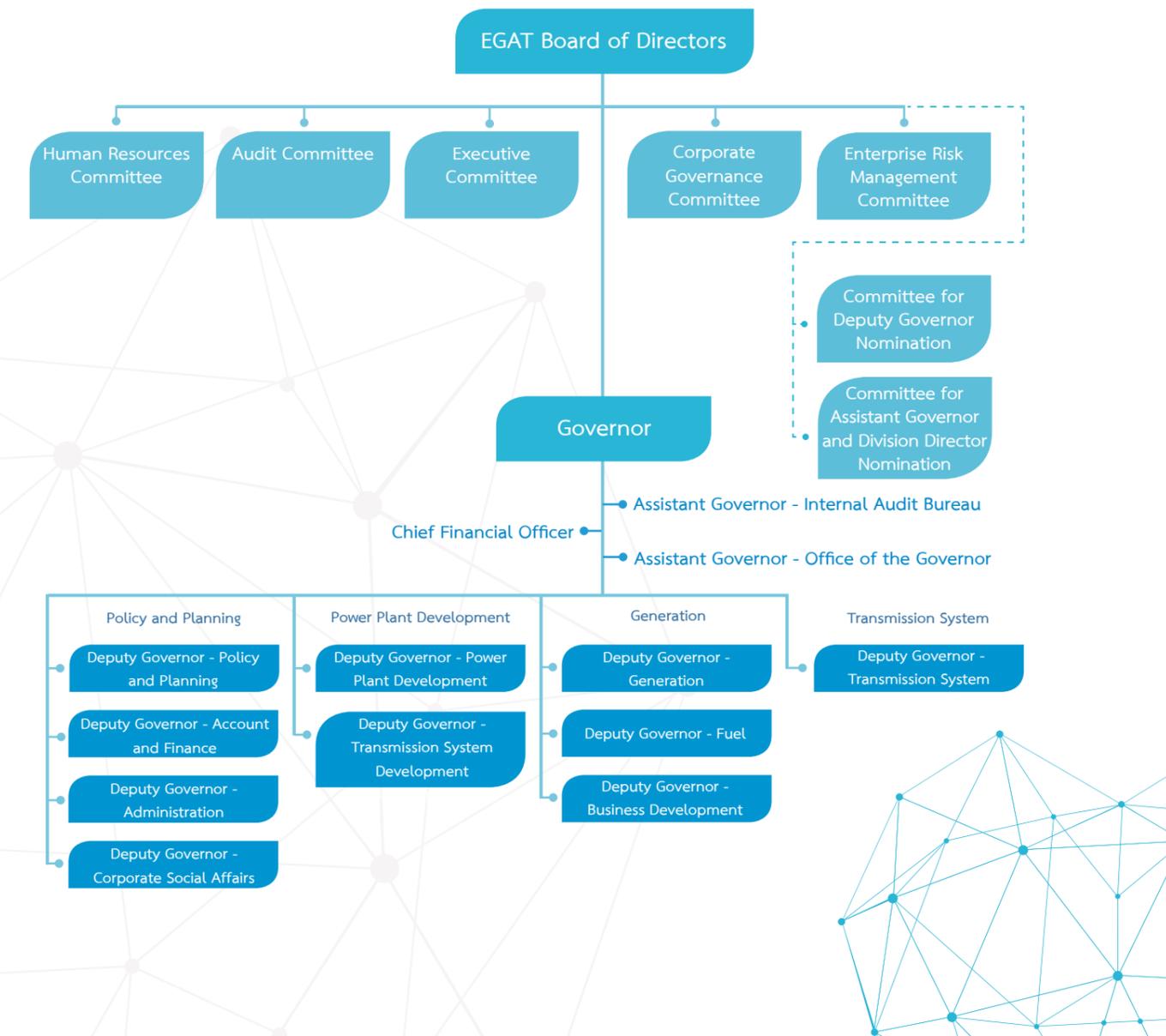


[G4-34]

# Organizational Governance

EGAT attaches great importance to good governance because it is central to ensuring integrity and transparency in all work procedures. A strategic goal - promotion of corporate governance - has therefore been included in the 2014 - 2024 EGAT Corporate Plan, in order to develop the EGAT Governance System throughout the organization. In addition, a "Transparent EGAT Day" event was organized on July 18, 2014, with the objective of demonstrating determination to drive EGAT as an organization with corporate governance in mind, having good supervision and recognizing the importance of anti-corruption measures taken within the organization. The event was attended by a large number of EGAT Directors, executives and employees.

The structure governing EGAT's organizational governance comprises the cabinet-appointed Board of Directors, with a Chairman and Directors, altogether not exceeding ten, and the EGAT Governor as ex officio Director, making the total maximum number 11. The Board's duties include setting policies and supervising the operations with adherence to corporate governance principles. Seven committees are appointed to assist the Board in screening the work and perform other executive functions. Among the committees is the Corporate Governance Committee tasked with making policy recommendations, formulating a master plan and supervising corporate governance and social responsibility undertakings.



EGAT has appointed the Deputy Governor - Corporate Social Affairs as the officer in charge of formulation of corporate social responsibility policies and execution, demand-side management (DSM) and communication with stakeholders.

For segregation of duties, balance, transparency and clarity, the Chairman of the Board of Directors and the Governor are two different persons. However, for smooth linkage between the supervision and execution bodies, the Governor also serves as the Secretary to the Board of Directors

Appointment of the EGAT Board of Directors requires approval by the cabinet. EGAT has transparent procedures and criteria and follow the relevant rules and regulations; e.g., the Regulation of the Ministry of Finance, the Standard Qualifications of State Enterprise Directors and Employee Act, B.E. 2518 and the revisions thereof, the Electricity Generating Authority of Thailand Act, B.E. 2511, and the Office of the Prime Minister's Regulation for the Policy and Governance of State Enterprises B.E. 2557.

To avoid and manage conflict of interest, all EGAT Directors are required to report their holding of other positions; i.e., directorship/top executive positions in other state enterprises/companies, connected transactions (during accounting year 2014), the numbers/values of securities (shares) held and names of companies of the shares (only with the same main industries or core businesses as EGAT) of the securities held. Securities (shares) held in an amount greater than or equal to 10 percent of the number of people with voting right. The information is disclosed in the EGAT Annual Report, both in hard copies and publicized on the EGAT Website.

The Board of Directors, the Governor and his deputies, as well as top executives of the companies in the Group, play important roles in determining and reviewing the vision, mission, strategies, strategic objectives and core values, which is normally done around the third quarter of the year. They also make recommendations and observations which make significant contributions to EGAT. An example was the setting of the vision on the part of being an organization publicly accepted, placing importance to creating correct understanding among the public, controlling procedures with a view to reducing and preventing potential negative impacts, fulfilling or exceeding regulatory and legal requirements in all EGAT work procedures, as well as having procedures for responding to stakeholders' needs or expectations. A review is done every six months.

However, in case of situations with risks or crises, the business line in charge will present the issue of concern to the EGAT Executive Committee for consideration. The matter will then be forwarded to the relevant committee for screening and endorsement before forwarding it to the Board of Director's monthly or quarterly meeting. The Board of Directors will then review the issue, indicate impacts, consider the risks and make a policy as well as follow up on actions taken by the Executive Committee to resolve the problems. Examples were the impact assessments for Khlong Rua Coal Seaport and the Krabi Power Plant Construction Project and the solving of health problems of people in communities around Mae Moh Power Plant and Mae Moh Mine. Such undertakings also render opportunities for study visits, and an exchange of ideas with opinion leaders of various groups.

During 2014, the EGAT Board of Directors, the Governor and his deputies and the top executives of the companies in the Group held a meeting to formulate strategies for EGAT for the period 2015 - 2025. The vision statement "To be a world-class leading organization in the electric power industry" (Global Top Quartile Utility) was maintained. However, adjustment was made to the strategy which now focuses on excellence in all operational areas to match world-class organizations. The strategy, of course, includes corporate social responsibility operations. The aim is to be a National Pride by 2021 and to be internationally recognized for sustainable development by 2025.

The outcome of the strategy formulation meeting is relayed to the Deputy Governors, the Assistant Governors and the Division Directors for preparations of strategic and operational plans for execution. Reports are required to be made to the Board of Directors and the Executive Committee on a quarterly basis.

### Strategic Objectives Catered for Sustainability

Strategic objective	Main goal	Under the Deputy Governor (s)	Example of achievement
<b>Economic</b>			
Enhancing competitiveness of the core business	Transmitting electricity and rendering high quality services	- Deputy Governor - Power Plant Development - Deputy Governor - Transmission System Development - Deputy Governor - Transmission System	- Development of a coal power plant project, construction of Wang Noi Power Plant, Block 4 and Chana Power Plant Block 2 (completed), and North Bangkok Power Plant Block 2 (under construction) - Feasibility studies of 10 projects have been approved and eight are under construction
Growing companies in the Group and related businesses	Growing related businesses and the EGAT Group	- Deputy Governor - Generation - Deputy Governor - Business Development	- Taking operation and maintenance jobs for outside clients
<b>Social and Environment</b>			
Being an organization caring for society, community and the environment	Having social, community and environmental responsibility	- Deputy Governor - Corporate Social Affairs	- Promotion of economical and efficient energy consumption, resulting in EGAT reducing power consumption by 20,726 units, peak demand by 3,476 MW and CO <sub>2</sub> emissions by 12 million tons

The Board of Directors conducts self-assessment once a year, using two types of assessment: one as a group and the other individually. Upon completion of the assessment, the results are reported officially to the Board of Directors Meeting without the presence of management. The purpose is to consider the results of the Board's self-assessment, performance, problems encountered in the operation and approaches to solutions and to achieving concrete effectiveness of the Board's operations. This is in line with the governance guidance on independence of the Board of Directors as outlined in the Principles and Guidelines for Good Governance of the State Enterprise Policy Office, which calls for independent directors from the outside to occasionally hold meetings without the presence of ex officio directors.

Remunerations for the Board of Directors are paid in accordance with achievement of economic, environmental and social targets based on the policy governing remunerations approved by the cabinet. Directors who are assigned to additional responsibilities; e.g., as members of the Audit Committee, the Executive Committee, or the Corporate Governance Committee, are eligible for additional remuneration at a rate also approved by the cabinet. The Chairman of the Board of Directors is eligible for meeting allowances at a rate 25% higher than that of the directors. The Vice Chairman's meeting allowance is 12.5% higher than that of the directors. Directors who hold positions in more than one committee are entitled to meeting allowances for only two committees, each not exceeding once a month. Top

executives holding a position in the committees are not remunerated for such position. Remuneration consultants do not have a role in determination of remunerations and operate independently from EGAT executives.

Apart from sourcing training courses and seminars from various institutes and proposing them to the Board of Directors to find time to attend, EGAT organizes other activities such as visits to EGAT operation sites and study visits to places both within and outside the country to develop and enhance knowledge and understanding of the members of the Board in social, environmental and economic areas. Presentations on the vision, mission, economic, social and environmental strategies as well as information about internal work systems and relevant laws are organized to familiarize new directors with the organization's business. A director's manual and other information necessary for performing duties as a director are also delivered.

### Organizational Values, Professional Conducts and Ethics [G4-56]

The Chairman of the Board of Directors has signed EGAT Regulation No. 346/2010 on Governance which, in Section 6, specifies ethics and professional conducts to make EGAT operations transparent and moral, with social and environmental responsibility in mind. The Board of Directors, executives and all employees are required to strictly observe the specified ethics and professional conducts. This is reinforced by a mechanism and an operational system as outlined in EGAT Regulation No. 347/2000 on the Code of Ethics for the EGAT Board of Directors, Executives and Employees.

As regards the corporate culture which serves as a solid foundation for the organization, the Board of Directors and executives, after a review, are of an opinion that FIRM-C should continue to be used. The Human Resources Division, which is responsible for this area, has therefore prepared strategic and operational plans for instilling the values and corporate culture, as well as success indicators. A Value Manual was also prepared, with the focus for 2014 on responsibility and accountability for own self, society and the country. This has been made a KPI for employees as well. Several forms of campaigns were organized to make it easy to remember and correctly practice.



[G4-DMA, G4-SO3]

## Anti-corruption

EGAT is a transparent organization, managed with good governance principles, and is open to monitoring and auditing. It has consistently and seriously attached importance to anti-corruption. An EGAT Corruption Prevention and Suppression Committee has been appointed, chaired by the Deputy Governor - Administration. The Committee is tasked with supervising corruption prevention and suppression work, with the emphasis placed on prevention rather than suppression. An EGAT Anti-Corruption Plan, which is in line with the strategic goals of EGAT's Corporate Plan (2014 - 2024), has been put in place. The Plan has also been designed in response to the National Strategic Plan for the Prevention and Suppression of Corruption Phase 1: Instilling Consciousness, Value, Morality, and Ethics, Building Discipline Among All Parties and Making Concerted Efforts to Fight Corruption.

To deter corruption effectively throughout the organization, EGAT has taken actions as follows:

- The target letter for the 2014 State Enterprise Performance Appraisal for EGAT has a KPI on good corporate governance and anti-corruption. All business lines bear this responsibility.
- Seven fraud risks were identified:
  - F1 Fraud Policy
  - F2 Conflict of Interest
  - F3 Corruption
  - F4 Non-Compliance
  - F5 Reporting Manipulate
  - F6 Misappropriation of Assets
  - F7 Information Technology Fraud

In 2014, all the 10 command lines (or all major operations), meaning 100%, carried out risk assessment and prepare a plan or preventive and corrective measures.

- The Internal Audit Bureau, which encourages assessment of fraud risk assessment, organized a lecture session on "Risk Management and Internal Audit Approaches Based on COSO 2013" and a workshop on "Fraud Risk Assessment" on November 14, 2014. The participants were 220 risk management and internal audit heads of all the 10 business lines. The objective was to provide knowledge and understanding of risk management and internal audit in principles and to enable them to do meaningful self-assessment of fraud risks throughout the entire organization.
- Fraud risk assessment was conducted at the divisional and business line levels.
- On July 18, 2014, the Office of the Governor organized a "Transparent EGAT Day" event, with the objective of demonstrating determination to drive EGAT as an organization with corporate governance in mind, having good supervision, and recognizing the importance of anti-corruption measures taken within the organization. A ceremony was held for signing and presentation of an EGAT Anti-Corruption Policy by the Board of Directors and the Governor. Awards were also presented to model persons and projects for 2013. In addition, there was a panel discussion on "Offensive and Defensive Fronts in the Anti-Corruption Battle" with panelists from outside agencies dealing with anti-corruption (a former NACC member and the Chairman of the Anti-Corruption Organization of Thailand).
- Communication with employees on compliance and ethical practices via meetings and other channels, such as manuals, brochures, e-Learning and the good corporate governance website.
- EGAT's Strategy, Risk Management and Internal Control Committee approved the adoption of the anti-corruption risk factor as a new organization-level risk factor from 2015 onwards.

### Command Lines, Fraud Risk Assessment and Risk Management Measures

Command line	Nature of work	Potential fraud risks							Risk management measures
		F1	F2	F3	F4	F5	F6	F7	
Policy and planning	Generation capacity planning; IT		✓	✓	✓				There are designated persons for review of non-compliance. If non-compliance is found, a probing and penalizing committee needs to be appointed. A report on conflict of interest needs to be prepared. Executives have to see to it that procurement is carried out in compliance and there is a reviewing committee. In case there are complaints, a probing and penalizing committee needs to be appointed.
Power plant development	New power plant construction						✓		Executives must ensure that proper procedures are strictly followed by operation persons. In case there are complaints, a probing and penalizing committee needs to be appointed.
Transmission system development	Transmission lines and high-voltage substation construction		✓					✓	Executives must ensure that persons responsible strictly follow procedures. Persons responsible have to be required to prepare control registrations for systematic and constant storage and examination.
Fuel	Procurement of fuel for electricity generation	✓	✓	✓	✓	✓	✓	✓	Top executives must attach importance to good governance and be role models. Executives and employees must observe the code of ethics. A working group on governance, ethics, values and culture should be appointed within the business line to prepare a governance plan, deter frauds and drive the business. There should be communication. There should be a reviewing committee for IT risks. There should be policy formulation, registrations and reviewing committees. For all risk factors, in case there are complaints, a probing and penalizing committee needs to be appointed.
Electricity Generation	Electricity Generation	✓	✓	✓	✓	✓	✓	✓	There should be communication. There should be a reviewing committee for IT risks. There should be policy formulation, registrations and reviewing committees. For all risk factors, in case there are complaints, a probing and penalizing committee needs to be appointed.
Transmission system	Transmitting electricity into the grid; make electricity sale and purchase contracts							✓	Executives must ensure that operation persons follow strict procedures. In case there are complaints, a probing and penalizing committee needs to be appointed.
Business development	Operation and Maintenance				✓				Executives must strictly enforce the control measures to prevent intentional violations/non-compliance. A probing and penalizing committee must be appointed in case of negligence affecting EGAT.
Account and Finance	Finance and accounting, and budgeting			✓	✓			✓	Executives must set a policy to follow in accordance with EGAT regulations. Proper measures must be taken to control money receiving in accordance with regulations and orders. Control and preventive measures must be taken. Control registrations must be put in place as well as annual counting. There must be a good supervision system. There must be ethical training to instill consciousness among employees. The cash management system should be used with criteria and operation guidelines clearly stipulated. In case there are complaints, a probing and penalizing committee needs to be appointed.
Administration	HR, services, transport, and procurement	✓	✓	✓	✓	✓	✓	✓	Measures similar to the Fuel business line
Corporate Social Affairs	Promotion of CSR operations		✓		✓			✓	A report on conflict of interest must be prepared, with a reviewing committee in place. Reshuffles should take place at appropriate intervals. Non-compliance should be reviewed. Control registrations and asset reports as well as reports of assets moving in and out must be prepared. In case there are complaints, a probing and penalizing committee needs to be appointed.

## Stakeholder Engagement

EGAT has always attached great importance to consideration of concerns, needs and expectations of all groups of stakeholders to bring about appropriate balances among all major stakeholders. A systematic review and improvement were made for the opinion taking procedure, which is done online through EGAT-VOC/Application. The system allows analyses, prioritization and categorization of stakeholders as well as grouping of opinions into complaints, requirements, expectations and recommendations to formulate strategies for use in system and work procedure improvement. The purpose is to strengthen the bonds, create satisfaction and generate innovations as well as develop opportunities for new businesses.

Meetings were also held to listen to opinions of people in communities around the new power plant development project in the South to do public scoping and determine the approach for environmental and health assessment. Surveys were conducted to determine the relationships between communities and dams/hydropower plants, relationships between stakeholders and EGAT, stakeholders' satisfaction with, and acceptance for, EGAT's operations, and overall satisfaction of general electricity customers and operation and maintenance customers.



Major stakeholders at organization level were grouped based on ISO 26000 criteria. Individuals, groups of individuals and agencies impacted by EGAT operations were divided into five groups plus parties in the supply chain (or suppliers). Actions were taken in accordance with the plan to respond to each group systematically. Details of stakeholder needs and EGAT's response mechanisms are shown in the table below:

Stakeholder groups	Needs and expectations	Response mechanisms	Methods of relationship building/type of media	Frequency	Communication	
					One-way	Two-way
A) Regulatory bodies consisting of - The Ministry of Energy	<ul style="list-style-type: none"> <li>Conforms with policies</li> <li>Renders good cooperation</li> </ul>	<ul style="list-style-type: none"> <li>Provides sufficient electricity.</li> <li>Security of the power system</li> <li>Fair electricity price</li> <li>Having renewable and clean technologies.</li> </ul>	Meetings/Seminars	At least once a month		✓
			Activities carried out in line with the Government's policies and requirements of relevant government agencies.	According to occasion		✓
			Formal and informal meetings	As planned/ According to occasion		✓
			Annual report	Yearly	✓	
- The Ministry of Finance (MOF)		<ul style="list-style-type: none"> <li>Remittances of revenue to the State</li> <li>Management efficiency enhancement</li> </ul>	Meetings/Seminars	At least once a month		✓
			Memos/Reports	According to occasion		✓
			Annual report	Yearly	✓	
- The Energy Regulatory Commission (ERC)		<ul style="list-style-type: none"> <li>Acquisition of adequate electricity</li> <li>Having a Smart Grid Roadmap for Thailand.</li> </ul>	Website	Daily	✓	
			Joint meetings/Seminars among EGAT, PEA and MEA	As planned		✓

Stakeholder groups	Needs and expectations	Response mechanisms	Methods of relationship building/type of media	Frequency	Communication	
					One-way	Two-way
B) The society in general	<ul style="list-style-type: none"> <li>Takes responsibility for the country and society, with emphasis on national development, well-being and social benefits.</li> </ul>	<ul style="list-style-type: none"> <li>The emphasis of every procedure on CSR in process.</li> <li>ISO 26000 used as the basis for operation</li> <li>Efficient energy consumption</li> <li>Energy conservation</li> <li>Volunteering spirit initiatives</li> </ul>	Website	Daily	✓	
			Call Center EGAT 1416	Daily		✓
			EGAT Information Center at EGAT Headquarters (prinfo.egat.co.th)	Daily	✓	✓
			Public Relations units both at the Headquarters and in the regions	Daily		✓
C) Communities living around the power plants and along the transmission line routes.	<ul style="list-style-type: none"> <li>Operates with minimum impact on safety and the environment necessary for daily living.</li> <li>Provides suitable and sustainable support addressing communities' requirements.</li> </ul>	<ul style="list-style-type: none"> <li>Community safety in life and property.</li> <li>Joint efforts in developing systematic and sustainably beneficial community relations contributing to economic strength of communities.</li> <li>Local employment</li> </ul>	The board showing the quality of air around a power plant	Daily	✓	
			Annual emergency exercises	As planned		✓
			Meetings of the Committee for Social, Community and Environmental Coordination	As planned		✓
			EGAT's community relations units	Daily		✓
			Activities which the management organizes jointly with communities around power plants.	As planned		✓
			Inviting community representatives to pay a visit to power plants and EGAT power projects.	As planned/ According to occasion		✓
			Website	Daily	✓	
			Print media	As planned/ Varying with activities	✓	
			Organizing social and environmental project activities (e.g., the Biological Way of Life and the Eyeglasses for the Poor or Wankaew projects and the mobile medical teams)	As planned/ According to occasion		✓
			D) EGAT employees	<ul style="list-style-type: none"> <li>Corporate image</li> <li>Roles of executives and supervisors</li> <li>Job profile and work coordination</li> <li>Quality of life</li> <li>Performance and remuneration management; internal management</li> </ul>	<ul style="list-style-type: none"> <li>Managing employee engagement corresponding to needs and expectations.</li> </ul>	Meetings of the EGAT Executive Committee
Meetings of the Relations Affairs Committee	At least once a month					✓
Meetings of the Committee for Departmental Relationship Building	At least once a month					✓
Meetings of the Committee for Internal Coordination	At least once a month					✓
Meetings/Teleconferences	According to occasion					✓
Print media releases/Email/EGAT TV	As planned/ Varying with activities	✓				
Meetings between Executives and Employees	As planned/ According to occasion					✓
Seminars/Meetings	As planned/ Varying with activities					✓
Annual Quality Award Night	As planned					✓
E) The public, academicians and non-governmental organizations (NGO's)	<ul style="list-style-type: none"> <li>Sufficient supply of electricity</li> <li>Security and safety</li> <li>Affordable price electricity</li> <li>Minimum environmental impact</li> <li>Openness and Transparency</li> </ul>	<ul style="list-style-type: none"> <li>Being a good corporate citizen.</li> <li>Strengthening Demand-Side Management (DSM)</li> <li>GHG emission reduction</li> </ul>				EGAT News, newspapers, radio, television
			The Survey	As planned		✓
			Call Center	Daily		✓
			Seminars Meetings	As planned/ According to occasion		✓
			Letters/Email	As planned/ According to occasion	✓	
			Website	Daily	✓	
			Visits	As planned/ According to occasion		✓

Management of Relationships between EGAT and Key Suppliers in the Supply Chain

Stakeholder	Role	EGAT's needs and expectations	Methods of relationship building/type of media	Frequency	Communication	
					One-way	Two-way
- 4,822 equipment manufacturers	• Delivery of equipment and services	• Delivery of equipment of specified quality and as scheduled	EGAT's procurement procedures	Varying with activities		✓
			Meetings/Seminars	As planned/Varying with activities		✓
			Telephone	Varying with activities		✓
			Letters/Fax/Email	Varying with activities	✓	
			Website	Everyday	✓	
- PTT Public Company Limited	• Supplying fuel (natural gas, fuel oil and diesel)	<ul style="list-style-type: none"> <li>Delivery of fuel of specified quality and quantity</li> <li>Giving an advance notice in a reasonable time in case of inability to deliver fuel as planned</li> <li>Cooperation in emergency fuel acquisition</li> </ul>	Meetings	As planned/Varying with activities		✓
			Telephone	Varying with activities		✓
			Letters/Fax/Email	Varying with activities	✓	
			Website	Everyday	✓	
			- 70 IPP's and SPP's	• Generating electricity for integrating into EGAT's transmission systems	<ul style="list-style-type: none"> <li>Power plant readiness as planned</li> <li>Increasing or decreasing electricity generating as instructed by EGAT's control centers.</li> </ul>	Coordination through control centers
Meetings/Seminars	As planned/Varying with activities					✓
Telephone	Varying with activities					✓
Letters/Fax/Email	Varying with activities	✓				
Website	Everyday	✓				



“ Bhumibol Dam has given us people living upstream of the dam a very good stuff - Arabica coffee seeds for us to grow and make Omkoi blend ground coffee for sale. They said to us that as long as the dam still uses water from upstream people, it will never abandon us. ”

**Woranut Chaita (far right)**  
The representative of the Bhumibol Dam Upstream Communities, Omkoi district, Chiang Mai province

# We think.



Thinking about more alternative fuels to secure the power supply system

At EGAT we are committed to the continual review of power development plan, the selection of alternative fuels for electricity generation, the balance of electricity prices, and the availability of power supply system via a network of reliable transmission system stretching over all regions across the country.

## Economic Performance

### Indirect Economic Impacts [G4-DMA, G4-EC7, G4-EC8]

EGAT's main missions are ensuring electricity security and taking care of communities in the vicinity of its operating locations which include the Headquarters, dams, power plants and transmission operating units, as well as communities along the transmission lines throughout the country. EGAT has been promoting, supporting, and improving the quality of life of people in communities, particularly in economic areas for better being and for mutually supportive coexistence.

EGAT's policy is to support communities around its premises both in the central areas and in the regions. Focus is on participation of communities, government agencies and local administrations, using the ISO 26000 approach. Community needs surveys are conducted before commencing projects. This is done by using various methods, such as community visits, dialogues, and village meetings. In addition, there are follow-up activities after project implementation in order to gather information for improvement to ensure that projects are appropriate and responsive to community requirements, which will lead to sustainable development.

In 2014, EGAT supported and implemented several infrastructure development projects, occupational development projects as well as other infrastructure projects for communities around its premises; e.g.:

#### The Projects to Improve Public Utilities for Communities around Mae Moh Power Plant, Mae Moh District, Lampang Province

EGAT provided financial, personnel and equipment support to 11 projects (as individually required), with budgets totaling 8,000,000 Baht. Examples of the projects are construction of culverts, road repairs, irrigation systems for farming, reservoir dredging, PVC pipe fixing and changing for mountain water supply systems and water supply systems for farming.

#### Artesian Well Drilling in Pakasai Subdistrict, Nuea Khlong District, Krabi Province

EGAT drilled four artesian well, each 150 meters deep, using large, sophisticated rigs. Each well took 20 days for drilling. The work was for solving consumption water shortage problems which happen every year. Water from the wells is managed and distributed to households by the Pakasai Subdistrict Administrative Organization.

#### Repair of Uttamanusorn Bridge in SangKhla Buri District, Kanchanaburi Province

EGAT allotted a budget of 4,000,000 Baht as financial support for the repair to enable local people to travel conveniently. The repair work has been completed and the bridge was reopened for use on October 18, 2014.

#### Construction of an Inpatient Building at Bang Pakong Hospital, Chachoengsao Province

To mark the 40<sup>th</sup> anniversary of its establishment, EGAT, in 2010, donated 46,400,000 Baht for construction of a 90-bed inpatient building to enable Bang Pakong Hospital to render adequate service to local people and to make it convenient for local people as they do not have to travel to a medical facility further away. The donation was in response to the requirement of local people for EGAT to provide medical support. The construction has been completed and the building was officially opened on September 7, 2014.



[G4-EC7, G4-EC8]

### The “12<sup>th</sup> Mae Moh Festival 2014”

EGAT organized the “Mae Moh Festival” at EGAT Botanical Garden in Mae Moh Mine, Mae Moh district, Lampang province, during November 28 - 30, 2014. The objective was to stimulate economic activities so that businesses in the North, such as hotels, restaurants, and travel and souvenir businesses as well as community product businesses could generate more revenues. The fair was an opportunity offered to the general public to appreciate fresh air. It also featured sales of community products, cultural shows, and an exhibition of electricity generating as well as recreational activities. An estimated 310,900 people attended the event.



### The Model Sufficiency Economy Community Project under the Biological Way of Life for Sustainable Development Project

EGAT has adopted Her Majesty the Queen's instruction and His Majesty the King's sufficiency economy concept in implementing this project since 1999. Under the project, the use of EM (Effective Micro-organisms) is promoted as a substitute for chemicals in daily life in four areas: farming, fisheries, livestock raising and environmental conservation. The practice has become popular and networks of users have been established in communities around EGAT's operation areas and along transmission lines. This has led to establishment of 21 model communities which serve as learning centers for disseminating knowledge bodies via activities, demonstrations and various forms of exhibitions to educate the public. EGAT also signed a cooperation memorandum with the Vocational Education Commission (VEC) to expand the project to 92 Colleges of Agriculture and Technology, Fisheries Colleges, Industrial and Community Education Colleges and Technology and Management Colleges throughout the country.



“I'm glad EGAT has introduced people of Sai Noi Community to the use of EM as a substitute for chemical fertilizer. EGAT also taught us to make organic composed fertilizer for use in our *Thanyaphum*, *Pinkaset* and *Riceberry* rice fields. Nowadays, many people have turned to consuming chemical-free foods, despite their higher prices. The quantity of rice we grow each year therefore cannot meet the demand. What's important is it makes us healthier because we only use organic composed fertilizer in our rice fields. That was why we were selected as one of EGAT's model sufficiency economy communities.”

Sirat Soiklom

Chairperson of the Biological Way of Life for Sustainable Development Project Group of Sai Noi Community, Sai Noi district, Nonthaburi Province

## Procurement Practices

EGAT's procurement is done in an open and transparent manner, allowing fair competition based principally on bidders' qualifications and competence. It also strictly follows laws and government regulations, such as those prescribed by the Comptroller General's Department and the Office of the National Anti-Corruption Commission. In addition, it is subject to stipulated operational framework such as EGAT Regulation Governing Procurement B.E. 2546, and Procurement Officers' Ethics B.E. 2543, and auditing of procurement of all units by EGAT's Internal Audit Bureau.

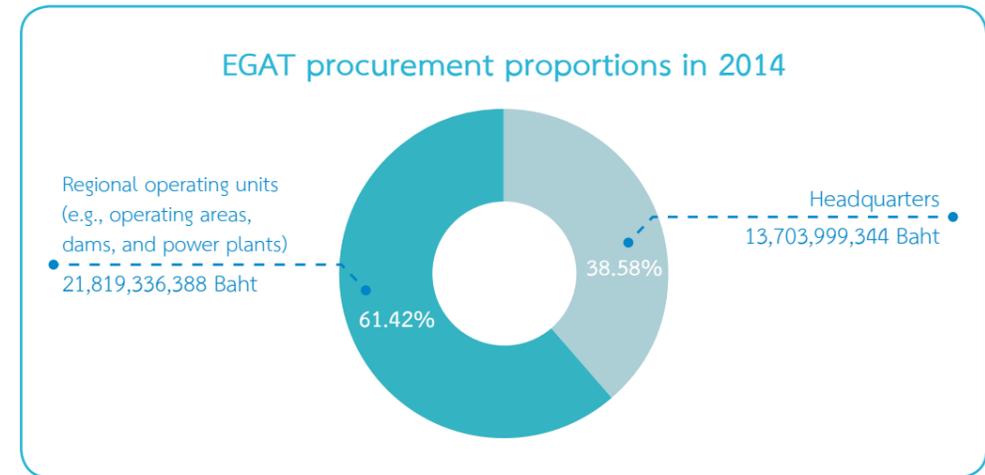
The focus in 2014 was placed on promotion of social responsibility in the supply chain. Business operations who are parties to contracts signed with EGAT are encouraged by various means to operate with good corporate governance, details as follows;

**Meetings with service contractors** and three seminars with 140 participants who were operators in general purchasing/hiring businesses were held. Lectures were given on EGAT procurement practices, such as the Electronic Government Procurement (e-GP). There were also Q&A sessions and recommendations were made by the business operators which have been used in improving procurement efficiency as expected by stakeholders.

**Awarding outstanding business operators** The selection of outstanding business operators was based on good corporate governance performance, having received a minimum of 10 EGAT purchasing orders, and on-time deliveries. Eight business operators were awarded; namely, Rockworth Public Company Limited, Thepparit Trade and Design, Mettler-Toledo (Thailand) Co., Ltd., CW Equipment Co., Ltd., A.Loha Charoen Ltd., Partnership, Chira Charoen Hardware Co., Ltd., Measuretronix Ltd., and Metro Systems Corporation Public Company Limited.

**Assessment and preparation of a database of business operators violating the principles of good corporate governance** EGAT requests trading partners to abide by contract terms and the principles of good corporate governance which comprise the rule of law, accountability, participation, responsibility, cost-effectiveness and morality. Violators who forged documents, impeded fair bidding, failed to make a contract within the specified time frame after having been selected without good reasons and failed to fulfill contract requirements are classified as work abandoners and are named on the list of work abandoners in the database. Business operators found to have violated human rights will be asked to make corrections. Failure to make corrections will result in EGAT taking actions deemed appropriate. 30 business operators were found to have violated the rule of law, responsibility and morality.

EGAT also has a policy to promote local procurement. As an example, public disaster relief budgets were allocated to its regional units all over the country to purchase blankets from local makers to distribute income to local communities in order to help communities around EGAT units suffering from cold spells, such as Bhumibol Dam, Tak province; Sirikit Dam, Uttaradit province; Kanchanaburi province; and the Northeastern Region Operation Division, Khon Kaen province.



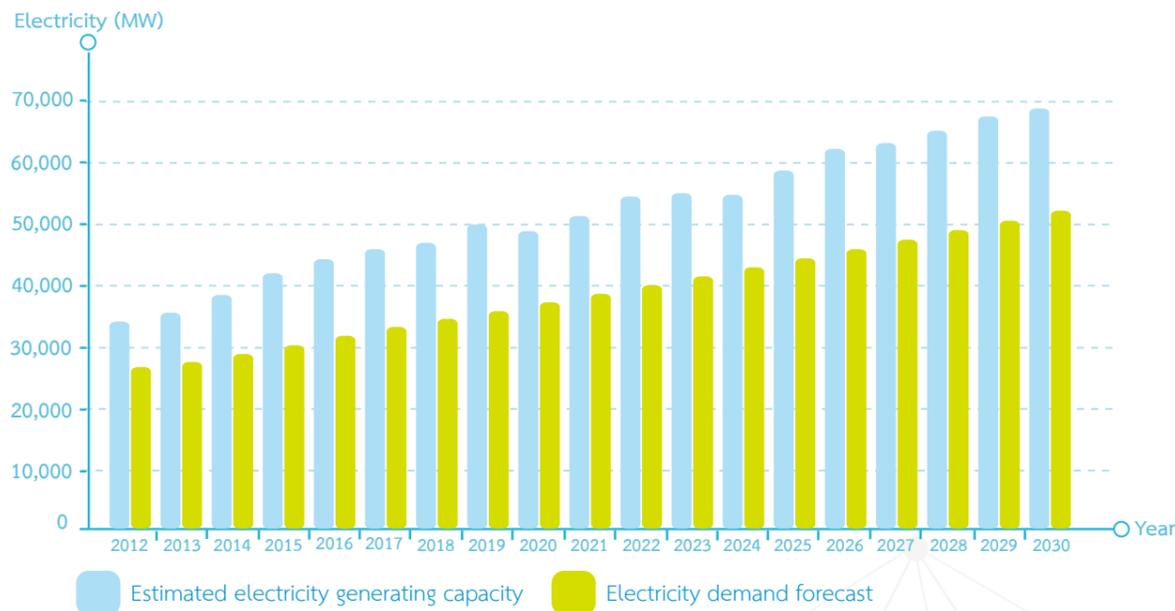
## Green Procurement

Acting as a consumer with concern over the environment is one way of demonstrating social responsibility. EGAT consequently issued Notification Number 22/2009 on Green Procurement Policy, encouraging all units to recognize the importance and promote the use of environmentally friendly products and services; e.g., toilet paper, facial tissues, eco fiber computer paper, hard cover ring binders, marker pens, correction fluid, dry cell batteries and printer ink.



## Electricity Availability and Reliability

EGAT places importance to long-term electricity generating capacity development. Preparations have been made to cope with potential risks in both generating and transmission, as well as power plant and transmission system construction as outlined in the Power Development Plan: PDP 2010 (Third Revision) approved by the cabinet on June 19, 2012, where the estimated electricity generating capacity and the demand forecast are as follows:



**Note:** The values of electricity demand forecast is based on data approved by the Electricity Demand Forecast Sub-Committee on May 30, 2012, with the following assumptions:

- Forecast of the Thai economic trends, GDP and GRP of the National Economic and Social Development Board (November 29, 2011) which already reflected the government's economic stimulation measures and the impacts of the flooding in late 2011 were used.
- Data on efficiency enhancement and electricity consumption reduction consistent with the Ministry of Energy's Thailand 20-Year Energy Efficiency Development Plan (2011 - 2030) were used.

## Electricity System Development

### New Power Plant Projects

EGAT is implementing new power plant construction projects to satisfy the demand for electricity which is growing along with the country's economic and industrial growth and to enhance the security and stability of the electricity system. The combined capacity of the power plants constructed during 2015 - 2019 is 2,748 MW, details as follows:

Power plant	Location	Fuel	Contracted capacity	Scheduled completion date
Bangkok Power Plant, Block 2	Nonthaburi province	Natural gas	848	January 2016
Lam Ta Khong Pumped Storage Power Plant, Units 3 - 4	Nakhon Ratchasima province	Hydropower	500	February 2018
Mae Moh Power Plant Units 4 - 7 Replacement Power Plant	Lampang province	Lignite	600	November 2018
Krabi coal-fired power plant	Krabi province	Coal	800	December 2019

### Power Purchase Projects

- **Power Purchase from IPP's** During 2015-2024, there are eight projects with a total capacity of 8,070 MW. These projects are either under construction or under the IPP Purchase Project Pursuant to the 2012 Purchase Announcement, acknowledged by the Energy Regulatory Commission (ERC) on July 16, 2013 and approved by the Minister of Energy, as endorsed by the ERC, on November 13, 2013.
- **Power Purchase from SPP's** During 2015-2019, the combined capacity of projects to be integrated into EGAT's grid totals 5,598 MW, 3,600 MW of which is the cogeneration system in the category of firm power purchase agreements, 60 MW of which is the cogeneration system in the category of non-firm power purchase agreements and 1,938 MW of which is generated from renewable energy.
- **Power Purchase from Neighboring Countries** Power is now purchased under six projects, with a combined contracted capacity of 2,404.6 MW. Six more projects will be added during 2015 - 2019 and the combined contracted capacity will be brought up to 3,316 MW.

### Transmission Systems Construction and Improvement

EGAT has improved and expanded its transmission systems to enhance the capability and security of power distribution. Projects approved and being implemented include the Greater Bangkok Area Phase 2 (GBAS2), the Transmission System Development for Power Purchase from Hongsa Lignite Thermal Power Plant Project (HSA), the Tha Tako Substation Renovation Project, Projects approved but not yet implemented include the Transmission System for Power purchase from My-Kok Thermal Power Plant (MKTP) Project, the Transmission System Development in the area of Loei, Nongbua Lamphu and Khon Kaen provinces for Power Purchase from Lao PDR Project (LNKP), and the Transmission System Improvement Project in Eastern Region to Enhance System Security (TIPE).

EGAT also attaches importance to improvement and maintenance of transmission equipment to ensure constant availability; e.g., cleaning of 500 kV insulators of transmission lines passing areas prone to short circuits due to impurities such as pollution, smoke and bird droppings. Exercises on the restoration plans are regularly carried out to ensure readiness when an outage occurs. Studies of the power systems are conducted to map out construction plans to respond to systems requirements. Undertakings in other area are also conducted to minimize problems of the transmission network; e.g., prevention of human errors, reducing malfunctioning of substations caused by animals, educating people in nearby community about potential hazards and damage caused by the transmission system in order to minimize problems and damage caused by communities. Complaints from power distribution stakeholders are accepted and seriously responded to. As a result, EGAT's transmission systems have been able to distribute electricity continuously, with stability and reliability, and also with good qualities in terms of both voltage and frequency. EGAT participated in the index benchmarking of ITOMS (International Transmission Operations and Maintenance Study) to obtain data for improvement and to find performance indices appropriate for the transmission business.

## Demand-Side Management

Demand-side management (DSM) has been the measures adopted by EGAT, since 1993, to encourage the Thai electricity users countrywide to change their behaviors or their patterns of daily electricity usage in effort to reduce the country's overall electric energy consumption, the imports of fuel for electricity generation, and the emissions of carbon dioxide into the atmosphere.

Throughout its 21 years of DSM implementation, EGAT has incorporated the DSM concepts and measures into the organization's strategic directions as described below:

**Market Transformation** EGAT has phenomenally promoted and transformed the Thai energy-efficient electrical appliance markets, based on the concept of encouraging the participation among manufacturers and turning competitors into trading partners. The efforts have led to the development of energy-saving electrical appliance markets. As a result, the active promotion and stimulation campaigns and the increasing customers' demand have successfully induced the market mechanism to work toward fair competition.

**Innovation Leadership** EGAT has promoted the conduct of R&D activities among electrical appliance manufacturers nationwide while encouraging them to consistently produce energy-efficient ones.

**Attitude Creation** EGAT has placed an importance upon the changing of consumers' attitudes and behaviors as regards energy conservation, to be in line with the Energy Conservation Program and the Energy Conservation Promotion Act, B.E. 2535. Various forms of energy conservation incentives and campaigns have been initiated. Energy conservation knowledge has been disseminated through public and personal media in the household, businesses and industrial sectors. Relationships with network of alliance and stakeholders have also been fostered.

In addition, EGAT has come up with a three-pronged campaign to promote and support the economical and efficient usage of electricity, with details as follows:

### Energy Efficient Electrical Appliances

Thai electricity users nationwide have been actively encouraged and promoted by EGAT to select the high efficiency electrical appliances bearing the energy efficient No. 5 label. During 2014, the No.5 labels were given to two additional electrical appliance products which included the microwave oven and the induction cooking stove. EGAT also signed agreements with manufacturers of two more products – the electric kettle and the television set - for them to work on the efficiency improvement to be eligible for bearing the No. 5 label in 2015. Since the commencement of this program in 1993, 296 alliance manufacturers have participated in the program and a total of 268,112,240 labels have been distributed to 24 products in the categories of lighting equipment, cooling equipment, household appliances, among others.

EGAT has also actively promoted and supported the selection of light emitting diode (LED) lamps for use as substitutes for other lower efficiency electric light bulbs. The No. 5 labels have been attached to all types of LED lamps. Since October 2014, numerous sales promotion campaigns have been launched for the sale of high efficiency LED lamps with warranty in EGAT-designed packages at lower-than-market prices.



## Energy Efficient Office Buildings

EGAT also focuses on launching campaigns to make large-scale end users including businesses and manufacturers recognize the need to pay attention to the energy efficient usage in both old and new buildings. Pilot projects have been launched for demonstration. This is done through load management and demand response measures, in cooperation with the business and manufacturing sectors in order to reduce electricity usage, either during the peak load periods or during the stoppage of natural gas distribution, with incentives given for participation. In 2014, EGAT, in cooperation with the Office of the Energy Regulatory Commission (OERC) and its two distributing authorities, namely MEA and PEA, launched a demand response campaign involving some business operators in southern provinces in preparation for the forthcoming shortage crisis due to the Myanmar's gas pipeline system maintenance in June 2014. The campaign substantially resulted in the reduction of electricity consumption by 810,322 kWh.

In addition, a pilot project was carried out to replace 5,175 conventional street lamps to the innovative LED lamps at 21 locations of EGAT's power plants, premises and dams. A requirement was for a bid-winning energy service company or ESCO to procure, install and maintain the lamps. It has been expected that the project will result in the saving of 6,450 kWh of electricity and the reduction of CO<sub>2</sub> emissions of 3,300 tons per year.

### Energy Efficient Behavior

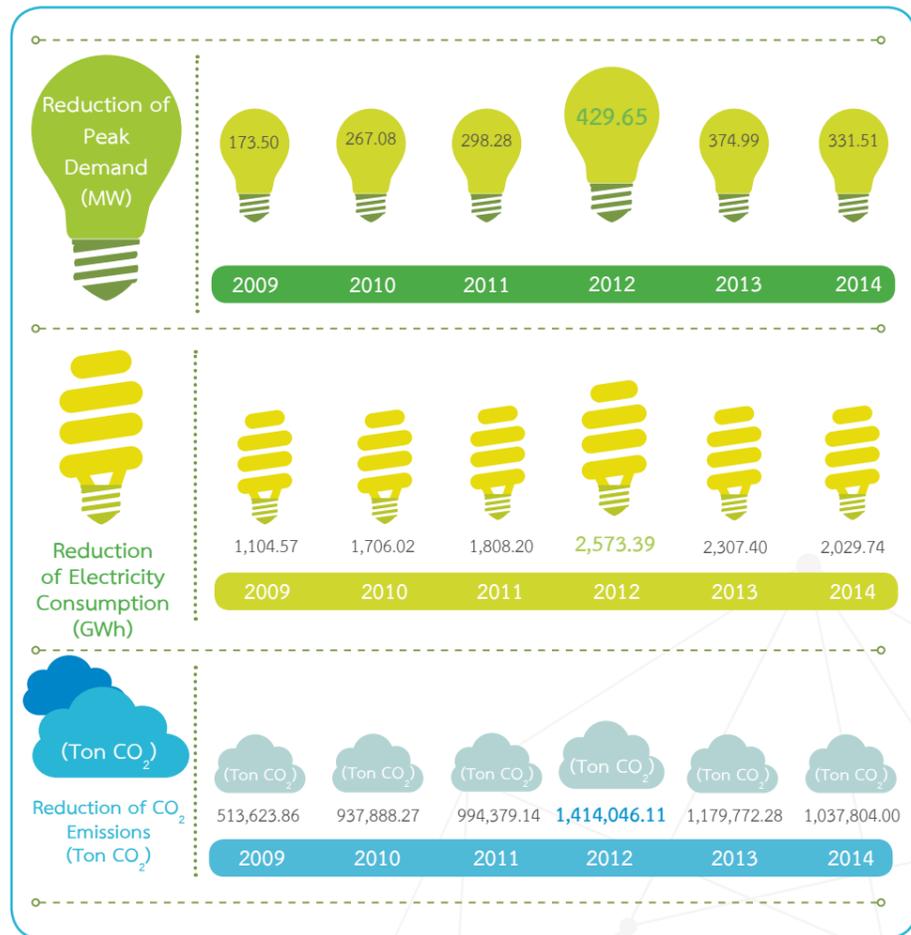
EGAT has launched numerous campaigns to instill awareness on energy efficient consumption behavior into young Thai students through its green learning room program. Efforts were made to encourage the use of knowledge in energy and environment conservation gained from the green learning room program in running schools in terms of both teaching and management. The "Green School Project" have been evaluated and selected on a yearly basis. In 2014, a total of 112 out of 414 schools operated under the green learning room project were upgraded to meet the requirements of the green school project.

Other energy saving campaign activities have regularly been conducted by EGAT. Another good example is a campaign for schools implemented under the green learning room program to promote the use of high efficiency electrical devices (bearing No. 5 label) and for them to become the "Low Carbon Green Schools". The school personnel were trained to measure carbon footprints caused by the schools' operating activities and by the use of electrical appliances. In 2014, 45 schools nationwide met the campaign criteria and were classified as the Low Carbon Green Schools.



### Achievements of EGAT's DSM Programs

EGAT's Label No. 5 program has served as a basis for the establishment of Minimum Efficiency Performance Standards (MEPS), which have become a regulation, already enforceable for refrigerators and air-conditioners. EGAT's Label No. 5 program has been widely recognized both domestically and overseas and has yielded concrete results from 1993 up to 2014. The program has resulted in the reduction of peak demand by a total of 3,538.8 MW, of total electricity consumption by 21,120 kWh, and of the emissions of carbon dioxide by 12,376,623 tons CO<sub>2</sub>.



### Research and Development

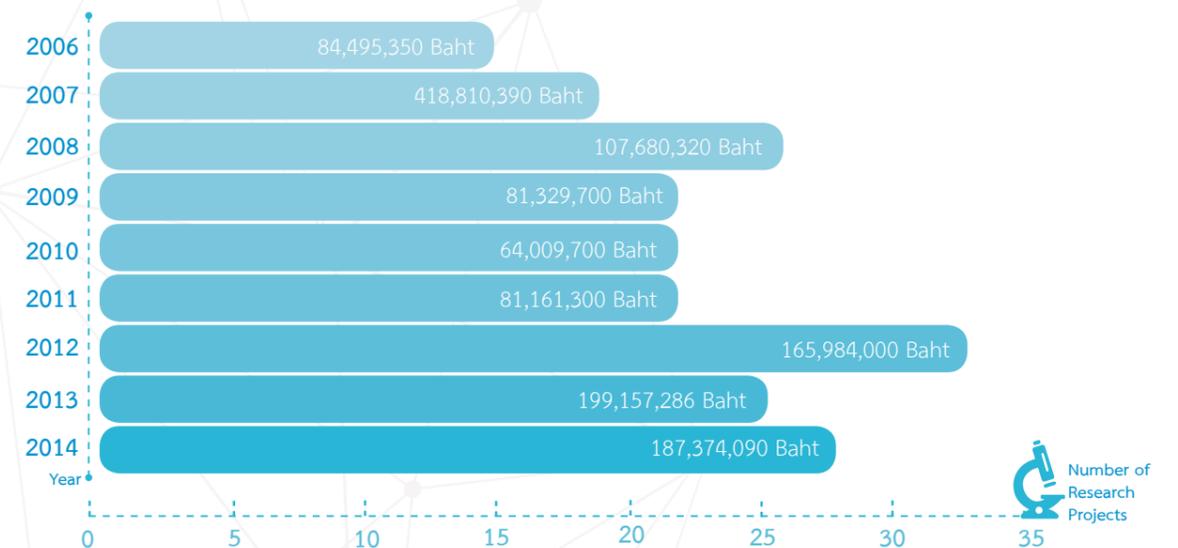
EGAT has developed a policy to allocate budgets for R&D to support new technology research and development with an aim to enhance the competitiveness of the Thai researchers countrywide, to bring down the imports of new technologies, and to promote the providing of the good quality, reliable electricity at reasonable prices, while supporting the coexistence with the society, communities and the environment in an interdependent manner. EGAT's R&D frameworks are designed to serve the following purposes.

- To substitute the imports of electrical power technologies, materials, and equipment,
- To contribute to the peak cuts and the improvement of energy efficiency consumption,
- To enhance the development of alternative energy for electricity generation,
- To improve the efficiency and to reduce the power generation cost,
- To prevent and mitigate the environmental and social impacts arising from power generating operations and related activities, and
- To support the conduct of social research for the development of communities around EGAT's power plants.

For EGAT's R&D projects implemented under the research frameworks for the prevention and mitigation of social and environmental impacts as well as those of the social research for the development of communities around power plants, the emphasis has been placed upon the commissioning of works to the local educational institutes. Meanwhile, local communities are encouraged to participate in the project activities so that they can optimize the benefits earned from the research.

In 2014, EGAT provided funds for 28 research projects conducted by 16 educational institutes and research agencies, accounting for 187,374,090 Baht in total. In addition, some financial support was also given to the research projects implemented in cooperation with the National Science and Technology Development Agency (NSTDA) and the Thailand Research Fund (TRF) under the EGAT-NSTDA R&D Co-Funding Project and the EGAT-TRF R&D Co-Funding Project, totaling 7,241,170.77 Baht and 7,105,084.26 Baht, respectively.

Since 2006, a total of 212 research projects have been funded by EGAT, accounting for a total of 1,390,002,136 Baht.



### Outstanding Research Projects Funded by EGAT in 2014

#### The Development of Robots and Automation for the Welding Process

EGAT provided fund to support a research project conducted by the National Metal and Materials Technology Center, the National Science and Technology Development Agency (NSTDA), the objective of which was to come up with the concepts of automatic welding robot systems and the software for the control of welding process and the

movement of welding torch – a welding innovation for use in EGAT’s existing power plants. The innovation could also positively affect the maintenance expenditure and the stability of power plants. Results of the research showed that the automatic welding robot systems, which replaced the manual welding by employees and might result in malfunction, proved to be efficient with consistent precision for the whole piece, with good speed, consistent quality and reduced correction requirements.

**The Reduction of Sulphate Contamination in Discharged Water from Mae Moh Mine by Using Red Bed Clay as Covering Material**

EGAT also provided a financial support for a study conducted by Mae Moh Mine Planning and Administration Division on the types of soil and coal with high sulphate solution leaching potential and the results of using red bed clay to cover the soil and coal deposits in order to reduce the amount of sulphate in percolation water with high leaching potential. The study revealed the recognition of the types of soil and coal which are the sources of sulphate and the efficiency of covering soil and coal deposits which are the sources of sulphate with red bed clay in reducing the quantity of sulphate caused by the leaching. EGAT will make use of the findings in mine planning in order to prevent the leaching of sulphate solution at source which will be beneficial for the water management at Mae Moh Mine in the future.

**The Development of Sorbent Material Technologies to Reduce CO<sub>2</sub> and SO<sub>2</sub> from Combustion**

In 2014, EGAT provided a research fund for the Sirindhorn International Institute of Technology (SIIT), Thammasat University to develop technologies to produce solid sorbent materials from fly ash and bottom ash to reduce CO<sub>2</sub> and SO<sub>2</sub> from combustion and to develop filters for absorption of CO<sub>2</sub> and SO<sub>2</sub> from power plant combustion before they are released into the atmosphere. The research findings revealed that fly ash and bottom ash can be used as sorbent materials which are highly efficient, inexpensive and capable of reducing CO<sub>2</sub> and SO<sub>2</sub> released into the atmosphere. After being used as sorbent materials, they can be further used in concrete work with no effect on the quality of concrete.



**The Development of Capacity Assessment Programs for High Voltage Substations**

EGAT funded a research project launched by King Mongkut’s University of Technology North Bangkok (KMUTNB) for the development of programs to assess the capacity of high voltage substations which are the assets of high-value and extremely important to the stability and reliability of the transmission systems. Results of the research will be used to determine appropriate approaches and budgets for substation upgrading and the prioritization of maintenance and upgrading tasks. The expected results of the research include a high voltage substation database program for systematic consolidation of the knowledge and experiences from all experts, a program for capacity assessment of main equipment and high voltage substations, and a program for workload and priority assessment for main equipment and high voltage substation upgrading works. These programs will further enable EGAT to improve existing substations in a technologically and economically sound manner.

**The Promotion of Community Participation in Environmental Health Surveillance Using the Sentinel Epidemiological Surveillance in the Communities Living around Mae Moh Power Plant**

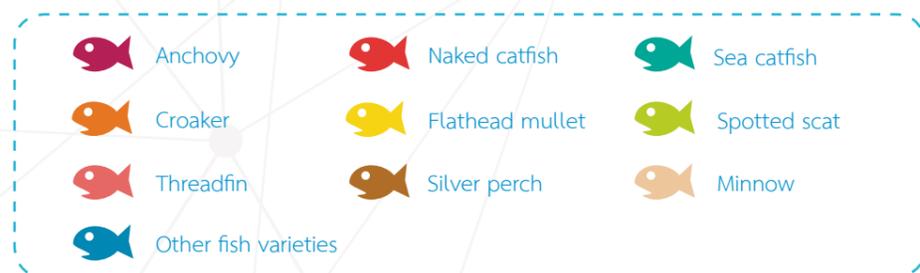
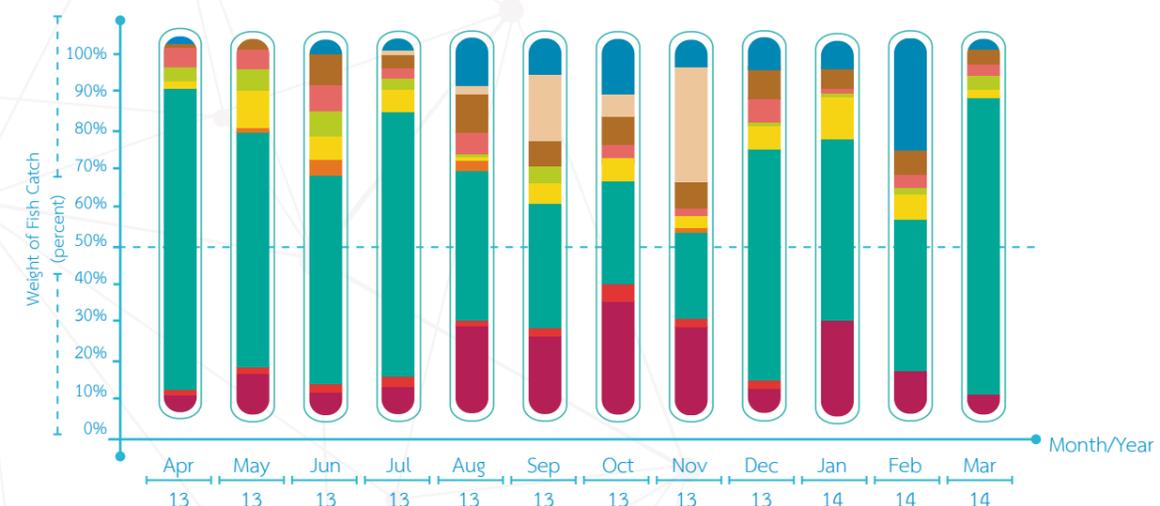
EGAT also provided fund for a study conducted by the Upper North Research Administration Network to look for appropriate approaches to promote the participation in environmental health surveillance among the communities at Hua Fai village, Ban Dong subdistrict and Huay King village, Mae Moh subdistrict, Lampang province. This is to be done by educating community people on the relationships between environmental threats and health using the sentinel

epidemiological surveillance tools; starting from conducting a walk-through survey to identify hazardous spots and people suffering from diseases, plotting on a village map, to performing linkage analysis. By undertaking the project activities, villagers were able to reach an empirical conclusion that community health problems could have been caused by activities conducted by community members which had created threats. This resulted in a project to solve smoke problems by tackling the root cause and enabled villagers to perform environmental health surveillance themselves.

**The Study on the Aquatic Ecology Status, Fish Diversity and Production on the Bang Pakong River**

EGAT provided a financial fund to support a research project launched by Kasetsart University, of which objective was to study the causes of, and to make recommendations for solutions to, the deterioration of the quality of water on the Bang Pakong River, which affected fisheries for fishermen in communities around Bang Pakong power plant in Chachoengsao province. The study encompassed the quality of water and soil, certain heavy metals and quantities of aquatic species, fisheries production, fisheries situations, as well as villagers’ potential for production of economical aquatic animals. Samples were collected once a month from 20 locations along the banks of Bang Pakong River and in the coastal areas of Bang Pakong district, Chachoengsao province over a period of one year, from April 2013 to March 2014. The results of the study are as follows:

- In terms of the environmental quality, it was found that the influence of rainfalls and fresh water quantity is the primary factor causing changes of water quality, decreasing salinity and a lower temperature, as well as other impacts.
- In terms of biodiversity, 140 varieties of fishes and larvae were found.
- As for net fisheries, it was found that the monthly catch amount was greatest in the period from October 2013 to January 2014 (50 - 80 grams per 100 square meter per night).
- For the socioeconomic conditions of villagers as regards the value chain, it was found out that push-net fisheries yielded the highest income and profit. However, in terms of the return compared to the total cost, the riverine net fishery yielded the highest value. As for farming, pond silver perch rearing was found to yield the highest revenue and profit.



# We create.



## Creating more values to clean energy consumption

All power plants of different types and sizes have been operated and maintained following all applicable international standards, while putting in mind the environmental and community well-being. The operations are guaranteed by the CSR-DIW Awards, presented to 21 locations of power plants by the Department of Industrial Works, Ministry of Industry.

## Environmental Performance

EGAT's overall environmental performance during 2014 highlighted the commitment to step forwards as an organization with social and environmental responsibility. Emphasis has been placed upon the strict compliance to all relevant laws and regulations which include the environmental impact assessment (EIA), the social impact assessment (SIA) and the health impact assessment (HIA), the adoption of international standard ISO 14001 and TSI 18001 for the operations ranging from the construction to the generation phase, as well as the implementation of participatory activities to listen to opinions of stakeholders as stipulated in the Constitution of the Kingdom of Thailand B.E. 2550. The purpose is to mitigate environmental impacts arising from the operations of EGAT and to build good understanding to bring about the acceptance of project implementation by all groups of stakeholders.

In 2014, two of EGAT power projects, of which their environmental impact assessment or EIA reports were approved by the Office of Natural Resources and Environmental Policy and Planning (ONEP), included the following: Bang Pakong power plant block 5 (approved on July 23, 2014), and Mae Moh power plant units 4 - 7 (approved on December 17, 2014). Other projects, of which their initial environmental examination or IEE reports gained approval from ONEP were the 230 kV Ayutthaya 4 - Sikhiu 2 transmission lines project, for the additional part passing an area of protected forests (approved on November 13, 2014), and the 115 kV Krabi - Lam Phu Ra transmission system expansion and renovation project, for the part passing an area of protected forests (approved on December 4, 2014). Apart from fulfilling the license requirements, all of the projects are also subject to examination by the committees for the joint monitoring of power plant operations and environmental community development, established at existing power plants, chaired by the provincial governor, and comprising representatives of the public and private sectors as well as communities. Two meetings are required to be held each year to allow the committees to consider and acknowledge the operating results and activities of the power plants. In addition, there is an environment inspection committee with representatives from the civil society sector observing the measuring of the qualities of air, noise and water, to provide assurance to all groups of stakeholders of EGAT's operations.

In addition, community environmental network activities were conducted around several power plants; namely, Wang Noi power plant in Wang Noi district, Phra Nakhon Si Ayutthaya province; Chana Power Plant in Chana district, Songkhla province; North Bangkok Power Plant, Bang Kruai district, Nonthaburi province; and Thap Sakae Photovoltaic Power Plant, Thap Sakae district, Prachuap Khiri Khan province. The objectives of such activities were to educate people and youths in nearby communities and to enable them to conduct preliminary water testing, creating bodies of knowledge and a learning process through actual practices. It is EGAT's intention to bring about greater understanding and linkages between the local ecological systems and the power plants.

### Sustainable Resource Use [G4-DMA, G4-EN1, G4-EN2]

During 2014, EGAT's electricity generation and net purchases in the power system totaled 177,580.47 million kWh. Natural gas and coal are the two main fuels of EGAT's electricity generation. No recyclable materials are used as fuel. However, EGAT recognizes the importance of the need to seek clean and environmentally friendly sources of energy. It has been promoting and developing the use of renewable and alternative energy. Support has also been continuously given to energy conservation and efficiency improvement projects for sustainable use of resources.

### Renewable Energy Project

As fossil fuels, such as oil, natural gas and coal, which are used in electricity generation, are being depleted each day, and will someday be no longer available, EGAT has been actively promoting and encouraging the use of renewable and alternative energy and has been continuously developing clean development mechanisms. In 2014, EGAT generated

3,918.30 million kWh of electricity from clean energy direct primary sources; i.e., solar energy, wind energy, geothermal energy and biomass energy. The proportions of wind and solar energy have to be increased before other alternatives such as coal and nuclear are considered. The aim is to be responsive to the government's policy of diversifying clean energy for electricity generating and to reduce global warming, while having secure electricity generation and fair and appropriate electricity prices.

### Electricity Generated from Renewable Energy by EGAT in 2014

Electricity generation from renewable energy in 2014	Million kWh	Percent
Solar power plants	492.43	12.37
Wind turbine power plants	383.82	9.64
Geothermal power plants	1.39	0.03
Biomass power plants	3,103.66	77.96
Total	3,981.30	100.00

The following are renewable energy projects developed by EGAT in 2014:

- **The 5 Megawatt Solar Power Plant** in Thap Sakae district, Prachuap Khiri Khan province. The project was launched in response to the government's policy to make use of renewable energy in electricity generating as outlined in the National 15 Year Renewable Energy Development Strategy (2008 - 2013) and to serve as a national prototype of photovoltaic power generation. Integration into the grid is scheduled for June 3, 2015. As of now, the work has been 14.21 percent completed.
- **The 250 Kilowatt Horizontal Axis Wind Turbine R&D Project** in Na Hu Kwang subdistrict, Thap Sakae district, Prachuap Khiri Khan province. The project has been designed for a wind speed of 10 - 12 meters per second to serve as a prototype for entire-system horizontal axis gas turbines and a direction setter for developing linkage technologies and industries. The work has been 62 percent completed.
- **The 500 kilowatt Napier grass biogas prototype power plant R&D Project.** This project, which was launched in cooperation with the Energy Research Institute of Chulalongkorn University, uses Napier grass planted on a 250-rai demonstration plot, and digested to produce biogas for use as fuel in electricity generation. The project's duration is from July 1, 2013 to June 30, 2015 and the work has been 22.40 percent completed. The Office of the Energy Regulatory Commission of Thailand has endorsed issuance of a factory permit (Form Ror. Ngor. 4) under the Factory Act, B.E. 2535.

EGAT also purchases electricity from small power producers, such as biogas electricity produced by private companies.

### Energy Consumption [G4-EN3, G4-EN4]

In 2014, EGAT generated a total of 73,335.79 million kWh and purchased another 104,244.68 million kWh from other producers. Of this, 1,069.63 million kWh, or 0.60 percent of electricity generated and net purchased was used in EGAT's operations; e.g. consumption at the Headquarters, Lam Takhong Pumped Storage Power Plant, Mae Moh Mine, high-voltage substations and offices. The remaining portion of energy, of 173,433.08 million kWh, or of 97.66 percent of gross energy generation and purchase, was supplied for sale to external customers such as Metropolitan Electricity Authority (MEA), the Provincial Electricity Authority (PEA), direct customers and neighboring countries, as well as to serve as stand by power supply. Power system loss accounted for 3,077.75 million kWh, or 1.73 percent.

## Overview of Energy Generation, Purchases and Sales

Details	(million kWh)	Percentage
<b>Energy generated and net purchased by EGAT</b>		
Generated	73,335.79	41.30
Net purchased	104,244.68	58.70
<b>Total energy generated and net purchased</b>	<b>177,580.47</b>	<b>100.00</b>
<b>Energy sold to customers</b>		
MEA	50,043.56	28.18
PEA	120,200.48	67.69
Direct customers	1,593.17	0.90
Neighboring countries	1,593.78	0.90
Others	3.38	0.00
Stand by power supply*	0	-0.10
Total sales	173,433.08	97.66
<b>Energy consumption by EGAT's</b>		
High voltage substations and offices	71.49	0.04
Water pumps at Srinagarind Dam	75.20	0.04
Water pumps at Bhumibol Dam	0.18	0.00
Water pumps at Lamtakong Jolabha Vadhana Hydropower Plant	264.62	0.15
Mae Moh Mine (private sector)	500.76	0.28
Contractual HVDC transmission to Tenaga Nasional Berhad (TNB) of Malaysia	122.91	0.07
Headquarters and Private agencies	34.49	0.02
Total consumption in EGAT's operations	1,069.63	0.60
Power system loss	3,077.75	1.73

**Remarks:** \*Energy sold to Independent Power Producers (IPP) and Small Power Producers (SPP) in accordance with contract terms

## Energy Consumption Reduction

EGAT recognizes the importance of energy consumption reduction and utilization of natural resources in offices, which includes the use of electricity, water, refrigerants, and wastes and wastewater management, as well as planting trees around buildings.

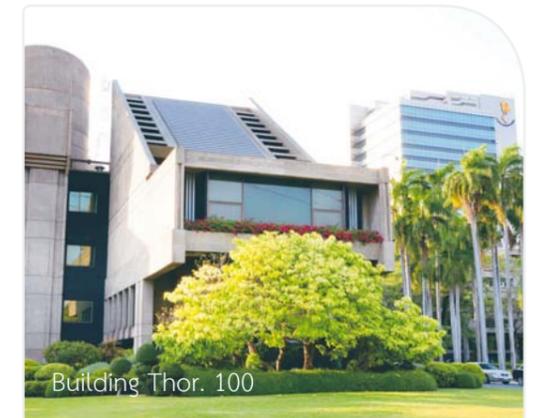
In 2014, EGAT nominated Building Thor.100 at its Headquarters located in Nonthaburi province for a certificate for CO<sub>2</sub> emissions reduction as the building meets the criteria for a carbon reduction building certification from the Thailand Environment Institute. (According to condition 1. of the criteria, buildings constructed before 2002 must reduce greenhouse gas emission by 10% or more.) A certificate is expected to be granted in early 2015. Energy conservation measures have been taken for Building Thor.100 since 2005. The measures were aimed primarily at increasing the efficiency of electrical equipment and energy management. The focus was on changing electrical equipment for improved efficiency. Seven types of equipment have been changed: one set each of 500-, 450- and 300-ton chillers, 8,584 sets of 28-watt T5 bulbs for the whole building, one set of 400-ton cooling tower, and 11 and 17 sets of 300,000 and 200,000 BTU/hour split-type air-conditioners, respectively. The changes have resulted in reduction of energy consumption by 922,940.34 kWh/year.

EGAT also nominated its Head Office Building, Thor.102, in Nonthaburi province for the Green Office Contest organized by the Department of Environmental Quality Promotion, Ministry of Natural Resources and Environment. Inspection was carried out in seven areas; namely, organization management, green office undertakings, energy and resources consumption, waste management, interior and exterior environment, procurement and continuous improvement. EGAT received an "Excellent Green Office" award and an honorary certificate in the category of environmental friendliness from the Ministry of Natural Resources and Environment and the Ministry of Interior on December 4, 2014.

### Transport [G4-DMA, G4-EN30]

EGAT's transmission lines in the power grid are installed with the environment in mind, and with impacts on communities, society and natural resources kept to a minimum. Major impacts include the passing of transmission lines over cultivation areas, reduction of the extent to which communities can utilize land, the forced escape of wildlife due to partial deforestation and hazards caused by high voltage electricity. EGAT has therefore laid down criteria for installing transmission lines in the national grid to prevent and mitigate impacts from the very beginning, as follows:

- Avoiding installing transmission lines into community areas.
- Avoiding installing transmission lines into historic sites or places of communities' spiritual value.
- Avoiding installing transmission lines along or near highways to minimize impacts on land utilization.
- Avoiding planning transmission lines in residential areas.
- If it is necessary to plan transmission lines passing rice fields, horticulture farms or orchards, transmission lines passing orchards should be kept to a minimum.



- Planning transmission lines passing wild life sanctuaries, national parks, watersheds class 1A and mangrove forests is prohibited.
- Planning transmission lines passing park areas, additional conserved forest areas (class c forests) and watersheds class 1B is to be avoided.

### Pollution Prevention and Environmental Quality Surveillance

EGAT is a high-performance organization engaged in electricity generating. It always considers environmental impacts resulting from the generation process and other activities, and recognizes the importance of impacts on all parties, including stakeholders around power plants. These include the qualities of air, water, wastes, as well as nearby habitats.

#### Effluents and Waste Management [G4-DMA, G4-EN23]

The use of certain fuels in the electricity generating results in wastes which can be reused for maximum value. In EGAT's case, such "by-products" are yielded by the electricity generating process using coal as fuel; e.g., Mae Moh Power Plant in Mae Moh district, Lampang province, where 16 million tons of coal is used each year. Three by-products are yielded: fly ash (about 2.1 million tons per year, constituting 13% of reused by-products), bottom ash (about 1.4 million tons per year, constituting 9% of reused by-products) and synthetic gypsum (about 2.3 million tons per year, constituting 14% of reused by-products). Mae Moh Power Plant manages these three by-products by selling them to cement and concrete manufactures for mixing with main raw materials in their production.

EGAT also has systems for management of wastes generated by activities inside all power plants and offices. As an example, Wang Noi Power Plant in Wang Noi district, Phranakhon Si Ayuttaya Province, has a system of waste disposal at the source in which wastes are separated and data are collected for the whole year for use as a database. Wastes are divided into three types as follows:

**General Wastes** The total amount per year is 65.72 tons, 47.42 tons of which is general wastes, landfilled by a licensed waste disposal contractor outside the power plant in the area of Lam Ta Sao Municipality in Wang Noi district, Phranakhon Si Ayuttaya province. The remaining 18 tons consists mainly of small pieces of wood and tree branches, which are digested into fertilizer, weighing 5.4 tons or one-third of the total quantity of the remaining.



**Recyclable Wastes** The quantity per year totals 100.92 tons, divided into five types: iron scraps (68.85 tons), inward air filter sets (22.38 tons), electrical wire bits (4.61 tons), paper cartons (3.89 tons) and automobile tyres (1.19 tons). For all recyclable wastes, Wang Noi Power Plant, as the waste generator, submitted on-line notifications regarding transport of non-hazardous materials of the plant to the Department of Industrial Works by registered disposal contractors as required by the Department.

#### [G4-EN23, G4-EN24, G4-EN25]

**Hazardous Wastes** The quantity per year is 1,050.43 tons, categorized into ten types. Most of the wastes are from generator maintenance work, such as contaminated water and oil, chemicals used in cleaning equipment and insulators. As in the case of recyclable wastes, Wang Noi Power Plant, as the waste generator, submitted on-line notifications regarding transport of non-hazardous materials of the plant to the Department of Industrial Works by registered disposal contractors as required by the Department.

Over the years of EGAT operations, no spills of fuel oil, wastes, or chemicals into the ground or water sources have been found. There is no transport, import, export, or treatment of hazardous wastes on list A and list B of the Basel Convention. (Thailand has given ratification as a party to the convention since November 24, 1997, which has taken effect since February 22, 1998.) EGAT's products and services have not been recalled either.

#### Water Quality Management and Control [G4-DMA, G4-EN8, G4-EN9, G4-EN10, G4-EN22, G4-EN26]

EGAT has specified measures to be taken to manage and control the quality of wastewater from power plants, conducting water pollution surveillance which might impact the environment and communities. The focus is on the management of water for office use, water conservation, treatment of wastewater, control of its quality to required standards before discharging from all EGAT power plants. Wastewater is also reused in other systems within the power plants (e.g., watering plants in green areas of the power plants) to ensure maximum benefits from water utilization.

A good example is Wang Noi Power Plant, where Blocks 1-3 are combined cycle power plants using natural gas as the main fuel, and diesel as a supplemental fuel, and Block 4 is a combined cycle power plant using natural gas as the sole fuel. It has a total capacity of 2,830.95 MW. An average of about 50,000 cubic meters of raw water is pumped daily from Klong Rapeephat, the only surface water source for irrigation, for use in the power plant, with no effect on the quantity of water in the canal or its biodiversity. Pumped raw water is kept in three raw water ponds, one for the cooling system, one for use for the water conditioning plant in the generation process and one for daily consumption.

Wastewater at Wang Noi Power Plant is managed as follows: The daily total quantity of wastewater from the generation process and daily consumption is around 10,000 cubic meters per day. It is treated according to its category, to the standards specified by the Department of Industrial Works and the Industrial Estate as required by law. Treated wastewater is then kept in a settling pond and a retention pond before being discharged into Klong 26, a waterway for irrigation, which is an outlet canal from farming areas. EGAT performs the monitoring of the quality of surface water and aquatic ecology comprising phytoplankton and zooplankton of Klong 26,500 meters upstream and downstream from the wastewater discharge point of Wang Noi Power Plant.

In addition, water in the settling pond is reused within the power plant, i.e. for watering plants, which requires about 450 cubic meters of water daily, or 1% of the total water intake.



### Management of Air Quality, Noise and Electromagnetic Fields

**Air Quality Management** EGAT has in place processes for monitoring and evaluation of air emitted from the generation process. A continuous emission monitoring system (CEMS) has been installed to monitor the efficiency of the combustion system and to keep combustion at an appropriate level at all times, for fuel saving and pollutant emission reduction. Pollutant emission data are recorded and reported to the Pollution Control Department (CPD) and the Department of Industrial Works (DIW) for examination to comply with legal requirements. The Ambient Air Quality Monitoring (AAQM) system installed around EGAT's power plants is operated around the clock. There are both sophisticated air quality monitoring stations and mobile units; e.g., devices for measurement of general particulates and up to 10 micron particulates. An alarm is sent to the Environmental Quality Operation and Control Center immediately if the reading suggests possible impact on communities around power plants for speedy action.



**Noise Quality Management** EGAT measures both work place noises and ambient noises twice a year to ensure that power plants' operations do not cause noises disturbing nearby communities as well as the operating personnel. The preventive and mitigating measures taken include installation of silencers (sound protection walls and sound enclosures) in areas where machinery, equipment and other sources cause loud noises.



### Pollutants Emitted by EGAT Power Plants in 2014

Power Plant	Generating Unit	Fuel	SO <sub>2</sub> (tons/year)	NO <sub>x</sub> (tons/year)	Particulates (tons/year)	
Mae Moh	Thermal Power Unit 4	Lignite	2,242.84	5,295.15	164.68	
	Thermal Power Unit 5	Lignite	2,241.11	5,291.06	164.55	
	Thermal Power Unit 6	Lignite	2,596.52	5,691.29	331.31	
	Thermal Power Unit 7	Lignite	2,520.19	5,523.98	321.57	
	Thermal Power Unit 8	Lignite	2,187.49	5,319.81	107.42	
	Thermal Power Unit 9	Lignite	2,028.73	5,043.93	223.18	
	Thermal Power Unit 10	Lignite	2,649.35	5,752.65	135.93	
	Thermal Power Unit 11	Lignite	2,234.62	5,617.17	112.24	
	Thermal Power Unit 12	Lignite	1,444.80	4,237.24	117.63	
	Thermal Power Unit 13	Lignite	1,801.07	4,103.34	86.66	
	Bang Pakong	Thermal Power Unit 1	Natural gas /Fuel oil	<1	1,106.24	21.27
		Thermal Power Unit 2	Natural gas /Fuel oil	21.76	1,784.44	43.52
		Thermal Power Unit 3	Natural gas /Fuel oil	5.08	660.06	25.39
Thermal Power Unit 4		Natural gas /Fuel oil	12.13	1,795.87	24.27	
Combined Cycle Block 3		Natural gas	<1	1,765.43	46.87	
Combined Cycle Block 4		Natural gas	<1	1,845.08	34.49	
Krabi	Thermal Power Unit 1	Fuel oil	437.43	2,989.12	121.51	
	South Bangkok	Combined Cycle Block 1	Natural gas	16.30	1,897.76	21.19
		Combined Cycle Block 2	Natural gas	22.21	3,298.70	31.10
Wang Noi	Combined Cycle Block3	Natural gas	24.17	1,595.36	41.09	
	Combined Cycle Block 1	Natural gas	21.99	2,396.82	43.98	
	Combined Cycle Block 2	Natural gas	0.93	90.48	1.87	
Chana	Combined Cycle Block 3	Natural gas	20.51	963.95	41.02	
	Combined Cycle Block 1	Natural gas	18.61	936.30	65.15	
North Bangkok	Combined Cycle Block 1	Natural gas	24.02	869.37	67.24	

Note SO<sub>2</sub> = Sulfur dioxide,  
NO<sub>x</sub> = Nitrogen oxide

**Electromagnetic Fields** EGAT's high-voltage substations receive electricity from the generating system in order to transform the voltage and transmit electricity to another substation, one after another, through the high voltage electricity transmission network. Transmission of electricity to places requires a high voltage which causes proliferation of the intensity of magnetic and electric fields. EGAT therefore monitors the intensity of magnetic and electric fields and prepares EMF contour maps from the sources of origin to the surrounding areas to assure communities near high-voltage substations and high-voltage transmission lines of their health safety.

### Protection of the Environment, Biodiversity and Restoration of Natural Habitats [G4-DMA]

EGAT holds that it is important to look after the environment, and to conserve, restore and strengthen the natural environment and biodiversity. Its strategic framework calls for “development of projects and participation of local communities in improving the quality of the community environment so as to maintain a natural balance and the country's social capital in a secure and sustainable way”.

In 2014, EGAT submitted an Environmental Monitoring Report for Wang Noi Power Plant, Blocks 1-4, to the Office of Natural Resources and Environmental Policy and Planning (ONEP), which has been approved, with details as follows:

#### Location and Protected Area [G4-EN11]

Wang Noi Power Plant is located in Wangchula and Khao-Ngarm sub-districts, Wang Noi district, Phra Nakhon Si Ayutthaya province, covering an area of 800 rai. It is not in a protected area. However, EGAT conducted a study on impacts on forestry and wildlife resources within a radius of five kilometers of the power plant. It was found that most of the areas surrounding the power plant is a farming area, with import crops grown being rice, orange and vegetables. There are also communities and industries. Therefore, the area does not have natural forest characteristics.

#### Major Impacts of the Operation on Biodiversity [G4-EN12]

**Air Pollutants** Wang Noi Power Plant, Block 4, uses natural gas as fuel. Major air pollutants are  $\text{NO}_x$ ,  $\text{SO}_2$  and particulates. Devices installed to prevent and mitigate impacts are as follows:

- For  $\text{NO}_x$ , dry low  $\text{NO}_x$  burners are used in the combustion chamber of the gas turbines to control the rate of inlet natural gas and to reduce the temperature which, in turn, reduces the occurrence of  $\text{NO}_x$ .
- Continuous  $\text{NO}_x$  and  $\text{SO}_2$  emission monitoring systems have been installed on the chimney to ensure that air pollutant emissions do not exceed the specified standard.
- An opacity monitoring system has been installed to ensure that the level of particulates emitted from the chimney does not exceed the specified standard. Opacity monitoring is performed continuously.
- Inlet air filters have been installed to remove contaminants from inlet air, resulting in very small amounts of particulate emissions from the chimney.

**Water Pollution** Wang Noi Power Plant has a wastewater treatment system. Wastewater from the electricity generation process has to go through a chemical neutralization system comprising a holding pond for catching sludge and a retention pond for temperature reduction. Toilet wastewater is treated in a bioway. An oil separator has also been installed for oil contaminated wastewater.

**Management of Chemicals** At Wang Noi Power Plant, chemicals are used to condition the quality of water for usage suitability, for prevention of fouling in the pipelines and for the cooling system. Hazardous chemicals are kept in the Hazardous Chemical Storage Building.



#### [G4-EN12]

In addition, Wang Noi Power Plant has made it a policy to monitor biodiversity by conducting aquatic ecological monitoring twice a year. Phytoplankton, zooplankton and benthic animals in Klong 26 are monitored within a distance of 500 meters upstream and 500 meters downstream of the wastewater discharge point, in both the rainy and dry seasons. It has been found that the quantities and types of phytoplankton, zooplankton and benthic animals vary with the season. The operation of Wang Noi Power Plant has not impacted local biodiversity.

#### Habitats Protected or Restored [G4-EN13]

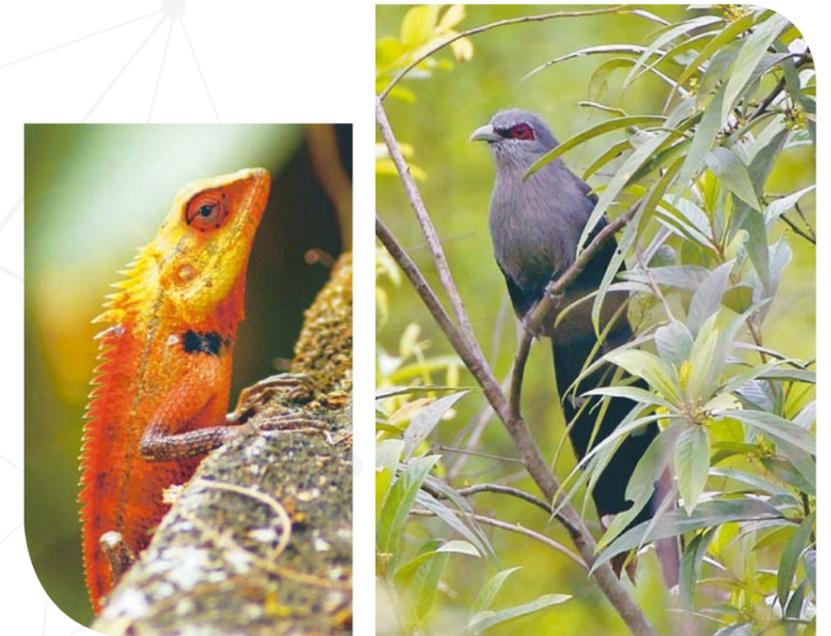
Trees have been planted in the vicinity of Wang Noi Power Plant in order to increase the green area, which is regularly maintained. Activities are conducted to instill and promote the sense of natural resources conservation among communities around the power plant. These include tree planting and canal dredging under the “Beautiful Canal and Clear Water Project in Honor of His Majesty the King”.

#### Number of IUCN Red List Species and National Conservation List Species [G4-EN14]

EGAT conducts studies on forest and wildlife ecological impacts for all project locations. As an example, the species found at Wang Noi Power Plant are as follows:

**Plants** The study of plants around the location of Wang Noi Power Plant revealed that only planted large trees were found, such as Son Pradi Phat (*Casuarina junhuhniana* Miq.) and fruit trees, as most of the area is used for rice farming, orange orchards and vegetable growing. It is also a populated area and hence does not have natural forest characteristics. Several kinds of weeds are also found in the power plant location, such as thatch grass (*Imperata cylindrical* Beauv), little iron weed (*Vernonia cinerea* (L.) Less.

**Wildlife** Based on the study of wildlife in the location of Wang Noi Power Plant and the areas within a radius of five kilometers and the Wildlife Preservation and Protection Act, B.E. 2535, no “reserved animals” were found. 164 kinds of “protected animals” were found, comprising two mammals, Lyle's flying foxes and small Asian mongoose, and 150 kinds of bird; e.g., green-billed malkoha, red-rumped swallows and common mynas and 12 reptiles; e.g., red chameleons and rat snakes. No amphibians found fall in the protected animal category.



## Conservation Status on a Global Scale

The IUCN Red List of Threatened Species provides information on the individual nations' threats. Based on the study of wild species in Wang Noi Power Plant areas, three species were found to have a vulnerable (VU) status; i.e., soft-shelled turtles (*Amyda cartilaginea*), cuora amboinensis, and Malayan snail-eating turtles (*Malayemys subtrijuga*). Three kinds of bird were found to have a near-threatened (NT) status; i.e., snakebirds *Anhinga melanogaster*, Black-headed ibis (*Threskiornis melanocephalus*) and Asian golden weaver (*Ploceus hypoxanthus*).



## Environmental Protection Expenditures and Investments

EGAT has prepared environmental, social and participatory operation plans for use as frameworks and guidelines in prevention and correction of environmental impacts, as well as monitoring environmental qualities and protection of the environment in power plant areas and nearby communities. In 2014, a budget of 11.44 million Baht was allotted to Wang Noi Power Plant, 14.17 million Baht to North Bangkok Power Plant, 3.35 million Baht to South Bangkok Power Plant and 28.56 million Baht to Chana Power Plant. The objective was to ensure that their operations were efficient and caused minimum impacts on society and the environment.

## Climate Change Mitigation and Adaptation

### Direct and Indirect Greenhouse Gas (GHG) Emissions [G4-DMA]

Recognizing the importance of solving current climate change problems, EGAT joined the Carbon Footprint for Organization (CFO) Promotion Extension Project, in cooperation with the Industrial Environment Institute, the Federation of Thai Industries, and the Thailand Greenhouse Gas Management Organization (Public Organization). The move enabled standardized assessment of the quantity of greenhouse gas emissions from EGAT operations and identification of the causes of the emissions, in order to find more efficient ways to reduce the organization's greenhouse gas emissions in the future.

In 2014, four of EGAT units participated as pilot factories in the "Carbon Footprint for Organization Promotion Extension in the Industrial Sector Project"; namely, Wang Noi Power Plant, Blocks 1-3, Wang Noi district, Phra Nakhon Si Ayutthaya province; Chana Power Plant, Block 1, Chana district, Song Khla province; Krabi Power Plant, Nuea Khlong district, Krabi province; and Bang Pakong Power Plant, Block 5, Bang Pakong district, Chachoeng Sao province. The four power plants measured the carbon footprint quantities and prepared a report on greenhouse gas emissions and removals to determine the carbon



footprint of organizations in the industrial sector. They also reported the volumes of greenhouse gas emissions, in the Industrial sector to the Federation of Thai Industries. This gesture demonstrated leadership among national-level electricity generating entities and sincerity in joining the efforts to mitigate environmental problems and solve global warming at the global level.

In establishing the boundaries for calculation, EGAT chose the operational control approach. Data of greenhouse gas emissions and removals from activities within the boundaries of operations are assessed and collated. These also cover a variety of activities, from the use of automobiles, the use of CO<sub>2</sub> for fire extinguishing, to the main activity, which is electricity generating. However, greenhouse gas emissions and removals caused by business units or factories which EGAT partially owns but do not have control over the operations are not included. Calendar year 2013 is used as the base year for benchmarking and calculation of greenhouse gas emissions as it was the first year assessment was carried out and the operations took place the whole year without any long maintenance stoppage. The year therefore serves as a good representative for normal operations of the four power plants.

Calculation of greenhouse gas emissions from EGAT's main activity – combustion of natural gas for electricity generation – employs the calculation method of the American Petroleum Institute (API), which is in line with the method selected by the Ministry of Energy for assessment of the National Database for domestic petroleum business operators. This will be useful for power plants in future data comparison. Calculation for the activities was on the basis of Activity Data x Emission Factor where the greenhouse coefficient is based on the "Guidelines for Carbon Footprint Assessment for Organization" prepared by the Thailand Greenhouse Gas Management Organization (Public Organization). In addition, assumptions used in the assessment and preparation of EGAT's Greenhouse Gas Emissions and Removals Report are consistent with all the requirements of the assessment method.

Assessments of EGAT power plants' carbon footprint had to go through internal auditing and a limited level of assurance of verification by experts registered with the Thailand Greenhouse Gas Management Organization (Public Organization). The monitoring period was scheduled for January to December 2013.

EGAT has completed the implementation of the Industrial Sector Carbon Footprint Preparation Extension Project. A certificate for the project implementation results was presented by the Industrial Environment Institute, the Federation of Thai Industries and the Thailand Greenhouse Gas Management Organization (Public Organization). The work will be extended to cover all EGAT power plants in order to develop EGAT's greenhouse gas reduction database, and preparations will be made for participating in the Emission Trading Scheme. Further efforts will also be made to reduce the organization's greenhouse gas emissions.



### Greenhouse Gas Emissions

Power Plant	Greenhouse gas (GHG) emissions (tCO <sub>2</sub> e)							
	Scope 1						Scope 2	Scope 3
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFC	SF <sub>6</sub>	Total		
1. Wang Noi, Blocks 1-3	4,627,744.89	1,881.21	2,240.89	85.15	132.47	4,632,084.61	43.26	152.73
2. Chana, Block 1	2,284,407.24	849.29	999.14	26.33	-	2,286,282.00	1,558.59	163.34
3. Krabi*	812,898.73	110.81	0.05	-	-	813,009.59	13,076.60	21.05
4. Bang Pakong, Block 5**	2,139,629.47	846.48	1,009.01	4.29	8.21	2,141,497.46	205.14	3.08

**Note:** \* Krabi Power Plant uses fuel oil as fuel. \*\*Bang Pakong Power Plant is a combined cycle power plant using natural gas as fuel.  
 CO<sub>2</sub> = Carbon dioxide  
 CH<sub>4</sub> = Methane  
 N<sub>2</sub>O = Nitrous oxide  
 HFC = Hydro fluorocarbon  
 SF<sub>6</sub> = Sulfur hexafluoride  
 Scope 1 refers to direct GHG emissions from sources that are owned or controlled by the organization; e.g., machinery combustion, emissions from organization-owned vehicles, the use of chemicals in wastewater treatment, leakage/spills in processes or activities.  
 Scope 2 refers to indirect GHG emissions; i.e. purchased for use by the organization, such as electricity, heating and steam.  
 Scope 3 refers to other indirect emissions; e.g., employee travel and commuting by vehicles not owned by the organization, off-site seminars, and the use of equipment.

### CO<sub>2</sub> Emissions from EGAT Power Plants in 2014 [G4-EN18, G4-EN20]

CO <sub>2</sub> quantity (tons)					kg CO <sub>2</sub> /kWh
Diesel	Fuel oil	Lignite	Natural gas	Total	
55,222	1,166,312	17,999,099	23,668,302	42,888,935	0.56

**Notes:** 1. Calculation of CO<sub>2</sub> quantity is based on 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 2 Energy  
 2. Calculation of kg CO<sub>2</sub>/kWh is based on electricity generated by EGAT in 2014 (76,912,474,420 kWh) - fossil fuels, hydropower and renewable energy combined. (Data of monthly fuel consumption from the Power System Control and Operation Division, EGAT).  
 3. Kg CO<sub>2</sub>/kWh means CO<sub>2</sub> emissions per kWh of energy produced - fossil fuels and hydropower combined.

EGAT does not produce, import or export ozone depleting substances. Ozone is normally generated through a reaction between hydrocarbon gases and nitrogen oxides, with sunlight as the catalyst. These gases originate from vehicles used in pollution-controlled and urban areas where the ozone intensity is limited at an average of not more than 100 ppb/hour. In the case of Thailand, the Department of Industrial Works has specified measures to control ozone layer depleting substances. Since 1998, substances in the CFC-11 and CFC-12 categories have been banned, and imports of ozone layer depleting substances have been controlled. CFC-113, CFC-114, CFC-115, methyl chloroform and halons have also been banned. EGAT's report therefore does not contain this section.

### Reduction of Greenhouse Gas Emissions

EGAT, through the use of various mechanisms, both at the national and international levels, voluntarily reduces greenhouse gas emissions. At the international level, under the Kyoto Protocol, it has improved the efficiency of Mae Moh Power Plant, units 10-11. The efficiency improvement project involved retrofitting of low-pressure steam turbines. The improvement could increase the efficiency of the turbines by not less than 5 MW/Unit and the electricity generating efficiency was increased by about 1.6%. EGAT conducted verification for certification of greenhouse gas emission reduction and to apply for issuance of CERs from the CDM Executive Board (CDM-EB) with a monitoring period from January 1 to December 31, 2013. The move enabled EGAT to reduce CO<sub>2</sub> emissions by 371,366 tCO<sub>2</sub>e, regarded as scope 1 reduction. EGAT sold the amount of CO<sub>2</sub> emission reduced as carbon credits by making a sale and purchase agreement with Vattenfall Energy Trading Netherlands N.V. Mae Moh Power Plant Units 10-11 has also been certified by UNFCCC as the biggest CDM project in Thailand, with the largest amount of carbon credits per year in the world, based on Methodology: Energy Efficiency Improvements of a Power Plant through Retrofitting Turbines.

In addition, EGAT has implemented voluntary greenhouse gas reduction projects by developing the Clean Development Mechanism (CDM) Project and participating in the Thailand Voluntary Emission Reduction Program (T-VER). Expected quantities of greenhouse gas reduction emissions in 2014 were as follows:

Clean Development Mechanism (CDM)	Capacity (MW)	Expected greenhouse gas emission reduction (tCO <sub>2</sub> /year)	Project status
1. Hydropower plant on the irrigation canal of Mae Ngat Somboon Chol Dam, Chiang Mai province	2.59	7,704	Under construction
2. Sirindhorn Solar Cell Power Plant, Ubon Ratchathani province	1	701	Being monitored
3. Hydropower plant downstream of existing Chao Phraya diversion dam, Chainat province	12	34,967	Being monitored
4. Hydropower plant downstream of existing Pa Sak Jolasid diversion dam, Lopburi province	6.7	18,392	Being monitored
5. Hydropower plant downstream of existing Mae Klong diversion dam, Kanchanaburi province	12	41,741	Being monitored
6. Hydropower plant downstream of existing Khundan Prakarnchon diversion dam, Nakhonnayok province	10	15,328	Pending registration
7. Hydropower plant downstream of existing Kwai Noi Bamrung Daen Dam, Phitsanulok province	30	78,693	Pending registration
8. Thap Sakae Photovoltaic Solar Cell Power Plant, Prachuap Khiri Khan province	5	4,367	Document verification

**Notes:** 1. The calculation methodology and the method for monitoring greenhouse gas emissions are based on the standards certified by the CDM Executive Board (CDM-EB) using the AMS-I.D. Version 17: Grid Connected Renewable Electricity Generation Methodology.  
 2. Projects under construction and projects being monitored have been registered with the United Nations Framework Convention on Climate Change (UNFCCC).

EGAT has implemented eight CDM projects using renewable energy. Direct greenhouse gas reduction (Scope 1) is expected around 201,893 tCO<sub>2</sub>/year.

(T-VER) T-VER projects	Size (MW)	Greenhouse gas emission reduction(tCO <sub>2</sub> /year)	Project status
1. Hydropower power plant downstream of existing Naresuan Dam, Phitsanulok province	8	15,806	Pending issuance of CERs
2. Lamtakong Wind Turbine Electricity Generating System, Nakhon Ratchasima province	2.5	1,068	

**Note:** T-VER-METH-RE-01: (On-Grid Renewable Electricity Generation) methodology is used.

EGAT signed a memorandum of cooperation in implementing pilot T-VER projects on March 17, 2014, with two projects participating. The move demonstrated its leadership among electricity generating entities and supported the Nationally Appropriate Mitigation Actions (NAMAs). Both projects have been registered with the Thailand Greenhouse Gas Management Organization (Public Organization), with a monitoring period from September 1, 2013 to August 31, 2014. The undertaking enabled EGAT to reduce greenhouse gas emissions by 16,874 tCO<sub>2</sub>e.

### ISO 14001 Environmental Management System

EGAT has adopted the ISO 14001 Environmental Management System for use with units responsible for electricity generating to strengthen the confidence among communities and society in its handling of the environment. In 2014, 27 of EGAT's power plants, dams, and coal mine were certified to ISO 14001 by Certification Bodies (CB's). The standard has also been applied for use with EGAT's high-voltage substations so that the standardized environmental management system covers the whole process, from generation to the transmission system.

Apart from operating in conformity with international standards, EGAT is involved in several other environmental conversation operations through other organizations, such as being a cofounder and serving as a board member of the Green Leaf for Life and being a member and serving as a board member of the Thailand Business Council for Sustainable Development (TBCSD). [G4-16]



## Compliance

EGAT places importance to environmental management as a means to achieve sustainable development. It strictly complies with state laws and environmental laws, as described below:

### Supplier Environmental Assessment

In 2014, EGAT hired four consultant firms to conduct a study and prepare environmental impact analyses (EIA's) for four of its projects. Three of the consultant firms (75% of the total number) were new ones. EGAT has a procedure for sourcing consultant firms for preparation of EIA's to ensure that the reports are of good quality and standards. All the consultant firms have to go through a screening and selection process based on environmental criteria in accordance with EGAT's regulation. Most importantly, they have to be juristic persons licensed by the Office of Natural Resources and Environmental Policy and Planning to prepare EIA reports. EGAT has included this requirement in the specification and scopes of the study. In addition, construction bidding documents require that project construction contractors follow the environmental measures specified in the EIA report. Every step of every activity is subject to thorough examination and control.

All the firms strictly abided by the contract terms, conditions and requirements, with inspection and evaluation by the acceptance committees. No contractors were found to have caused significant adverse impacts on the environment.

### Environmental Grievance Mechanisms

EGAT has always recognized and attached importance to environmental problems. It offers opportunities for stakeholders to take part in preventing and correcting environmental problems that might arise from development project implementation and power plants. Various complaint handling systems have been put in place for convenience, both during and after office hours. Complaints can be accepted through the EGAT website, complaint boxes at project offices, the public relations and community relations units of all power plants, EGAT Contact Center (1416) and EGAT's Opinion Handling Center. Complaints can also be lodged through the Joint Committees for Operation Monitoring and Community Environment Development and the Power Plant Community Environment Working Groups where local people, local agencies and relevant government agencies are also represented. In handling complaints, EGAT treats complainants fairly, with responsibility and transparency. Case owners are also designated to look into the matter and determine an approach to take and the timeframe for resolution in a concrete manner. Immediate actions are taken in urgent cases. Complainants are then informed of the outcome.

An example of complaints lodged in 2014 through the formal complaint acceptance mechanism in connection with environmental impacts was people's concern over air pollution caused by the cooling tower of North Bangkok Power Plant. EGAT quickly conducted fact finding by measuring the air quality to find contaminants in steam released from the cooling tower and particulates evaporating from the power plant's Unit 1 chimney. The complainant and other parties concerned were invited to observe the operation and to acknowledge the measurement results, and an explanation. Questions were answered and understandings were straightened. EGAT considers every complaint important for caring and sustainable coexistence of communities and society.



# We share.

## Sharing knowledge and expertise

EGAT's power plants, and Mae Moh Mine in particular, organized open house events to transfer knowledge about energy and natural forest restoration to all visitors at Mae Moh Mine Museum in Lampang province and at Rajanurak Learning Center located at Srinagarind dam in Kanchanaburi province, where plant conservation activities initiated by HRH Princess Maha Chakri Sirindhorn are exhibited.

# Social Performance

## Labor Practices

EGAT has put prime importance upon the practices of human rights. All EGAT employees are well managed in such a way that they are entitled to fair and appropriate remuneration and welfare benefits. Opportunities are also opened for them to keep advance in their career, to have a good quality of life, safety, as well as a good environment to work in. The purpose is to boost morale, strengthen bonds and work enjoyment, which will lead to the readiness of employees for work and ultimately to the organization's success and objective achievement.

## Employment [G4-DMA]

EGAT has also regularly developed the recruitment procedures which are fair and transparent. Its employment is based on specification of remuneration, working hours, rest time, holidays, working environments, occupational health and safety as well as welfare, benefits, all of which exceed labor law requirements.

As regards contracting out, EGAT requires that all contractors recruit personnel through transparent procedures and treat workers appropriately and fairly, complying with the labor protection law, the labor relations law, the social security law, the workmen's compensation law and other relevant laws. This is considered part of the contract. As an example, wages paid may not be lower than the legal requirement. In the event the contractor fails to pay wages or any other compensation, EGAT has the right to use the service fee to pay the contractors' employee first. Contractors' failure to comply gives EGAT the right to terminate and penalize as well as blacklist them.



EGAT provides coach transportation for employees to travel to and from work on 42 routes.

Age range (years)	Employees			Special contract workers			Total (persons)
	Male (Persons)	Female (Persons)	Total (Persons)	Male (Persons)	Female (Persons)	Total (Persons)	
Under 20	3	-	3	-	-	-	3
20 - 30	3,198	1,100	4,298	62	1	63	4,361
31 - 40	1,334	567	1,901	190	7	197	2,098
41 - 50	4,334	1,348	5,682	129	18	147	5,829
51 - 60	8,346	2,244	10,590	31	8	39	10,629
Total	17,215	5,259	22,474	412	34	446	22,920

Age range (years)	Employees						Special contract workers						Grand total (persons)
	Central Offices			Regional Offices			Central Offices			Regional Offices			
	Male (Persons)	Female (Persons)	Total (Persons)	Male (Persons)	Female (Persons)	Total (Persons)	Male (Persons)	Female (Persons)	Total (Persons)	Male (Persons)	Female (Persons)	Total (Persons)	
20 - 30	235	145	380	279	83	362	7	-	7	13	-	13	762
31 - 40	2	4	6	-	1	1	5	-	5	3	-	3	15
Total	237	149	386	279	84	363	12	-	12	16	-	16	777

Age range (years)	Central Offices			Regional Offices			Grand total (persons)
	Male (Persons)	Female (Persons)	Total (Persons)	Male (Persons)	Female (Persons)	Total (Persons)	
20 - 30	18	12	30	9	2	11	41
31 - 40	2	4	6	2	-	2	8
41 - 50	1	2	3	-	-	-	3
51 - 60	3	1	4	2	-	2	6
Total	24	19	43	13	2	15	58

Retiring in the next 5 years				Retiring in the next 10 years			
Central Offices	%	Regional Offices	%	Central Offices	%	Regional Offices	%
2,711	12.06	3,518	15.65	4,745	21.11	6,168	27.45

To be terminated in the next 5 years				To be terminated in the next 10 years			
Central Offices	%	Regional Offices	%	Central Offices	%	Regional Offices	%
10	2.24	7	1.57	50	11.21	22	4.93

## Welfare and Benefits

EGAT encourages employees to set up their own group – the Labour Union of Electricity Generating Authority of Thailand (LU-EGAT) as prescribed by the State Enterprise Labour Relations Act, B.E. 2543. The objective of the labour union is to protect the rights and benefits of the employees. At present, the LU-EGAT consists of 16,871 members, or 73.61% of the total number of employees. A bilateral committee was also established, comprising nine representatives each of management and the LU-EGAT. The main function of the committee is to ensure understanding between management and the employees, to follow up on employment conditions, rights and benefits, and employees' complaints, and to review the suitability of the organization's welfare. It also aims to promote and develop labor relations matters for reconciliation and for settlement of disputes within the organization, as well as to revise and update work regulations as appropriate.

EGAT offers equal welfare and benefits, to all groups of employees at levels, higher than legal requirements. However, there are some differences depending on job characteristics, locations and levels, as follows:

No.	Welfare and benefits	Employee group		
		High level executives	Managerial level	Operation level
1	Various leaves: sick leave, personal leave, annual leave, maternity leave, parental leave, study leave, monkhood leave, pilgrimage leave, spouse accompanying leave, military service-related leave and paternity leave.	✓	✓	✓
2	Work stoppage for recovery from EGAT work-related danger or illness or work stoppage not counted toward leave days	✓	✓	✓
3	Provident fund	✓	✓	✓
4	Financial assistance for medical expenditure of employees, spouse, children and parents	✓	✓	✓
5	Financial assistance for employee's children	✓	✓	✓
6	Emergency loan	✓	✓	✓
7	Financial assistance for medical expenditure and compensation for loss of income due to non work-related disability	✓	✓	✓
8	Bonus	✓	✓	✓
9	The use of guest houses, boats, restaurants, shuttle buses, and school buses	✓	✓	✓
10	Financial assistance for damage of residence or other property caused by a public disaster	✓	✓	✓
11	Overtime and holiday work payments	-	-	✓(*, **)
12	Special allowance for certain work characteristics (e.g. heavy machine operating; shift working)	-	-	✓(**)
13	Risk allowance	-	✓	✓(***)
14	Rental allowance	-	✓	✓(***)
15	Insurance coverage for operating in southern border provinces	✓	✓	✓(***)
16	Outfit for certain jobs	-	-	✓(****)

Notes: (\*) As specified by EGAT

(\*\*) Applicable only to positions and levels as specified by EGAT

(\*\*\*) Applicable only in areas as specified by EGAT

(\*\*\*\*) Applicable to employees performing work as specified by EGAT

## Occupational Health and Safety

EGAT manages occupational health, safety and environment in accordance with relevant laws and international standards. Reorganization and personnel development have been continuously conducted in order to prevent losses in terms of personnel, property and production processes. Another purpose is to raise employees' quality of life as they are considered the organization's valuable resources. EGAT wants them to be happy, to have confidence in their jobs, and to have a guarantee for safety as they are in a good environment, free from occupational hazards or effects of diseases, so that they can perform their jobs to the best of their ability.

Major activities conducted by EGAT during 2014 in the area of occupational health, safety and environment were as follows:

- Revision of the Notification on Occupational Safety, Health and Environment, to place greater emphasis on appropriate management of occupational safety, health and environment, proportionate to risk levels and on controlling incidental losses. The focus is also on compliance to relevant laws, requirements and standards, as well as promotion of communication to bring about knowledge and understanding, awareness and participation, in order to eventually lead to instilment of an EGAT safety culture. Resources were also devoted with a view to having serious and sustainable implementation while developing EGAT into a high performance organization enjoying social acceptance and attaining international standards.
- Having in place an EGAT Safety Management System (EGAT SMS) for use as a common standard of safety management by EGAT units.
- Classification and categorization of units based on EGAT's 2014 Occupational Safety, Health and Environment Management Standard. Units are divided by risk level into three groups, as follows: 1) the high-risk group, comprising units with the majority of personnel operating generators, controlling or maintaining machinery or equipment and with safety management evaluated by OSHAS 18001 2) the moderate-risk group, comprising units with the majority of personnel performing survey, construction, engineering, transportation, servicing and communication system maintenance jobs and with safety management evaluated by certification by EGAT's Committee for Certification of Quality Management and Safety Systems, and 3) the low-risk group, comprising units with the majority of personnel performing administrative and managerial office work, and with evaluation based on reports on occupational safety, health and environment performance submitted to EGAT's Quality and Safety Development division.
- Enhancement of the effectiveness of the occupational environmental hazard surveillance and the annual medical check-up of employees of regional units by outsourcing the tasks to private companies for speedier reports.

### Organization of Units Responsible for Occupational Safety, Health and Environment [G4-LA5]

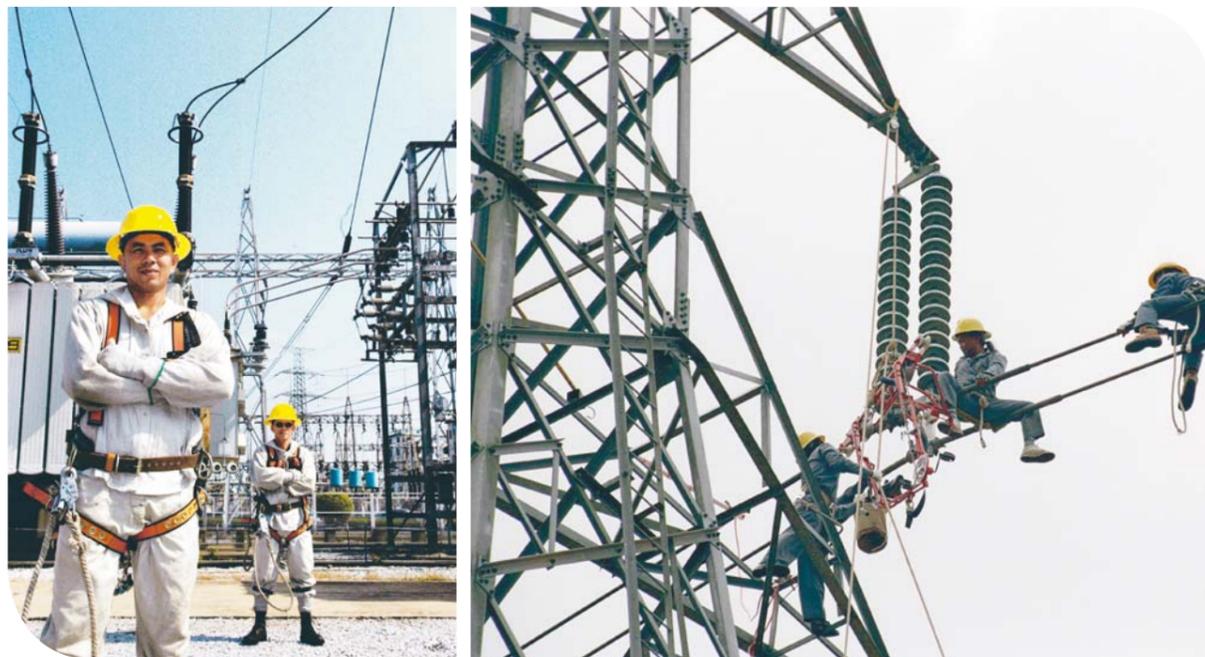
EGAT has altogether 23 units dealing with safety, at division, department and section levels, depending on the mission, hazardous risks, the number of personnel, the size and physical characteristics.

In addition, 28 Occupational Safety, Health and Environment Committees have been appointed to oversee employee's rights in the area of occupational safety, health and environment; to formulate work safety policies and plans; to prepare safety training plans; to lay down a system for unsafe circumstance alerting for prevention and resolution; to conduct surveys and improve working environments for safety as well as to follow up on progress and oversee other matters relevant to safety of personnel and related persons within the area. These committees' operations cover all EGAT premises, such as power stations, dams, and power plants, as required by law. As an example, the Head Office Occupational Safety, Health and Environment Committee has 22 members comprising a chairman, nine representatives of management, ten representative of employees, a secretary and an assistant secretary. The total number of employee representatives in all the committees is 128, representing 0.79% of the total number of employees.

## Compliance to Relevant Laws and Standards

EGAT takes measures to provide occupational safety, health and environment for all employees in accordance with requirements of laws and international standards, including the Occupational Safety, Health and Environment Act, B.E. 2554, the Labour Protection Act, B.E. 2551, the State Enterprise Labour Relations Act, B.E. 2543, ISO 9001:2008, ISO 14001:2004, and TIS/OHSAS 18001, covering such areas as:

- Provision of personal protective equipment to employees in accordance with job risks
- Hygiene surveillances for such items as chemicals, hazardous objects, radiation, heat, light and confined spaces
- Training in such areas as occupational safety, health and environment for new employees; occupational diseases and other courses suitable for the health condition; risk factors resulting from the nature of work or illnesses. The aim is to enable employees to behave correctly and stay healthy.



- Special health examination for occupational disease surveillance for jobs with high exposure to accidental and occupational disease risks. In addition, all employees are entitled to medical treatment when they become ill and to an annual check-up to assess risks and illness conditions or to detect a disease from the early stage. The purpose is to be able to prevent, control or restrain chronic diseases before they become serious and hard to cure.
- Provision of compensation, protection and rights for making claims for medical expenditure in accordance with EGAT regulations and laws in cases of occupational accidents resulting in loss of working days or bodily injuries or disability.

## Property Damage Accidents

In 2014, EGAT encountered 366 cases of accidents which caused damage to EGAT's property, broken down as follows: 157 accidents which caused damage to motor vehicles, 75 cases of accidents resulting in damage to heavy machines, 117 cases of accidents resulting in damage to machinery and equipment, 3 cases of accidents resulting in damage to buildings and 14 cases of accidents resulting in damage to other kinds of property. Property damages totaled 20,176,985.63 Baht.

## Work-related Accidents and Injuries Statistics

Injuries or illness	2013 (cases)	2014 (cases)	Increase/decrease (percent)
Number of accidents	122	89	Decrease 27.45
Loss of working days	25	20	Decrease 20
No loss of working days	87	65	Decrease 25.29
Fatal	4	0	Decrease 100
<b>Frequency (Index)</b>			
Disabling Injury Frequency Rate - DIFR	0.74	0.51	Decrease 31.08
Incident Rate of Non-Fatal Occupational Injuries and Illness per 200,000 hours/man	0.13	0.10	Decrease 23.08 *
<b>Severity (Index)</b>			
Disabling Injury Severity Rate - DISR	13.16	4.65	Decrease 64.67 **
Disabling Injury Index - DII	0.01	0.00	Decrease 100

Notes: \* The figure was lower than the NAICS Electric Generation, Transmission and Distribution Code which is 38.77 cases to 200,000 employee-hours worked.

\*\* Fatal  
Information as of March 3, 2015

## Training and Education

Considering human resources extremely important and valuable to the organization’s continuing growth, EGAT places emphasis on adding value to its personnel. The aim is to make them competent persons who are knowledgeable, skillful and professional; good persons who are moral, generous, and dedicated to the organization, society and the country; and happy persons who have good morale and a good quality of life.

10,985 EGAT employees are expected to retire in the next 10 years. The number constitutes 48% of the number of personnel in 2014 – 22,920. EGAT has therefore been developing younger generations to enable them to learn and adopt the organization’s values and culture so that they can promptly take the jobs handed off by the older personnel to allow the organization to continue moving forward. First priority is given to the groups with special technical talents who are key personnel to ensure smooth and error-free continuation of EGAT’s operation. Emphasis is also placed on development in the areas of fast changing advanced technologies in order to be prepared for changes.

### Skills Development [G4-LA10]

At EGAT, human resources development is done through various processes, such as in-house training, coaching, mentoring, on-the-job training, special assignments, seminars and job rotation.

EGAT’s in-house training consists of programs run by Human Resource Development Division. The programs are divided into eight groups; namely, leadership and operational employee development; general management promotion; quality of life, moral and ethics promotion; new incumbent orientation; learning promotion; job skills enhancement; information technology development; and organization’s special competence development and technical courses. Also included are control engineering, information technology, risk management, and knowledge management, which are handled by various lines; namely, Transmission, Fuel, Administration, Accounting and Finance, and Policy and Planning.

In addition, EGAT promotes self-development among its personnel. Training courses can be sourced from outside the organization. Postgraduate scholarships are also granted for both domestic and overseas studies. The purpose is to promote and develop the potential of personnel in preparation for future requirements and to enhance its competitiveness.



## Numbers of Average Training Hours of Personnel per Person per Year

Department	No. of persons	No. of days	Man-Day	Man-Hour
Governor	150	1,533	10.22	71.54
Deputy Governor-Policy and Planning	362	3,768	10.41	72.86
Deputy Governor-Account and Finance	1,152	7,788	6.76	47.32
Deputy Governor-Administration	1,968	8,945	4.55	31.82
Deputy Governor-Generation	8,104	43,428	5.36	37.51
Deputy Governor-Fuel	2,069	6,373	3.08	21.56
Deputy Governor-Transmission System	3,587	23,574	6.57	46.00
Deputy Governor-Corporate Social Affairs	458	2,464	5.38	37.66
Deputy Governor-Power Plant Development	2,004	11,166	5.57	39.00
Deputy Governor-Transmission System Development	1,420	9,283	6.54	45.76
Deputy Governor-Business Development	2,553	13,911	5.45	38.14
Total	23,827	132,233	5.55	38.85

### Making Preparations for Retirement

Several courses are provided to employees to help them prepare for their retirement years. These courses are designed for different ages. For example, a course on life balance is offered to people around 40 years old. A course on health and wealth management is for those around 45 years old. A life planning course is designed for those whose age is around 50. Life Management is for 58-year-old personnel. These courses are designed to educate personnel so that they have an understanding of their physical change, how to take care of their mental health, financial planning and relevant laws, so that they can enjoy a happy life after retirement.



## Performance Appraisal

EGAT requires that the performance of all personnel at all levels be appraised in order to bring about operational effectiveness. The results of the performance appraisals are used in remuneration and motivation consideration. In addition, individual competencies are appraised for use in the preparation of individual development plans, which is an exercise jointly conducted by employees and their supervisors. Training needs are identified in accordance with the position, roles and the category of work in order to develop competencies which address the organization's requirements.

For specific technical skills, such as in transmission line and high-voltage substation maintenance, a specialized school, Lineman Training School, has been established to serve as a center for development of knowledge and skills of personnel operating on high-voltage transmission lines, and, likewise, a High-Voltage Substation School is for those whose jobs involve maintenance of high-voltage substations. Trainees are required to pass the evaluation criteria for both the theory and the practice parts and to qualify for a certificate before they can perform actual work.



## Social Performance

### Taking Care of Local Communities [G4-DMA]

#### EGAT and Community Care

It takes years to construct a power plant, from the preparation stage to the construction stage. Communities' way of life, the environment and local resources, such as water resources, may be affected. There are also concerns over various issues. Looking after communities is therefore considered a vital part of EGAT's electricity generating operation. The successive executives made it a firm policy that "Where EGAT operates, local communities lead a happy life."



#### Management Approach

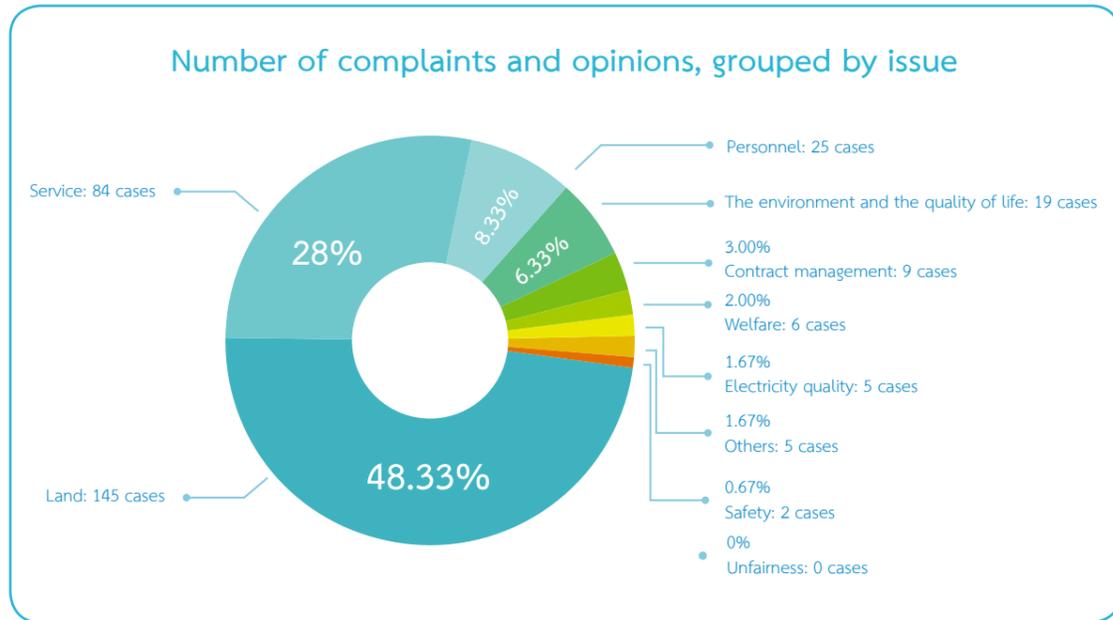
Management follows the good governance policy under the Organic Act on Counter Corruption. The EGAT Corporate Governance Branch under the Office of the Governor, plays the key role in this area. The social responsibility policy, which follows ISO 26000, has the Social Affairs Division as the driver and the EGAT Environment Pledge, which follows ISO 14001, is led by the Project Environment Division. These leading departments cascade down the policies set by the executives to the operation levels of every business line, prepare operational plans and monitor outcomes. They also hold meetings of committees and working groups responsible for each area to ensure participation in efficient operation, spending and communication.

The policies cover human right protection, dealing with impacts of the organization's decisions and operations on stakeholders, and caring for environmental impacts, as well as compliance to laws, and regulations and orders.

In the event impacted parties feel that they are not treated fairly, complaints can be lodged through various channels; e.g., letters to the Governor or to the relevant EGAT working group or officer, complaints lodged through complaint boxes on project sites, or through the hotline, 1416, or the EGAT website which has the Voice of Stakeholders (VOS) and the Voice of Customer embedded. Complaints can even be lodged during tripartite (EGAT - communities - local government agencies) meetings.



Upon receipt of complaints, the systems and units responsible will take action to resolve them within a specified time frame. The complainants are kept posted of the progress at intervals. Resolved and pending cases are summarized and reported to management. Relevant units are also given notice in case of delay or failure to take action. In 2014, there were 300 complaints.



### Monitoring and Reporting Mechanisms

EGAT monitors and verifies the outcomes of the operations to ensure that the units responsible have executed the policy, with good management and standardized operations. Committees and working groups relevant to the nature of the work are put in place; e.g., the Risk Review and Internal Control Committee, the Working Group for Verification of Social Responsibility Operations in Accordance with ISO 26000 and the Working Group for Monitoring of Environmental Impacts Based on ISO 14001. These bodies act as internal auditors or verifiers at least once a year.

Auditing by external agencies is done twice a year for the systems with certification, such as ISO 14001, which require certification by external bodies. Once a year, EGAT also conducts a survey to determine the level of awareness, satisfaction and acceptance of stakeholders concerning EGAT operations.

The outcomes of the operations, auditing and opinion surveys are presented in the EGAT Annual Report, the Report on Environmental Performance Monitoring, and the Sustainability Report based on GRI guidelines which, for the 2015 edition, EGAT plans to improve in terms of monitoring, data gathering and reporting efficiency. In addition, key achievements are also reported within the scope of the Organization Performance Report 2014.

### Operations Related to Communities

In accomplishing the mission of generating electricity, develop and operate generators and transmitting electricity into the high-voltage national grid to distribute to substations of the Metropolitan Electricity Authority, the Provincial Electricity Authority for sale to all categories of electricity users throughout the country, EGAT has five main operations which are directly related to managing the impacts and developing communities, out of the total 10 operations, or 50%, as described below:

Category	Nature of operation	Operations related to communities					
		Community Engagement	Environmental Impact Assessment	Environmental and Health Impact Assessment	Disclosure of study results to communities	Monitoring	Projects/ programs based on communities' needs
Power plant development	New power plant construction	✓	✓	✓	✓		✓
Transmission system development	Transmission line and high-voltage substation construction	✓	✓		✓		✓
Fuel	Mae Moh Mine operation	✓	✓		✓	✓	✓
Electricity generation	Electricity generation	✓				✓	✓
Transmission system	Transmission of electricity into the system	✓				✓	✓

**Pre-construction Stage** EGAT's focus is on environmental, social and health impact assessment. Once an Environmental and Health Impact Assessment Report has been completed, it will be reviewed by the specialist committee and the National Environmental Board. Following approval of the report, the results of the reviews will be used in making a request for project approval and applying for a business operation permit.

**Construction Stage** After the project is approved, EGAT, by its Project Environment Division, will monitor the project implementation to ascertain that it adheres to the environmental impact prevention and mitigation measures, the environmental quality monitoring measures, as well as the survey of community attitudes as stipulated in the impact assessment report, both during the construction stage and the generation stage.

Progress of the operation has to be reported to the tripartite committee, consisting representatives of the government sector, the people sector and EGAT. A report on the outcome of the measures taken, including a public attitude survey, has to be submitted to the Office of Natural Resources and Environmental Policy and Planning every six months.

**Operation Stage** The Project Environment Division monitors the electricity generating operation of power plants on a quarterly basis and prepare an annual monitoring report. A popular version is also produced to enable the general public to follow up on progress and performance in various areas in an easy-to-understand fashion.

In addition, systems have been put in place for international standard environmental management and occupational health and safety management based on TIS 18001, from the power plant construction stage, the transmission system construction stage, to the operation stage. There are internal monitoring committees for the various systems who, on a quarterly basis, check the operation against the stipulations in the impact assessment report, the impact mitigation operation plan and standard occupational health and safety undertakings.

**Grievance Mechanism** To take opinions and listen to complaints about the operations, EGAT has set up various systems and channels. These include administrative units, a hotline, a complaint and opinion handling system and a “Voice of Customer (VOC)” system which is embedded in the EGAT website www.egat.co.th under the button “Complaint”. Units and personnel have been designated to handle complaints systematically. As an example, the customers of Transmission System are the Metropolitan Electricity Authority, the Provincial Electricity Authority and eight direct users. The business line has appointed a committee and subcommittees to handle complaints by gathering concerns, observations and recommendations and respond in acknowledgement of the matters within two business days. A report is submitted to the Transmission System Executive Committee for resolving. The persons lodging the opinions are notified of the results within 30 days of the registration in the VOC system.

**Presentation of Analyses and Opinion Hearing**

During 2014, EGAT and consultant firms organized venues for presentation of Environmental and Health Impact Assessment (EHIA) Reports for large-scale construction projects and to listen to opinions of seven groups of people and stakeholders in construction project sites. These groups were: directly impacted parties, agencies responsible for preparation of EHIA Reports, the study team and the Office of Natural Resources and Environmental Policy and Planning, representatives of the relevant government agencies from the central administration, the provincial administration and the local administration, representatives of agencies sensitive to impacts, local politicians, representatives or other organizations or organized groups, representatives of local media, and the general public and interested individuals. The participatory procedure is used. The activity is divided into three sessions:

- Session 1 (Khor. 1) To listen to opinions towards the scoping and the EHIA approach (Public Scoping)
- Session 2 (Khor. 2) To listen to opinions towards the assessment and the preparation of the report, in order to understand local community way of life and the community environment which may suffer from environmental and health impact. A survey and hearing are conducted; e.g., by having group discussions, interviews, or offering an opportunity to attend presentations and voice opinions. (Public Screening)
- Session 3 (Khor.3) To listen to opinions towards the review of the draft EHIA Report and gather opinions of the stakeholders for use in preparation of a final report for completion. The purpose is also to consider measure for prevention and correction of impacts and monitoring measures (Public Review) for submission to the Specialist Committee, independent environmental and health organizations, permitting agencies and the National Environmental Board, in that order, for consideration prior to seeking cabinet approval of the project.

Project name	Session type			Time/place	Concerns
	Khor.1	Khor.2	Khor.3		
Krabi Power Plant Capacity Expansion Project (installed capacity: 800 MW)	2012		✓	October 12, at the community hall of Nuea Khlong district, Krabi province	- Environmental impacts: bridge construction and transport of imported coal by ships - Impacts of chemicals on health; improvement of the quality of life of people in communities
Khlong Rua Seaport Project	✓			March 9, at Khlong Rua School, Mu 1, Talingchan subdistrict, Neau Khlong district, Krabi province	
		✓		April 28 - June 12, in the field	
			✓	September 28, at the community hall of Nuea Khlong district, Krabi province	- Underwater resources; transport of imported coal; tourism

Project name	Session type			Time/place	Concerns
	Khor.1	Khor.2	Khor.3		
Thepha Power Plant Project and Seaport Project (installed capacity: 1,100 MW)	✓			November 2, at Pak Bang SAO, Thepha district, Songkhla province	<u>Power Plant Project</u> - Impacts on the ecological system - Site selection techniques - Criteria for impact assessment - Access to information - Good and efficient management of the construction and electricity generation <u>The Seaport Project</u> - Construction techniques - Impacts on the ecological system, fisheries and farming - Construction of the seaport and navigation routes - Tourism - Having thorough and comprehensive information - Risk management plans in case of unexpected events

**Stakeholder Management**

In developing electricity generating sites, EGAT recognizes the importance of communities nearby. Therefore, its Project Community Relations Division performs social mapping by issuing letters to local units to inform them of the objectives in advance.

- Personnel preparation
- Fieldwork preparation
- On-site activities: prepare a “foot map”, explore the community structure, and identify opinion leaders (e.g., local “wise men”).

The Project Community Relations Division then makes use of the information obtained in developing a data base for each project site. It is also used as information for the analysis of social capital of the communities as well as for preparations of work plans and desired activities.

Each power plant and dam has its own public relations and community relations unit, which gathers local data in much the same way. The information is reviewed and updated on a yearly basis.

Visiting the location to gather information is one way of building relationships and having informal dialogues with community members, leading to closeness and good relationships. It is also input to no less than 75 participatory work plans for EGAT and people living around power plants and dams and over a hundred activities each year. These work plans are for development of the quality of life, generating income, creating jobs, developing youth education and promoting tourism. Examples are the cases of Mae Moh EGAT, Lampang province; Bhumibol Dam, Tak province; Ubolratana Dam, Khon Kaen province; Rajjaprabha Dam, Surat Thani province; Bang Pakong Power Plant, Chachoengsao province; and Chana Power Plant, Songkhla province.

“Tales from Forests”: EGAT’s 20 Years’ Reforestation Program



Projects to Improve the Quality of Life to Satisfy Community Needs [64-501]

Target group	Project/work	Output	Outcome
Society in general	<b>1. 20-year Reforestation Program (1994-2014)</b> The targeted 6,500 rai reforestation in 2014 was completed as scheduled. The work was under the Reforestation Project in Honor of Her Royal Highness Princess Maha Chakri Sirindhorn. Reforestation was carried out in areas of Doi Phu Kha National Park, and Mae Charim National Park, Pa Nam-yao and Pa Nam-suad National Conserved Forests, areas of Doi Phu Kha National Park, Pa Pha Daeng National Conserved Forest, Nan province, and Pa Pha Daeng National Conserved Forest. The reforestation is broken down as follows: 5,000 rai of terrestrial forests, 500 rai of community forests and another 1,000 rai of mangrove forests in Chumphon and Nakhon Si Thammarat provinces.	20 years = 425,251 rai 2014 = 13,000 rai	<ul style="list-style-type: none"> <li>- Restoration of the forest ecosystem and rehabilitation of wildlife.</li> <li>- Communities around the locations can utilize the forest, earn income and have a better quality of life.</li> <li>- Reduction of CO<sub>2</sub> emission; reduction of global warming.</li> </ul>
	<b>2. The Wankaew (eyeglasses) for the Poor Project</b> in honor of Her Royal Highness Princess Maha Chakri Sirindhorn. 47 mobile units were dispatched to serve about 30,000 people.	30,000 people	- Better quality of life for the underprivileged.

Target group	Project/work	Output	Outcome
	<b>3. Mobile Medical and Dental Unit Project.</b> The Medical and Health Bureau has established mobile medical and dental units since 2010, focusing on providing examination and treatment to people living around power plants or along transmission lines.	24 years = an average of 21 visits per year, broken down as follows: mobile medical units 807 patients/visit or 17,000 patients per year; mobile dental units 159 patients/visit or 1,880 patients per year. 16 visits in 2014	- People having better physical and oral health.
Communities around power plant construction projects	<b>1. Khlong Na Thab Blue Swimmer Crab Bank</b> Ban Pak Bang Na Thab, Na Thab subdistrict, Na thab district, Songkhla province. The Chana Power Plant Block 2 Development Project provided financial support for construction of a blue swimmer crab hatchery system and training in crab trap making to increase the crab supply in Khlong Na Thab canal. The project was aimed at increasing awareness of the importance of natural conservation and restoration and educating local people in fisheries without harming natural resources and the environment. It also serves as a coastal fisheries learning spot for other communities.	The opening ceremony of the Blue Swimmer Crab Bank was held on October 25, 2014.	<ul style="list-style-type: none"> <li>- Increased income from crab sales.</li> <li>- Crab hatchery knowledge body.</li> <li>- Restoration of natural resources of Khlong Na Thab.</li> </ul>
	<b>2. Artesian well drilling project</b> EGAT, in cooperation with Pakasai SAO, Krabi province, drilled artesian wells to solve water shortage problems of local people.	Four wells	- People having an all-year supply of water for consumption.
	<b>3. The Biological Way of Life for Sustainable Development Project</b> The Project Community Relation Division of EGAT Krabi launched public education project for people in Pakasai subdistrict on the use of EM in farming and livestock raising.	A large number of trainees.	- Better quality of life and environment.
Communities around transmission line routes and high-voltage substations	<b>1. Improvement of education quality for youths</b> through an online English tutorial program and a lunch support program	52 activities	- Youths’ language knowledge enhanced; skills and experience for youths in mushroom cultivation for food or for supplementary family income plus good health.
	<b>2. Health promotion: mobile medical and dental units rendered services</b> to the people, at the same time straightening understandings about electricity development issues.	14 activities	- People having better physical and oral health.
	<b>3. Promotion of public facilities</b> such as health parks and improvement of children’s playgrounds	11 activities	- People having good physical and mental health.

Target group	Project/work	Output	Outcome
Communities near transmission lines	1. The Model Sufficiency Economy Community Project with the concept of His Majesty the King - Khlong Na Mon Community, Sai Noi district, Nonthaburi province	170 families	- Better health, income, and the environment due to chemical-free farming and livestock raising. All-year supply of chemical-free vegetables.
	2. Sustainable Self-Reliance Promotion Project at Ban Huay Yang, Khao Suan Kwang district, Khon Kaen province. This project involves cooperation between villagers of Ban Huay Yang and EGAT by the northeastern operation team, Thammasat University and Dong Mueang Aem SAO. All worked together to solve the consumption water shortage problems by diverting water from Huay Yang to Lower and Upper Nong Saeng.	Villagers of Mu 5 and Mu 15, 195 households altogether	- The quantity of water in the reservoir of Lower and Upper Nong Saeng villages is sufficient for water supply production. The quantity of water in the reservoir as of September 2014 was 76,000 cubic meters, more than the set target of 35,000 cubic meters. - A sense of ownership, more solid self confidence and pride for achievement. - Being a model commodity and can expand the network to other communities. - The community leaders see EGAT officials as their children and grandchildren and are thus ready to cooperate in taking care of EGAT transmission lines.
	3. English Skills Development for Children and Youths Project in the northern part of Thailand	52 participating schools 560 participants	- Youths in the northern provinces having English knowledge and skills.
	4. Model Sufficiency Economy Community Project at Ban Kok Saya, Narathiwat province Ban Kok Saya Community is near Su-ngai Kolok high-voltage substation with 115 kV transmission lines passing over. Villagers are interested in the biological way of life for sustainable development project, having grown chemical-free vegetables and perennials under the transmission lines since 2001.	Eight activity groups: 1. Cassava, lemon grass, galanga, and turmeric farming. 2. Fish culture under transmission lines. 3. Organic fertilizer making. 4. Goat raising. 5. Poultry raising. 6. Agricultural produce processing. 7. Chemical-free vegetable farming (chilies, beans, corn, pumpkin, cucumber and watermelon - depending on seasonality). 8. Cleaning fluid making.	- Evident ability to improve the quality of life, general income for group members. Cooperation with EGAT by keeping an eye on the transmission lines in dangerous zones.

Target group	Project/work	Output	Outcome
Communities around power plants and dams	1. Project for People Upstream, Midstream and Downstream Launched by Bhumibol Dam, this project uses the potential of the dam in straightening understandings of people living in areas upstream, midstream and downstream of the dam in utilization of the limited water resources by refraining from deforestation and correcting problems in the flood and the dry seasons under Community Joint Efforts. Under the project, people with volunteering spirit work together to build check dams and firebreaks, using small budgets driven by cooperation within their community.	Operation based on the six governance principles; namely, the rules of law, moral integrity, transparency, participation, responsibility and accountability and effectiveness and efficiency	<b>Community level</b> - Sharing of water, jointly protecting headwater forests; mutual understanding and care among upstream, midstream and downstream people. <b>Regional and national level</b> - Expansion of forest protection networks; increase in forest area; increase in water quantity thanks particularly to people on the Ping river and its tributaries. - Cooperation in water management with integration of various sectors and parties. - A model for understanding and relationship building among upstream, midstream and downstream people.
	2. Community Knowledge Sharing Event in Nam Phong district, Khon Kaen province. The event has been organized by Nam Phong Power Plant since 2009. Support and encouragement are given to the establishment of sufficiency economy learning centers for communities around the power plant and community environmental conservation.	23 centers	- Occupational development and community environmental protection. - Transfer of local knowledge and wisdom. - Conservation of local arts and culture unique to the northeast.
	3. (Complete) Northern Traditional Music Conservation Project This work of Mae Moh EGAT employees with volunteering spirit has been carried out since 2009. The teaching of music is done both in and outside the school system.	16 participating schools. One class a week throughout the academic year. For after-class sessions, the teaching is done in the afternoon after weekday school hours or on weekends. 9 youth groups.	- Continuation of local culture, traditions, and music. - Transfer of knowledge in the making of local musical instruments for own use and for sale. - Pride of the youths in performing music on various occasions both in the country and abroad.
	4. The "Move World Together Project", the Corporate Communications Division and Thammasat University jointly organized training to promote energy innovation creations among youths.	21 educational institutes and 102 students participated.	- Thai youths having innovation creation capability.

## Happy Life Around the Reservoir of Ubolratana Dam

As water is so important to the well-being of the people, Ubolratana Dam attached importance to water jointly used with communities around its reservoir. Its work in water-related areas has been successful in generating income, brought about reputation, and has been a good model.

Ubolratana Dam is the second multi-purpose dam in Thailand, constructed after Bhumibol Dam. Built to obstruct the Nam Phong river, it is the dam of the first hydropower plant in the Northeast, located in Khuan Ubolratana subdistrict, Ubolratana district, Khon Kaen province, and was officially opened on March 14, 1966. Unlike most other dams in terms of physical characteristics, it is shallow and is of a rice plate shape. Despite its huge size, it can be full rapidly in case of heavy rainfall, with the depth greater than that in the wet and the dry seasons. Moreover, the river passes an area of economic value - Mueng district of Khon Kaen province.

With such characteristics, water management is complicated and many factors have to be taken into consideration to ensure that all parties of stakeholders share the benefits in terms of consumption, fisheries, water supply production, flood relief, etc. The river's ecological balance also needs to be maintained. Farming and fisheries are of most importance. Farming areas cover about 300,000 rai and rice cultivation is done twice a year, with average annual production of over 1,500,000 kilograms. Electricity generating is the second priority. The primary mission of Ubolratana Dam is therefore obviously management of CSR in process. The dam has been tremendously successful in conducting activities under its “Good governance and Water Management Quality Improvement Project”.



Ubolratana Dam is among the largest fisheries resources in the Northeast. Millions and millions of fingerlings and other aquatic animal young are released into the reservoir each year to increase the supply of aquatic animals and to satisfy the demand of people living around the reservoir, a large number of whom are engaged in fisheries and basket fish farming. Millions and millions of kilograms of catches generate 60 million Baht annually, which helps to improve the quality of life and strengthen the communities. The “Fish Conservation Zones Project” has strengthened the communities around the reservoir as the aquatic animals

are an important resource generating income as well as linkage occupations such as fishing gear making and trading of processed aquatic animals. It is also a vital source of protein for people in general.

Apart from occupations and income, what people gain from the efforts is knowledge and understanding of the benefits from sustainability of aquatic animals, which has stimulated their participation in preventing deterioration of the water resources and in restoring the conditions conducive to aquatic animals' living and reproduction. Besides, information about aquatic animal conservation and laws and regulations pertaining to fisheries is disseminated. Recommendations are also made regarding approaches to management of fisheries resources in the reservoir for appropriate and sustainable utilization suitable for the local way of life. This is, in fact, implementation of EGAT's policy in becoming part of the local communities and is in line with its governance policy.

The Fish Conservation Zones Project has been launched since 2009 in areas covering two provinces (six districts and 23 subdistricts) where there are communities on the reservoir of Ubolratana Dam. The districts are Ubolratana, Nong Ruea, Phu Wiang, and Nong Na Kham of Khon Kaen province and Si Bun Rueang and Non Sang of Nong Bua Lam Phu province. The project is implemented with cooperation from the Khon Kaen Inland Fisheries Research and Development Center, and the Khon Kaen and Nong Bua Lam Phu Provincial Fisheries Offices. The success of the project can be witnessed by the national level award given to Ban Tha Lard Fisheries Community, Mu 12, Non Sang district of Nong Bua Lam Phu province. The community demonstrated good participation and potential in local fisheries management under the Model Fisheries Community Management Project. The community received this award as a model fisheries community for two consecutive years, 2011 and 2012.

With such rich fisheries resources, EGAT Ubolratana Dam encourages the people of Ban Huay Bong Community in Non Sang district, Nong Bua Lam Phu province, to engage in fish processing as an occupation, with additional financial support from Non Mueng SAO. The Kamnan (subdistrict headman) and employees of Ubolratana Dam join hands in helping group formation, product development and sales promotion. As a result, several products have been developed and several awards received. The product range has been extended and several products are certified by the Food and Drug Administration; e.g., a variety of pickled fish and dried fish. The business has been consistently growing and net profit per month is about 150,000 Baht. The community members therefore enjoy a much better quality of life.



“The Biological Way of Life for Sustainable Development Project” is another project launched by EGAT Ubolratana Dam since 2008, starting at Ban Kok Noi, Kok Yai subdistrict, Non Sang district, Nong Bua Lam Phu province, which has now been named a model sufficiency economy community following the concept of His Majesty the King, for the 15 communities around the reservoir of Ubolratana Dam. In 2014, the community was given two regional awards and an honorable mention from EGAT. The people of Ban Kok Noi Community and nearby communities now earn decent income and have a good, happy life as desired by EGAT’.



In addition, in 2014, EGAT Ubolratana Dam arranged for students of Ubolratana Pittayakom School, Ubolratana district, Khon Kaen province, to participate in the “Move World Together Project”, organized jointly by EGAT and the Faculty of Social Administration, Thammasat University. The students’ Electric Sticky Rice Cooker Project entered the Creative Thinking Contest in an international Invention contest in Taiwan. The students received five awards; namely, 1. an honorable mention 2. a special award from South Korea 3. a special award from Qatar 4. a special award from Taiwan and 5. a TIIA Award for the excellent Invention from TIIA Outstanding Diploma. The awards gave the students great honor and highly reflected their success.

The Electric Sticky Rice Cooker is very efficient in cooking sticky rice in a short time and consumes very little energy. It cooks 800 grams of sticky rice in just 15 - 20 minutes. The cooked rice grains are shiny, nice looking, soft, and delicious, and have a sweet aromatic fragrance. The invention has already been granted patent and petty patent.

All these reflect EGAT Ubolratana Dam’s determination and care for the quality of life of people in communities around the reservoir of Ubolratana Dam. The people and the dam will continue to co-exist in this mutually supportive way in the years and years to come.



[DMA (former EU21)]

## Preparation of Contingency Planning Measures in Response to Major Accidents and Disasters

EGAT has made preparations for the prevention of potential hazards which include major accidents and natural disasters in effort to ensure the continuity of businesses. The top executive of each unit has been instructed to appoint a working group to assess risks and to prepare a contingency plan for each possible emergency. In doing so, the risk management and internal control policies, the IT policy, the business continuity policy, relevant laws and regulations, demands and expectations of stakeholders and disaster risk factors which may potentially affect EGAT’s operations derived from the analysis of the Committee of Sponsoring Organization of the Treadway Commission-Enterprise Risk Management, or COSO-ERM are taken into consideration to determine activities, plans, targets and indicators.

An EGAT manual for preparation of contingency plans for emergencies has been put in place with activities and individuals responsible clearly specified, to prepare employees, workers and subcontractors in case an emergency situation arises. The manual consists of a risk analysis and assessment for preparation of a contingency plan corresponding to actual necessities, a preparation of a preventive plan before a situation arises; i.e., inspection and maintenance and plans for preparation of warning devices, an identification of steps to take in the situation, and a preparation of a plan for use after the situation, which involves a survey and restoration.

In addition, EGAT has prepared a manual for management and communication in case of emergency at command line level, dividing the situation into four levels of intensity.

Level	Intensity	Contingency plan
Level 1	Minor	Incident management plan executed by on-site operating units
Level 2	Moderate	Incident management plan executed by on-site operating units
Level 3	Severe	Crisis management and/or communication plan executed by the command lines under relevant deputy governors
Level 4	Very severe	EGAT’s crisis management and/or communication plan

In 2014, EGAT’s Working Group for Preparation of a Business Continuity Plan conducted a Business Impact Analysis (BIA) and prepared a Business Continuity Plan (BCP) for disasters and crises in accordance with ISO 22301 and ISO 27001 (only IT aspects). The purpose is to ensure efficient continuity of production, procurement and delivery of electricity, including its Operation and Maintenance Business, within the maximum tolerable period of disruption (MTPD) and with an acceptable level of data loss in the set Recovery Point Objective (RPO) and an appropriate Recovery Time Objective (RTO). In addition, follow-up activities, analyses and preparations are made for disasters and emergencies as prevention and execution of the Business Continuity Plan and recovery.

EGAT’s emergency and disaster contingency plan testing conducted in 2014 at the national level, the organization’s level, the command line level and the operating unit level were as follows:

- Energy Crisis Contingency Plans. EGAT conducted a simulation at the Energy Complex, Muang Thong Thani, Pakkred district, Pathum Thani province. The exercise was jointly conducted with several other agencies concerned, such as the Ministry of Energy, the Department of Mineral Fuels, the Department of Energy Business, the PTT Public Company Limited, the Metropolitan Electricity Authority, and the Provincial Electricity Authority. The simulation was for a stoppage of natural gas supply from Thai-Malaysia Joint Development Area: JDA-A18. EGAT had to conduct a BCP exercise for electricity transmission. A control center was used to perform a black start in order to test blackout restoration, using Dispatcher Training Simulation or DTS.

- EGAT Crisis Management and Communication Plan (Level 4). A simulation was for a stoppage of natural gas supply from JDA-A18 and malfunctioning of the transmission system, causing wide-area blackouts in some southern provinces. There was a need to manage correct and unified communication of information with EGAT’s stakeholders during the crisis until it was over and to restore the image after the situation returned to normalcy. The undertaking also required support in various areas – legal, security, financial and communication, etc.
- Crisis Management and Communication Plan for Operating Units under the Deputy Governor-Fuel. The simulation was for a stoppage of natural gas supply from JDA-A18 and fuel (oil) needed to be procured, delivered and reserved for power plants at a speed which met the requirement.
- Crisis Management and Communication Plan for Operating Units under the Deputy Governor-Generation (Level 3). The simulation was for a fire which broke out at the air handling unit (AHU) in the power plant of Srinagarind Dam. Electricity generation had to be halted for four hours and three people were injured. The purpose of the exercise was to make preparations for efficient operation of the power plant if a real situation occurred, including seeking support from nearby units; namely Erawan Municipality, the Erawan Sub-district Health Promoting Hospital, Srisawat Police Station and the Firefighter Team of the Power Plant Division of Tha Thung Na Dam.
- IT Business Continuity Plan. The simulation was for malfunctioning of the Enterprise Resources Planning (ERP) system. The area of Bang Pakong Power Plant was used for an actual operation relocation exercise. Key personnel were also trained in working from home, using of a Virtual Private Network or VPN.
- A Fire Drill at EGAT Headquarters Plan. A fire was simulated at the Inventory Building and two office buildings located in the area of EGAT Headquarters. Employees were trained to evacuate to the assembly point and an actual headcount was carried out.
- Annual Emergency Plan. Every power plant, including Mae Moh Mine Production Division, conducted an annual emergency plan exercise to prevent, resolve and end such incidents as oil storage and fuel station fires, natural gas leakage, flooding at the power plant/mine pond, an earthquake, ionizing radiation leakage, geophysical logging radiation and hazardous chemical leakage, a collapse of a mine pond wall, explosions, forest fires, riots/protests, closure and sabotage.

EGAT makes use of the results from the exercises of emergency and disaster contingency plans in revising the manuals and plans so that those concerned can avoid making mistakes and are prepared to perform effectively in a real situation. Examples are the addition of demand-side management or DSM measures to the plan as preparation for a situation where there is an unplanned stoppage of natural gas supply from the production site or malfunctioning of the natural gas supply system, and revision of the IT BCP, the manual for crisis management and communication of the generation command line and the manual for fire prevention and fighting within the area of EGAT Headquarters.



[G4-DMA]

## Compliance (Society)

EGAT is a state enterprise, established under the Electricity Generating Authority of Thailand Act, B.E. 2511 (EGAT Act). It is tasked with enforcing the law for public benefits, and providing facilities and services to the people in accordance with good governance principles. Failure to comply or to operate correctly or completely as required by law will be considered an offense and will result in civil, criminal and administrative punishment. Employees or officers who violate laws are also subject to disciplinary action.

EGAT is determined to comply with laws for effective and efficient execution of the EGAT Act, B.E. 2511. To ensure proper and strict compliance with all the relevant laws and regulations, supervision, monitoring, auditing and evaluation are performed in accordance with the nature of operations, with adherence to good governance principle and EGAT’s Governance Manual.

### Laws and Regulations Relevant to EGAT Operations [G4-15]

System	Relevant laws/regulations	Key control issues
Energy business operation	- Energy Industry Act, B.E. 2550	- Regulatory bodies; permit issuance; standards; safety; disputes; punishment
Power plant construction	- Building Control Act, B.E. 2522 - Factory Act, B.E. 2535	- Plant designing and remodeling, supervision, control - Potential impact of the operation
Electricity generating	- Engineering Act, B.E. 2542	- Inspection and authorization of major items of equipment
Electricity transmission	- Electricity Generating Authority of Thailand Act, B.E. 2511	- Execution of the mission must not affect rights proprietors or assets.
Fuel sourcing	- Minerals Act, B.E. 2510 - Fuel Control Act, B.E. 2542	- Control of wastewater from mine ponds - Control of vibration caused by mine blasting
Environment management	- National Environmental Quality Act, B.E. 2535 - Energy Conservation Promotion Act, B.E. 2535 - Ministerial Regulation Restricting the Quantity of Air Pollutant Emissions from Power Plants	- Quality of air in the atmosphere around power plants - Quality of air emitted in the electricity generating process - Energy saving - Quality of wastewater
Accounting and finance	- Budget Procedures Act, B.E. 2502 - Office of the Auditor General of Thailand - Internal Audit Bureau	- Budget disbursements - Review of operation and compliance

System	Relevant laws/regulations	Key control issues
Procurement	<ul style="list-style-type: none"> <li>- Regulations of the Office of the Prime Minister on Procurement B.E. 2535 (1992)</li> <li>- Regulations of the Office of the Prime Minister on E-Government Procurement B.E. 2549</li> <li>- Organic Act on Counter Corruption B.E. 2554</li> </ul>	<ul style="list-style-type: none"> <li>- Transparency and fairness</li> <li>- Compliance</li> <li>- Anti-corruption</li> </ul>
Management of occupational safety and health	<ul style="list-style-type: none"> <li>- Occupational Safety, Health and Environment Act, B.E. 2554</li> <li>- Labour Protection Act, B.E. 2541</li> <li>- The State Enterprise Labour Relations Act, B.E. 2543</li> </ul>	<ul style="list-style-type: none"> <li>- Hygiene measurement (chemicals, hazardous objects, rays, heat, light, confined spaces, dust)</li> </ul>
IT management	<ul style="list-style-type: none"> <li>- Computer Crime Act, B.E. 2550</li> </ul>	<ul style="list-style-type: none"> <li>- Determination of prevention and suppression measures</li> <li>- Computer crimes</li> </ul>

In addition, EGAT has established a Risk Management Committee to review disclosure of risk information to the regulators and the public. There is an Internal Audit Bureau to assess and review work systems of the departments, all of which rendered good cooperation. Operation policies are set in conformity with laws; and activities are organized to promote moral and ethical behaviors in order that executives and employees as well as people living around EGAT areas behave morally, ethically and legally, as described below:

- **Support for Compliance of EGAT Operations.** This includes provision of information and guidance in complying with laws such as procurement procedures and methods, procurement frauds, preparation of the term of reference (TOR), submission of bidding proposals to government agencies, civil contracts and administrative contracts, and tort liability of officials.
- **Dissemination of Knowledge about Laws being Enforced** and revised laws, through organizing training, responding to questions and consultations and establishing a law clinic etc.
- **Violation Surveillance** Complaints are processed through the Labour Relations Department, Human Resources Division, covering such areas as probing into disciplinary action taken against employees and revision of regulations on operational procedures.
- **Dissemination of Information and Provision of Counseling in Legal Matters to the Public.** Mobile units are dispatched to communities around EGAT dams, power plants, projects and head office.

Throughout 2014, EGAT did not commit any unlawful act and was not penalized or fined by any government agencies.



## Product Responsibility

### Survey on Stakeholders' Attitude towards EGAT'S Operations

During 2014, EGAT engaged the Advanced Research Group Company Limited to conduct a survey on the satisfaction of stakeholders towards, and the acceptance of, EGAT's operations and performance. The results of the survey are as follows:

#### Satisfaction of Stakeholders in EGAT's Operations

The satisfaction of stakeholders in EGAT's operations and performance was at a "high" level with an average score of 3.70 out of the total score of 5, or 74.09%. The topic which EGAT earned the highest score was as follows: EGAT provides good quality electricity supply.



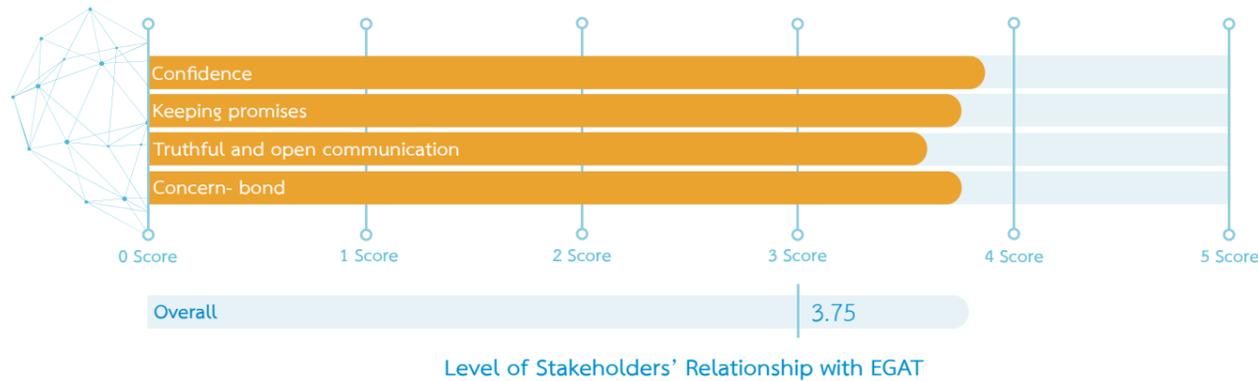
#### Acceptance of Stakeholders on EGAT'S Operations

The acceptance of stakeholders on EGAT's operations and performance was rated at a "high" level with an average score of 3.82 out of the total score of 5, or 76.40%. The topic EGAT achieved the highest score was as follows; the management and operations in consistent with the international standards for power generation and environmental management systems.



### Stakeholders' Relationship with EGAT

The score of the stakeholders' relationship with EGAT was rated at a "high" level with an average score of 3.75 out of the total score of 5, or 75.00%. The topic with the highest score was the "confidence".



### Acceptance on EGAT's CSR Projects

The score of stakeholders' acceptance on EGAT's CSR projects and activities was at a "high" level with an average score of 3.83 out of the total score of 5, or 76.60%. The topic with the highest score was the energy-efficient No.5 label project.



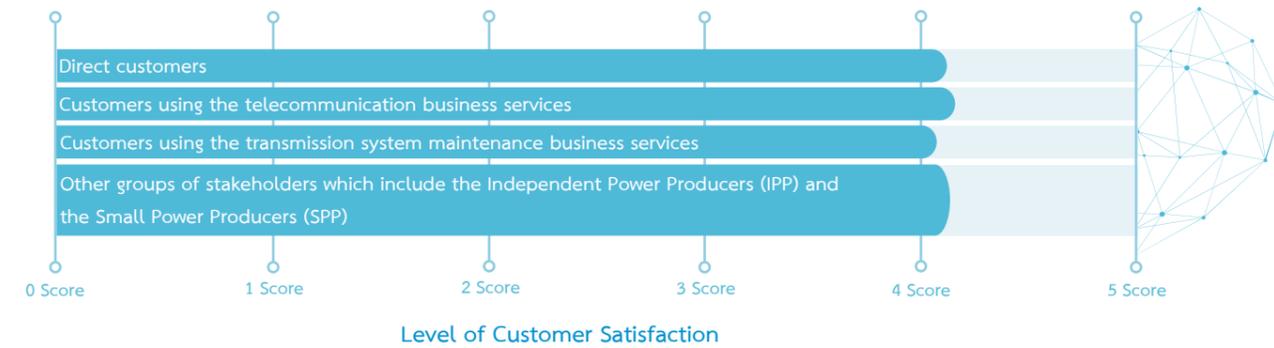
### Relationship between Communities and Dams/Hydropower Plants

EGAT's working group for social, community, and environmental management for hydropower plants, and the public communication group for power generation line, have conducted an evaluation of the relationship between local communities, both within and beyond a distance of five kilometers from EGAT's dams and power plants of 11 locations. These included the following dams and power plants, namely Sirikit, Bhumibol, Vajiralongkorn, Srinagarin, Rajjaprabha, Ubolratana, Nam Pung, Sirindhorn, Pak Mun, Chulabhorn and Lamtakong Jolabha Vadhana. The result of evaluation revealed that the average score for the relationship between communities and EGAT's dams and hydropower plants stood at 3.04, out of a total score of 4. The topic with the highest score was the "image".



### Customer Satisfaction

EGAT has engaged the Thammasat University Research and Consultancy Institute to conduct a survey on the satisfaction of direct customers and customers in related businesses as well as its groups of stakeholder. The survey results showed that each group had a "high" level of satisfaction with EGAT. The highest level of satisfaction were in the group of customers using the telecommunication business services as well as the IPP and SPP groups.



“

Kok Noi is a small community on the reservoir of Ubolratana Dam. We are happy and glad that officials from the dam came here to teach us many things about our occupations. It has enabled villagers to earn extra income after the rice harvest. They even took us to the market to sell our products. They advised us to form groups and all the groups were taught to do bookkeeping for all the revenues and expenses. We have groups doing processed fish, parboiled brown rice, organic rice, wickerwork, deep pit swine, and organic composed fertilizer. The best selling is processed fish, like sai-diaw pickled fish and dried fish. Some people even place standing orders. It has become villagers' main occupation. Our Kok Noi Community has also been named an EGAT model sufficiency economy community.”

”

Samai Phromso

Kok Noi Village Headman, Kok Yai subdistrict, Non Sang district, Nong Bua Lamphu province



We contribute.

## Contributing to the happiness of society at large

EGAT has a motto in mind - “wherever our plants are located, local communities nearby must have happy lives.” What follows are numerous social projects both at a community scale and up to those for the society at large. These projects have been developed to support education and promote occupation in response to a sufficiency way of living as suggested by His Majesty the King. Other projects include the restoration of terrestrial and mangrove forests as well as the listening to local people’s opinions as they are our friends and relatives.

## Awards of Great Pride

During 2014, EGAT continued its commitment to the operations following the corporate governance principles encompassing the supervision, transparency, accountability and counter-corruption, as well as the contribution to the building of a caring society and the instilling of a sense of social and environmental responsibility in response to the government's efforts to drive the country as a proud member of the international community.

The awards which EGAT won in 2014, particularly the NACC Integrity Award, well reflected the fact that it is an organization operating with transparency and compliance, and free of corruption, such that it is well recognized at the national level. The awards presented for innovation served to inspire EGAT's operating personnel who have been working with physical, mental and intellectual dedication to accomplish missions set forth under the organization's strategic directions, corporate values (FIRM-C) and corporate culture, with a view to establishing a superior EGAT brand trusted by the society and bringing about achievements contributing to the Thai society's sustainable well-being.



### ● Invention Awards from the 42<sup>nd</sup> International Exhibition of Inventions of Geneva, held in Geneva, Swiss Confederation. EGAT's inventions won awards as follows;

- Belt auto alignment, which won a Silver Medal Award and a Special Prize Award from Poland,
- Development and design of zero voltage switching for solenoid valve of hydraulic dumper in power plants and industrials, which received a Silver Medal Award,
- Intelligent generation shedding controller system, which got a Bronze Medal Award, and
- Ceramic grinding machine for ceramic assembling of gas turbine with annular combustion, which won a Bronze Medal Award.

### ● Invention Awards from the 10<sup>th</sup> Taipei International Invention Show & Technomart (INST 2014), organized in Taipei, Republic of China, Taiwan. Two inventions from EGAT Move World Together Program received the following awards;

- Electric sticky rice cooker. The invention won numerous awards ranging from an Honorable Mention Award and a Special Award from the Republic of Korea, a Special Award from the State of Qatar, a Special Award from the Republic of China (Taiwan), to TIIIA Outstanding Diploma, TIIIA Award for Excellent Invention from Taiwan Invention & Innovation Industry Association (TIIA).
- Sustainable energy stove. The invention received a Silver Medal Award and a Special Award from the Republic of China (Taiwan), a Special Award from the Republic of Korea, and a Leading Innovation Award from the International Intellectual Network Forum (IIPNF).

### ● Invention Awards from the 8<sup>th</sup> International Exhibition of Inventions of Kunshan (IEIK 2014), held in Jiangsu province, the People's Republic of China. EGAT's inventions won the following awards;

- EGAT sequential event recorder (EGAT-SER), which earned a Gold Medal Award and a Special Prize Award from World Woman Inventors & Entrepreneurs Association (WWIEA-Korea),
- Innovative spray blow down tank system for start-up and shutdown unwanted sound reduction of Bang Pakong thermal power plant, which won a Silver Medal Award and an Innovation Prize Award from Saudi Innovation Window, and a Special Award from International Warsaw Invention Show (IWIS-Poland),
- Smart tool: equipment for replace capacitor unit, which won a Bronze Medal Award and the Best Invention Award from the First Institute Inventors and Researchers in I.R.IRAN, and
- SCADA of drainage system for surveillance flood and monitoring water level in EGAT Headquarters area, which received a Bronze Medal Award and a Leading Innovation Award from International Intellectual Property Network Forum (IIPNF).

### ● Asian Power Awards 2014. EGAT Chana power plant –Block 2 won the Asian Power Awards 2014 in the category of Gas Power Project of the Year at the silver level. The power plant is also praised as one of the most environmentally friendly power plants in Asia.

### ● NACC Integrity Award 2013. In 2014, EGAT received an NACC Integrity Award 2013 from the Office of National Anti-corruption Commission or NACC.

### ● Thailand Energy Awards 2014. EGAT won two Thailand Energy Awards 2014 presented by the Department of Alternative Energy Development and Efficiency (DEDE), Ministry of Energy. The awards included;

- The Distinguished Award for Energy and Alternative Energy Conservation in the category of organizations promoting energy conservation, and
- The Distinguished Award in the category of mass media for the EGAT official website [www.egat.co.th](http://www.egat.co.th).

- **State-Owned Enterprise (SOE) Awards 2014.** EGAT also received two SOE Awards presented by the State Enterprise Policy Office (SEPO), Ministry of Finance, consisting of;
  - The SOE Award of Great Pride, and
  - The SOE Award for Outstanding Innovation (Honorable Mention-Organization Level) for the invention of remote terminal unit (RTU).
- **National Occupational Safety and Health Awards 2014.** Presented by the Department of Labour Protection and Welfare, Ministry of Labour, the awards EGAT departments and operating units of 36 locations won included the following;
  - 34 awards for EGAT department and operating units,
  - One award for Outstanding SHE Committee for 2014, and
  - One Outstanding Security Officer Awards.

In 2014, Ubolratana dam, located in Ubolratana district, Khon Kaen province, was EGAT's first dam which won the award in all three categories.
- **CSR-DIW Awards 2014 and CSR-DIW Continuous Awards 2014.** The awards were presented by the Department of Industrial Works, Ministry of Industry. A total of 21 locations of EGAT departments and operating units won the following awards;
  - Four locations received CSR-DIW Awards 2014, and
  - 17 locations received CSR-DIW Continuous Awards 2014.
- **Outstanding Green Office Award and a Certificate of Honor.** The award, in a category of an outstanding green office award, was presented by the Ministry of Natural Resources and Environment and the Ministry of Interior to
  - EGAT Thor 102 office building, located at EGAT Headquarters, in Bang Krui district, Nonthaburi province.
- **Green Mining Awards 2014.** The award was presented by the Department of Primary Industries and Mines (DPIM), Ministry of Industry, to the Thai entrepreneurs who put prime importance on the environmentally friendly operations and the participation of local communities and the society in their operating activities. This year the award went to
  - Mae Moh Mine, located in Mae Moh district, Lampang province.
- **EIA Monitoring Awards 2014.** The award was presented by the Environmental Impact Evaluation Bureau, Office of Natural Resources and Environmental Policy and Planning (ONEP) to
  - EGAT's fuel jetty project for Krabi power plant, located along Khlong Siboya in Tambon Talingchan, Nuea Khlong district, Krabi province.
- **Sustainability Report Award 2014.** The award was presented by the Thai Listed Companies Association, the Office of the Securities and Exchange Commission (SEC), the CSR Club, and the Thaipat Institute.
  - An Outstanding Award for EGAT Sustainability Report 2013

## CSR Performance of the EGAT Group

EGAT has invested in electricity generation and related businesses. It has five subsidiaries and affiliates; namely, Electricity Generating Public Company Limited (EGCO), Ratchaburi Electricity Generating Holding Public Company Limited (RATCH), District Cooling System and Power Plant Company Limited (DCAP), EGAT International Company Limited (EGATI) and EGAT Diamond Service Company Limited (EDS). These five companies are, together, referred to as the EGAT Group.

Throughout 2014, the EGAT Group has carried out various activities in diverse forms which all well reflected the fact that they have been doing businesses placing prime importance on social and environmental responsibilities.

### Good Corporate Governance

Companies under the EGAT Group have been promoting the operations of businesses with good corporate governance, transparency and accountability through various activities, such as the "DCAP Open House Activities" which are undertaken annually to publicize achievements in the areas of occupational safety and health as well as the environment. Other activities carried out by DCAP were to keep people living in areas around the power plants informed, at the same time providing communities with opportunities to examine and visit power plants to observe the operations.



### Doing Businesses in an Environmentally Friendly Manner

The EGAT Group attaches a great deal of importance to conforming with the environmental and health standards and legal requirements, at the same time actively promoting natural resources conservation activities.

- **EGCO, in cooperation with the Nakhon Si Thammarat Coastal Fisheries Research & Development Center,** launched a project to increase the quantity of unfarmed blue swimming crabs, under which mature females and baby crabs are bred and released into the sea at Khanom Bay. Berried females were also released into cages in the areas of Kwaeng Phao Beach and Cape Prathab in Khanom district, Nakhon Si Thammarat province.

- EGCO, Doi Inthanon National Park and the Thai Rak Pa Foundation, jointly organized the “43<sup>rd</sup> EGCO-Thai Rak Pa Youth Camp”. The youths of 60 in number joined the event to get to know and learn the way of life of headwater people and how they coexist with nature in an interdependent way. The camp was organized at Doi Inthanon, Chiang Mai province. The “44<sup>th</sup> EGCO-Thai Rak Pa Youth Camp” was also organized jointly with Khao Luang National Park, Nakhon Si Thammarat province at the National Park, with 40 youths living around Khanom Power Plant participating.
- RATCH, in cooperation with the Department of National Parks, Wildlife and Plant Conservation, launched a headwater reforestation project for carbon dioxide absorption, aimed at planting 200,000 trees in an area of 1,000 rai in Pua district, Nan province. An estimated 2,000 tons of carbon dioxide is expected to be absorbed by the forest each year.



## Social Contribution Activities

The EGAT Group always fully recognizes the importance of improvement of the quality of life of people in communities around their operating areas and the society in general. Hence, a variety of social contribution activities have been carried out on a continuous basis.

### Improvement of the Quality of Life

- RATCH, in cooperation with the Provincial Energy Offices of Ratchaburi, Phetchaburi and Kanchanaburi provinces, launched an On-going Community Energy Plan Project, to provide appropriate energy technologies to communities to ease their dependence on external energy sources and reduce household expenditure, such as biomass stoves, biogas digesters, solar ovens, high efficiency stoves and energy-efficient light bulbs.
- EGCO, in cooperation with the Office of the Basic Education Commission, Ministry of Education, and the Energy Policy and Planning Office (EPPO), Ministry of Energy, implemented a second-year continuation of the “Energy for Life - Reducing Global Warming by Efficiency Economy Means Project”. 60 Schools from around the country participated in the 2013 Project Contest. The prizes to be given and delivered were 3.5 kW photovoltaic systems. Six schools were selected as



outstanding schools. The event also featured an “Energy for Life on Tour Activity” designed to disseminate knowledge in energy and environmental conservation using mobile exhibition sets, an “Energy for Life Quiz” and a “Distinguished Youth Project Contest 2014”, from which distinguished 24 projects were selected.

- EGCO, by its EGCO Cogeneration Power Plant and the Office of the Rubber Replanting Aid Fund of Rayong province and Mabkha Sub-District Municipality, organized training courses on rubber tree tapping to rubber tree planters in Mabkha sub-district, so that they can use the skills in their occupation and transfer the knowledge to other planters.
- EGATi launched a Sufficiency Economy (Under the Royal Initiation) Learning Center Project at Baan Mae Sam Lab School, Sop Moei district, Mae Hong Son province. Most of the students of this school, which is located along the bank of Salawin River, are the underprivileged ethnic Karens. The main objectives of the project were to ensure that the children were adequately fed at lunch and to serve as a learning center for chemical-free farming based on the sufficiency economy concept. Students and people in the community could learn the basics and apply the knowledge gained in their households, in order to cut down expenses, increase income, and have enough food to eat.

## Education Development

- RATCH has been presenting scholarships to students in areas around power plant projects. From 2002 to 2014, a total of 11,907 scholarships accounting for a total of 23,251,000 Baht, have been presented. In addition, the company and the Lao PDR’s Ministry of Education and Sports organized an Occupational Skills Enhancement Project in order to support Lao PDR’s policies towards education, human resources development and occupations. Under the project, of which duration is from 2011 to 2016, 219 scholarships will have been presented and 20,000,000 Baht will have been spent for upgrading school laboratories.
- DCAP launched a “DCAP Scholarships Project” to present 68 scholarships to students of 21 schools located around existing power plants.



## Public Health

- EGCO, by its Roi-et Green Power Plant, launched three mobile medical unit projects to provide medical examination to people in communities around the Roi-et Green Power Plant, Neua Muang sub-district, Muang district, Roi-et province. Medical examination, initial treatment, tooth extraction and scaling were also offered under a mobile medical unit project to people in communities around the EGCO Cogeneration Power Plant in Mabkha sub-district, Rayong province.



## About this Report

EGAT Sustainability Report 2014 has been prepared to cover the contents relevant to the organization’s performance on economic, social and environmental activities from the sustainable development perspectives during the reporting cycle 2014 from January 1 to December 31. The report has been produced following the policy laid down by the State Enterprise Policy Office (SEPO), Ministry of Finance, of which its objectives are to disclose the performance on good organizational governance and social responsibility to all groups of stakeholders; namely, the related government agencies/regulators, trading partners/suppliers, the society in general, the local communities around existing power plants and along the transmission line routes, the academicians/non-governmental organizations (NGO’s), the Board of Directors, the top executives and employees, all groups of customers and the general public.

In preparation of this report, EGAT selected the guidelines developed by the Global Reporting Initiative (GRI) and used GRI G4 and Electric Utilities Sector Supplement for the disclosure of standard and specific indicators. EGAT has self-declared the level of reporting for this 2014 report at the “in accordance” – core option. The report was also submitted for and successfully completed the GRI Content Index Service. The icon can be found on page 95.

As of the present stage, EGAT has not yet looked for any external assurance to approve the disclosure of indicators for the former Sustainability Reports including this one. According to a recent policy set by EGAT Top Management, the overall performance of EGAT’s social responsibility should correspond to most GRI indicators, before having its report approved and assured by external agencies, to be scheduled for commencement by 2018.

As for the boundary of reporting, the contents of EGAT Sustainability Report 2014 cover only the CSR operations of EGAT and some social contribution activities of the EGAT Group comprising five subsidiaries and affiliates. However, its contents excluded the CSR operations of the EGAT Group, suppliers, trading partners or contractors. The report was produced in two languages, namely Thai and English, and can be downloadable from EGAT’s official website. For further information about this report, please contact the following address:

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 Electricity Generating Authority of Thailand,  
 Head Office, Bang Kruai, Nonthaburi 11130, Thailand  
 Telephone: +66 (0) 2436 4610, +66 (0) 2436 4612  
 Facsimile: +66 (0) 2436 4695  
 Website: www.egat.co.th

## GRI Content Index for “In accordance” – Core



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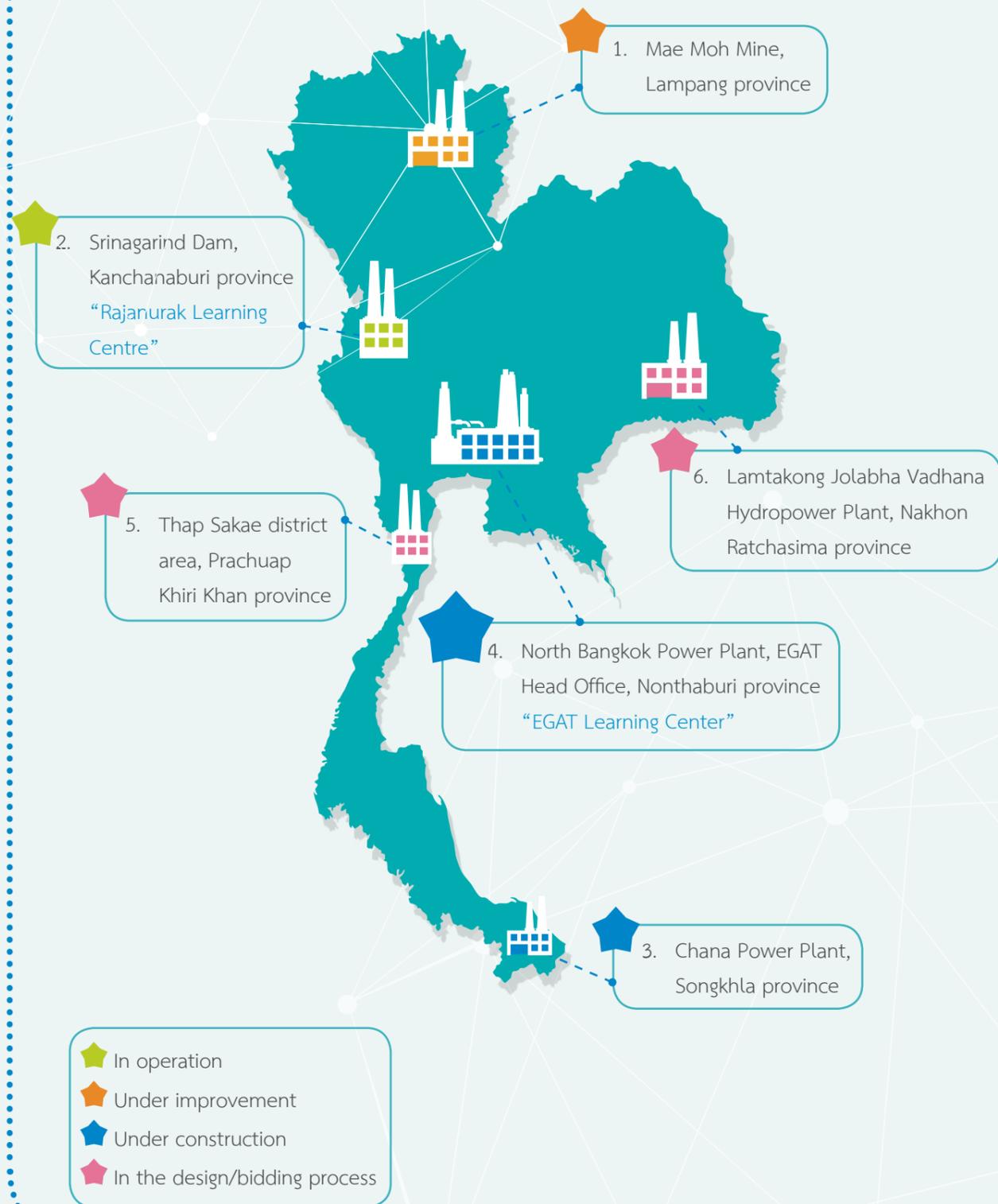
SPECIFIC STANDARD DISCLOSURES			
DMA and Indicators	Page Number	Omission (s)	External Assurance
<b>MATERIAL ASPECT: BIODIVERSITY</b>			
G4-DMA	48	-	-
G4-EN11	48	-	-
G4-EN12	48 - 49	-	-
G4-EN13	49	-	-
G4-EN14	49 - 50	-	-
<b>MATERIAL ASPECT: EMISSIONS</b>			
G4-DMA	46, 50 - 51	-	-
G4-EN15	52	-	-
G4-EN16	52	-	-
G4-EN17	52	-	-
G4-EN18	52	-	-
G4-EN19	53 - 54	-	-
G4-EN20	52	-	-
G4-EN21	47	-	-
<b>MATERIAL ASPECT: EFFLUENTS AND WASTE</b>			
G4-DMA	44 - 45	-	-
G4-EN22	45	-	-
G4-EN23	44 - 45	-	-
G4-EN24	45	-	-
G4-EN25	45	-	-
G4-EN26	45	-	-
<b>MATERIAL ASPECT: TRANSPORT</b>			
G4-DMA	43	-	-
G4-EN30	43	-	-
<b>CATEGORY: SOCIAL</b>			
<b>SUB-CATEGORY: LABOR PRACTICES AND DECENT WORK</b>			
<b>MATERIAL ASPECT: EMPLOYMENT</b>			
G4-DMA	58	-	-
DMA (former EU14)	66	-	-

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SPECIFIC STANDARD DISCLOSURES			
DMA and Indicators	Page Number	Omission (s)	External Assurance
G4-LA1	59	-	-
G4-LA2	60	-	-
EU15	59	-	-
<b>MATERIAL ASPECT: OCCUPATIONAL HEALTH AND SAFETY</b>			
G4-DMA	61	-	-
G4-LA5	61	-	-
G4-LA6	63	-	-
G4-LA7	62	-	-
G4-LA8	62	-	-
<b>MATERIAL ASPECT: TRAINING AND EDUCATION</b>			
G4-DMA	64	-	-
G4-LA9	65	-	-
G4-LA10	64	-	-
G4-LA11	66	-	-
<b>SUB-CATEGORY: SOCIETY</b>			
<b>MATERIAL ASPECT: LOCAL COMMUNITIES</b>			
G4-DMA	67 - 68	-	-
G4-SO1	69 - 70, 72	-	-
<b>MATERIAL ASPECT: ANTI-CORRUPTION</b>			
G4-DMA	19	-	-
G4-SO3	19 - 20	-	-
<b>MATERIAL ASPECT: COMPLIANCE</b>			
G4-DMA	81 - 82	-	-
G4-SO8	82	-	-
<b>MATERIAL ASPECT: DISASTER/EMERGENCY PLANNING AND RESPONSE</b>			
DMA (former EU21)	79 - 80	-	-

## EGAT Learning Center

To serve the strategic goal of public knowledge sharing, EGAT has established six Learning Centers.



## Transmission lines, a network vital to all lives

The transmission lines which supply electricity to all end users in all regions across the country, are the backbone of the country's economic development. They are behind the success of all other aspects of development which bring happiness to the Thai people and the country as a whole.

## Bua Tong flower field in full bloom

The fields of Bua Tong flowers, or Mexican sunflowers, are in full bloom in the vicinity of Mae Moh Mine, Lampang province. Nowadays, the Bua Tong field becomes a symbol of clean and green environmental revitalization at Mae Moh. The "Mae Moh Festival" has been held every year during the cool season for all visitors to admire the beauty of the Bua Tong field.

Our report was produced from the best quality green paper mixed with deinked pulp and with the use of chemical-free soy ink in the printing process.



**EGAT**

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