RATCH

RATCHABURI ELECTRICITY GENERATING HOLDING PCL.

Sustainability Report 2016

Driving the shift toward

sustainable future

Contents

"...Let's talk about electricity and energy. For electricity and energy, electricity needs energy to generate. We need energy to have electricity. This has been done for a long time. When there is energy shortage, people are told to switch off television. Switch off television and light. Then it is said this measure is effective. Switching off television is fine. If oil is used up, we can still use other sources of fuel. There is other fuel but we have to work hard to generate new sources of fuel. Fuel, which we call oil, will be used up in a few years time, or in tens of years..."

H.M. King Bhumibol Adulyadej's speech given to well-wishers on the occasion of his birthday at Dusidalai Hall, Chitralada Villa, Dusit Palace on Sunday 4 December 2005.
(Unofficial Translation by Ratchaburi Electricity Generating Holding Public Company Limited)

About This Report

(G4-18, G4-28, G-30)

Reporting Approach

This 2016 edition of the Sustainability Report of Ratchaburi Electricity Generating Holding PCL. (RATCH) publicizes the policies, strategies, operating approach, and economic, social, and environmental sustainability performance considered material for the businesses of RATCH and its stakeholders. Spanning business performance from January 1 to December 31, 2016, this is the fourth report prepared under the guidelines of Global Reporting Initiative (GRI) and the third report under GRI version 4.0 (G4) and GRI's Electric Utilities Sector Supplement (In accordance-Core).

Quality Assurance and Reliability

In preparing this report, RATCH followed the GRI guidelines. Topics and contents covered all groups of stakeholders, sustainability context, as well as significance to RATCH and its stakeholders. Regarding the reporting process, RATCH arranged for reviews by information holders and its central unit to ensure completeness and relevance. All information disclosed in this report has already received endorsement from RATCH's top management and the Board.

(G4-17, G4-23)

Scope of the Report

This report contains information of RATCH, subsidiaries, and joint ventures companies, as well as associates in which RATCH holds at least a 25% stake, as listed below. A comprehensive list of subsidiaries and joint-venture companies can be found in the 2016 Annual Report, downloadable from www.ratch.co.th.

Subsidiary / Joint venture	Location	%	Type of business
Ratchaburi Electricity Generating Co., Ltd.	Thailand	99.99	Operating the 3,645-MW Ratchaburi Power Plant and the 700-MW Tri Energy Power Plant
RATCH-Australia Corporation Ltd., the shares of which are held by RH International (Singapore) Corporation Pte. Ltd.	Australia	80	Operating three gas-fired power plants and four windfarms with a combined equity capacity of 653.52 MW
Ratchaburi World Cogeneration Co., Ltd., the shares of which are held by Ratchaburi Electricity Generating Co., Ltd.	Thailand	40	Operating the Ratchaburi World Cogeneration Power Plant with equity capacity of 93.60-MW

Subsidiary / Joint venture	Location	%	Type of business
Hongsa Power Co., Ltd., the shares of which are held by RH International (Singapore) Corporation Pte. Ltd.	Lao PDR	40	Operating Hongsa Thermal Power Plant with equity capacity of 751.20-MW
Nava Nakorn Electricity Generating Co., Ltd., the shares of which are held by Ratchaburi Electricity Generating Co., Ltd.	Thailand	40	Operating a cogeneration power plant, with 55.65-MW equity capacity
Ratchaburi Power Co., Ltd. the shares of which are held by Ratchaburi Alliance Co., Ltd.	Thailand	25	Operating Ratchaburi-Power Power Plant, with 350-MW equity capacity

(G4-18)

Determination of Contents

This report's contents align with the approach taken by GRI G4 (In accordance-Core), which requires four stages as detailed below. In addition, the measurement methods, calculation principles, and assumptions made for data approximation have been shown under the applicable topics without restating the past year's data. Indicators of key issues are shown in the GRI Content Index, page 136.

Step 1

Issue Identification (G4-24, G4-25, G4-26, G4-27)

Key sustainability aspects significant to business operation and aspects of value to stakeholders are considered and collected from two major sources:

1) Documents-Taken into account are the company's short-term and long-term strategic plans and goals; corporate risk factors. It also includes aspects with significant impacts on the power generation industry, which is available in various documents and secondary sources of news.
2) Opinions-This includes opinions expressed in questionnaires and interviews with RATCH's top and middle managers and stakeholders including shareholders, customers, suppliers, and academic that wield significant impacts on RATCH.

Dividing stakeholders into nine groups by their significant relevance to both positive and negative impacts on its businesses, RATCH has its own process for forging engagement and echoing each group's expectations, as detailed below:

Stakeholder	Expectation	Participation channel	Example of how expectation is addressed
1) Shareholders and investors	• Satisfactory dividends and profitable returns on investment • Fair, transparent business conduct with adequate and timely disclosure of information • Business alignment with the directions and strategies of EGAT (the major shareholder) and cooperation to raise competitiveness • Contractual power volume generated and planned income generation • Business growth and higher enterprise value	**Major shareholder: EGAT** • Meetings on various occasions, such as EGAT's business committee meetings, board meetings, and joint business management units' meetings • Formal and informal activities • Site visits **Shareholders and investors** • Shareholders' annual meeting and analysts' meetings • Site visits • Meetings with investors through various activities • Company website • Company Secretary Office and Investor Relations	• Setting strategies and business targets in line with the major shareholder's "EGAT Group policy" and forging cooperation to enhance information sharing and develop common work processes • Increasing power plant efficiency to consolidate national power security, the major shareholder's mandate • Expanding integrated businesses and developing new businesses to enhance security of income and sustainability of RATCH's business operation • Staging shareholders' meetings to provide arenas for queries and comments • Achieving membership certification of Council of Thailand's Private Sector Collective Action Coalition Against Corruption (CAC) • Disclosing information in the annual report and the sustainability report
2) Creditors	• Financial discipline and debt coverage • Compliance with laws • Fair, transparent business conduct • Asset profitability • Corporate goodwill and credibility	• Information-sharing meetings and get-togethers to forge close ties • Site visits • Communication through finance units	• Strictly honoring debt repayment schedules for creditors' trust • Credit rating by domestic and international institutions, namely TRIS Ratings, S&P Ratings & Moody's • Making revenue analyses and estimates, together with financial risk management • Upgrading the internal anti-corruption system through CAC membership certification
3) Business allies	• Capable personnel with business insight and synergy of strengths among business allies • Fair, transparent business conduct • Corporate goodwill and credibility • Robust financial standing	• Formal and informal meetings • Site visits • Business deals for mutual benefits • Sharing of information, experience, and specialization • Activities and occasional visits for stronger ties	• Searching for business allies, considered a prime strategy defined in long-term strategic plans • Introducing some basic measures for constantly assessing confidence in business allies and constantly developing work processes • Valuing risk management • Assigning determined and professional personnel to deal with business allies • Introducing a clear information-disclosure method concerning business allies • Upgrading the internal anti-corruption system through CAC membership certification

Stakeholder	Expectation	Participation channel	Example of how expectation is addressed
4) Regulators	• Compliance with laws • Quality and environmental management with continuous, concrete community stewardship • Fair, transparent business conduct • Complete, timely disclosure of information	• Formal and informal meetings • Site visits • Coordination through responsible agencies • Participation in training and seminars organized by regulators	• Monitoring changes in applicable legislation, regulations, and requirements, and regularly reviewing actions to ensure complete compliance • Assessing risks, defining measures, and reviewing emergency response plans and running annual drills • Providing complete information as required by law • Upgrading the internal anti-corruption system through CAC membership certification
5) Business partners & contractors	• Good business partnership and long-term relationship • Fair, transparent, and professional business conduct • Robust financial standing with on-time payment • Stewardship of work safety, occupational health, and workplaces • Corporate goodwill and credibility	• Information exchange and choice of business partners and contractors • Meetings, regular follow-ups of work progress, and joint problem-solving efforts • Regular communication with business partners and contractors	• Establishing a transparent and internationally accepted procurement system to prevent conflicts of interest • Assessing business partners before and after appointment, and setting aside preferred partners • Safety training for business partners and contractors; implementing strict measures to ensure business partners' and contractors' safety • Designing work plans with precise completion dates, follow-up processes, and budget control • Upgrading the internal anti-corruption system through CAC membership certification
6) Employees	• Pays and welfare that are attractive, fair, on a par with business peers • Staff capacity building • Career growth and participation in career path planning • Sound work environment and work safety	• Staff meetings and department meetings • Channels for expressing views and filing complaints • Welfare Committee; Safety, Occupational health, and Working Environment Committee; and 5S Committee • HR activities to promote employee relations • Employee volunteer activities	• Conducting regular reviews of the remuneration structure and regularly benchmarking it against the industry • Developing succession plans for career growth • Developing clear career growth plans to let staff see their opportunities and retain those with high potential • Devising a training plan to raise staff potential and boost their morale • Devising a yearly plan on employee volunteer activities and inviting staff participation • Setting measures for safety, occupational health, and work environment for high standards • Heeding views and recommendations from those on the jobs to improve work methodologies

Stakeholder	Expectation	Participation channel	Example of how expectation is addressed
7) Customers & consumers	• Meeting power generation and delivery contracts in volume and quality • Green power generation processes without adverse impacts on communities • Sensible power pricing	• Meetings to share information and views • Devising measures to improve power generation efficiency	• Strictly following the maintenance schedule for power distribution efficiency • Management of the use of parts and fuels to reduce costs and raise generation efficiency • Practicing correct, complete environmental management as required by law; paying constant attention to communities' wellbeing • Revising crisis and emergency response plans and running annual drills
8) Society and communities	• Responsible operation without adverse impacts on communities and the environment • Ongoing community and social stewardship, development, and promotion of the quality of life • Community engagement and open-mindedness • Upgrading of socially and environmentally friendly operations for tackling climate change	• Site visits • Community development activities • Community hearings and community visits • Public relations and information publicity for proper understanding • Social engagement activities and campaigns • Corporate Relations centralizes RATCH's communication	• Executing diverse communication, including newsletters, news alerts, and occasional visits, as well as community development activities • Taking part in the Power Development Fund Committee to maximize community benefits • Establishing an environmental inspectors from all sectors in community to monitor environmental management at power plants; also providing knowledge and training to team members • Campaigning for energy-saving and promoting less power consumption by communities • Arranging activities to promote community forest conservation nationwide as a source of carbon dioxide sequestration to lessen global warming • Upgrading the internal anti-corruption system through CAC membership certification
9) Mass media	• Accurate, adequate, timely, thorough, and equal disclosure of information • Two-way Communication with senior executives	• Press conferences • Interviews • Company website • Site visits • Occasional meetings • Relations activities • Corporate Relations centralizes RATCH's coordination and contacts	• Drawing up plans for continuous, regular communication, both one-way and two-way • Establishing clear procedures for information disclosure and communication with the media • Providing sufficient, timely information as required by the media in a fair manner

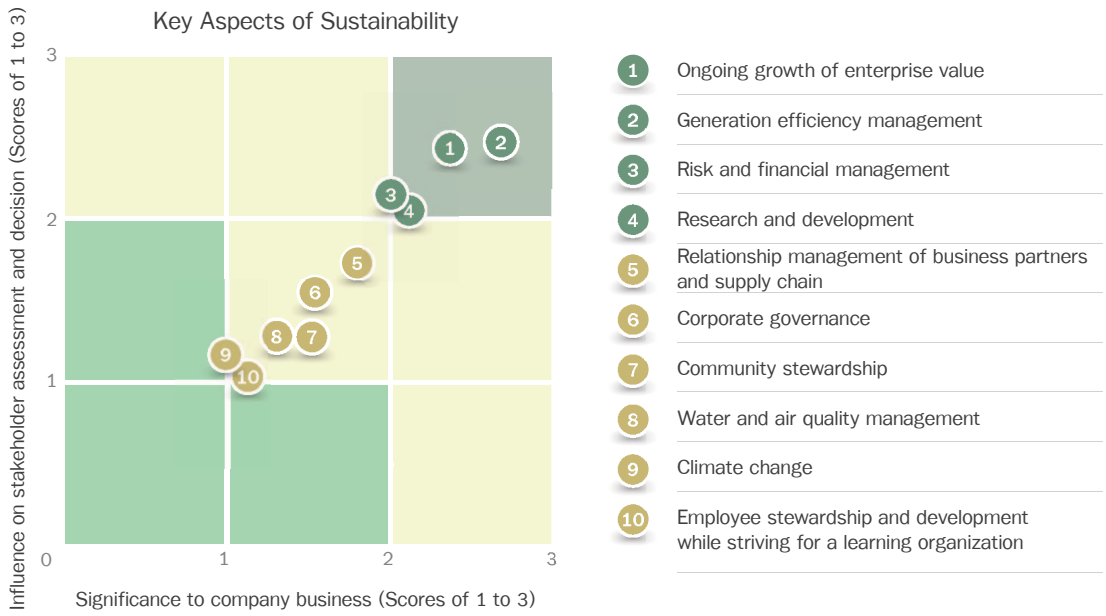
Step 2

Prioritization

Upon their assessment, significant issues acquired from Step 1 yield their priorities, depending on their impacts on the business in economic, social, and environmental aspects, as well as their significance of influence on stakeholders' decisions. The Materiality Matrix below determines their prioritization.

(G4-19)

Assessment Outcomes of Key Aspects of Sustainability



Step 3

Validation

Reviewing the issues, a central unit responsible for preparing the report proposes significant ones to the top management for consideration and endorsement to ensure that issue identification is complete and that the details disclosed in the report align with the principle of report quality measurement.

Step 4

Review

A suggestion form is attached to the report and posted on the website. Interviews with stakeholders are conducted after the issuance of the report to acknowledge views and recommendations for improvement of the contents and the approach to make next year's report more responsive to stakeholders' expectations and interests.

Assurance of This Report

This report is assured by a third-party expert in certification. The completeness, accuracy, and reliability won their endorsement against the GRI G4 guidelines. Certification details appear on page 146.

Access to Information

Should further information be required or should there be recommendations, please contact Corporate Relations Division, Ratchaburi Electricity Generating Holding Public Company Limited, Tel: 66 2 794 9940, 9951, email: charusudab@ratch.co.th, and pornpent@ratch.co.th.

(G4-19)

Materiality Aspects in This Report

Materiality Aspects	GRI Aspect	Topic in the Report	Page	Boundary of the Report				
				Internal (G4-20)			External (G4-21)	
				Electricity generating	Business related to power	Non-power business	Community/ Supplier/ Customer/ Partner/ Shareholders/ Lender/ Regulator	
3 Risk and financial management	Strategy and analysis	Risk and crisis management	28	✓	✓	✓	Shareholder, lender, partner, supplier	
6 Corporate governance	Governance	Corporate governance	38	✓	✓	✓	Regulator, shareholder, community, lender	
Economic								
4 Research & development	Research and Development	Sustainability development strategy	24	✓	✓	✓	Partner, supplier	
1 Continued growth of enterprise value	Economic performance	Economic performance	48	✓	✓	✓	Shareholder, partner, supplier	
2 Power generation efficiency	Economic	- Sustainability development strategy - Economic performance	24 48	✓	✓		Shareholder, customer, community	
5 Supply chain management	Procurement practices	- Customer satisfaction management - Supply chain management	52 57	✓	✓	✓	Customer, partner, supplier	
Environment								
8 Water and emission management	Water, emission, effluent and waste	Environment performance	66	✓	✓		Community, regulator, supplier	
9 Climate change impact	Energy, emission	Management to cope with climate change	81	✓	✓	✓	Community, supplier, regulator	
Social								
10 Employee care and its competency enhancement for being learning organization	Occupational, health and safety	- Safety and occupational health - Personel development and administration	110 93	✓	✓	✓	Shareholder, regulator	
7 Caring for community	Local communities	- Community relationship management	99	✓	✓	✓	Community	

● High significant aspect

● Moderate significant aspect

Message from
the Chief Executive Officer

To all shareholders and stakeholders,

In framing its businesses through the years, Ratchaburi Electricity Generation Holding PCL. (RATCH) has relentlessly remained committed to sustainable development. This year's emphasis was on economic issue management to maintain and foster corporate growth for long-term security. Provided by the management and key stakeholders, these significant issues appear as materiality aspects in this report.

It was in early 2016 that RATCH began reviewing and modifying its long-term strategic plans in keeping up with change and prevailing circumstances so as to steer corporate directions; define clear short-term, medium-term, and long-term goals; and raise the efficiency of internal business processes to foster RATCH's domestic and overseas competitiveness. The revised strategic plans have made significant implementation progress this year, which is captured below.

Successful investment in electric transit trains strengthens business base

An unprecedented success was scored this year, signifying RATCH's business venture into non-power and non-energy businesses, when it took part in bids for electric train concessions. Two Bangkok mass rapid transport routes were involved: the Pink Line (Khae Rai-Minburi) and the Yellow Line (Lat Phrao-Samrong). The bids carried the consortium names of BSR, consisting of BTS Group Holdings PCL. (consortium leader) along with RATCH and Sino-Thai Engineering & Construction PCL. Yet, this success remained in the field of infrastructure, in which RATCH could leverage its operating competency and which yields suitable, long-term returns. More important, this move represented diversification of business risks and a supplementary source of backup income if RATCH's PPAs expire, so that corporate growth may proceed on a stronger and more secure business base. The selected bids are now under negotiation, due to be concluded by the second quarter of 2017.

Greater capacities for renewable energy production in pursuit of economic and environmental goals

The revised strategic plan's goal of 2,000-MW capacity from renewable energy (20% of the total goal of 10,000 MW) by 2023 is going to generate income and cut greenhouse gas emissions. This year, RATCH-Australia Corporation (a 80%-owned subsidiary) posted clear progress on the development of renewable energy projects, including the Mount Emerald wind farm project with 144-MW equity capacity (under construction, due for completion in 2018) and the Collinsville solar farm project with 42-MW equity capacity and 9.5-million Australian dollar support fund from Australian Renewable Energy Agency (ARENA), which lowered project investment by about 10% from 100 million Australian dollar (construction due to begin in the second quarter of 2017). Environmentally, these two projects will be accounting for 549,000 tCO_2e of GHG reduction.

Improved efficiency in asset management

At the heart of RATCH's economic security, as well as its business supply chain, is asset management. Today, RATCH operates 33 large, small, and very small power plants with a total equity capacity of 6,866 MW (excluded EDL-Gen) and a variety of categories and plant ages-which will rise even more with future investment. Therefore, asset management is becoming increasingly critical. RATCH is going to apply the ISO 55001 standard to frame its efforts to raise the profitability of power plant assets and keep costs manageable. The past year was spent investigating details, and implementation looks set to proceed in 2017.

RATCH has done its best to raise the generation efficiency of the Hongsa Power Plant and ensure that its availability are up to meet contractual requirement. Our efforts paid off when its availability rose to 63.46% in 2016, and expected better in 2017 resulting of its proactive maintenance plant. The plant's capacity is 1,878 MW (40% owned by RATCH), and its commercial operation began in 2015. Hongsa is regarded as a significant source of RATCH's income, which explains why its efficiency improvement will continue in 2017.

A step toward future business development

In RATCH's view, competition and dynamic technological changes pose challenges that potentially affect its sustainability, prompting the company to ensure that its new strategic plan extends its businesses to non-energy industries and that new businesses are developed over the next 10-15 years so that RATCH may remain relevant as a business entity over the long term. This past year it began investigating data and trends for new business models that may be promising and commercially viable so as to lay down its future investment plans. To this end, Corporate Planning and Systems Development Division is in charge of such exercise.

The surroundings, communities, and safety matter at all times

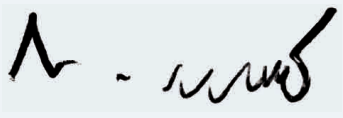
This year, RATCH successfully managed its carbon dioxide emission reduction from its office buildings, power generation processes, to development of renewable energy, totaling 476,884 tCO_2e. Meanwhile, its stewardship of communities and society continued to make headway with communication of news and data to forge mutual understanding, together with RATCH's quality-of-life improvement programs and community support in looking after and reviving natural resources and the environment. This year, RATCH's community investment support amounted to 68.67 million baht. Finally, it arranged training to cultivate awareness of human rights among middle management upward so that they may take into account risk and its impact prevention.

Through these years, RATCH has stressed its prime principle of work safety, particularly during maintenance turnarounds, during which accidents are prone to happen. Officers have been reminded to take discipline very seriously and conform to work safety rules for employees and contractors. Accident-free operation is our key goal.

Business Direction for 2017

The coming year will still see RATCH continue to drive corporate change for a sustainable future through investment diversification to strengthen its business base, manage the efficiency of power plants for higher productivity (in particular the Hongsa Power Plant), and upgrade its risk management standard and prevention of risks arising from internal and external factors. At the same time, it needs to keep in mind the benefit, engagement, and safety of stakeholders, communities, and society as a whole-not to mention environmental stewardship everywhere it operates. Certainly, these approaches will enable RATCH to survive in business amid formidable challenges.

On behalf of the management and the Board, I wish to express sincere thanks to the shareholders and stakeholders for their solid support through the years, together with their useful comments and recommendations for the development and improvement of RATCH's operations to better address the needs of all parties. These will help RATCH make great strides.



Rum Herabut
Chief Executive Officer

Our Business

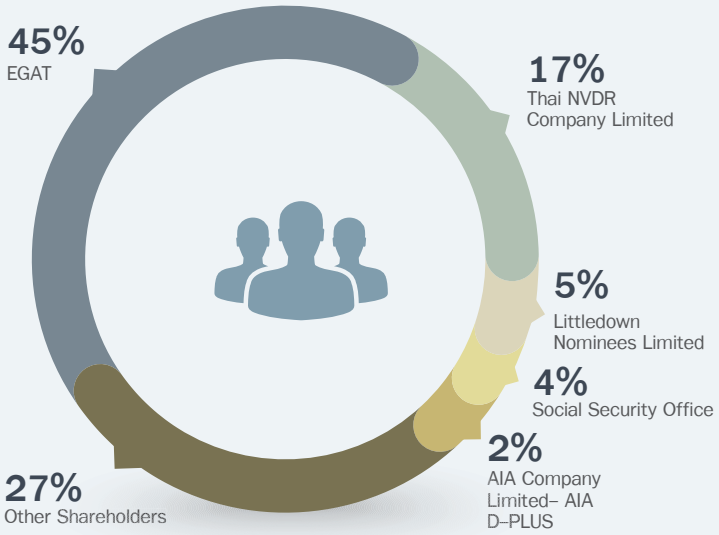
Ratchaburi Electricity Generating Holding Public Company Limited

Emblem	The emblem consists of company name, securities name used in trading on SET, and a turbine, echoing its core business and competence
Establishment	March 7, 2000
Registered and paid-up capital	14.5 billion baht
Status	Public company limited whose stocks are registered on SET
Stock name	RATCH
Head Office	8/8 Moo 2, Ngam Wong Wan Road, Bang Khen Sub-district, Muang District, Nonthaburi 11000
Nature of business	Mainly business investment through a holding company engaged in power generation and related businesses (domestic and international)
Major shareholder	Electricity Generating Authority of Thailand (EGAT): 45% Shares held: 652.5 million (as of September 9, 2016)
Employee headcount	Total: 439 persons • Thailand: 271 persons • Lao PDR: 150 persons • Australia: 18 persons

Subsidiaries	Total: 17 companies • Thailand: 11 companies • Lao PDR: 1 company • Australia: 1 company • Hong Kong: 1 company • Mauritius: 1 company • Singapore: 2 companies
Joint ventures and Associates	Total: 20 companies • Thailand: 15 companies • Lao PDR: 4 companies • Cambodia: 1 company
Other investments	• Lao PDR: 1 company (Electricite du Laos-Generation Public Company: EDL-Gen)
Total assets	96,391.09 million baht
Total liabilities	33,938.32 million baht
Shareholder's equity	62,452.77 million baht
Net profit	6,165.72 million baht
Retained earnings	48,825.15 million baht

Shareholding Structure

RATCH has a registered capital of 14.5 billion baht and a total of 1.45 billion common shares, all listed on SET in October 2000. The Electricity Generating Authority of Thailand (EGAT) is the major shareholder with 45% interest. Thai-nationality shareholders as of September 9, 2016, accounted for 87.15%, and foreigners, 12.85%. RATCH's top 5 shareholders are:

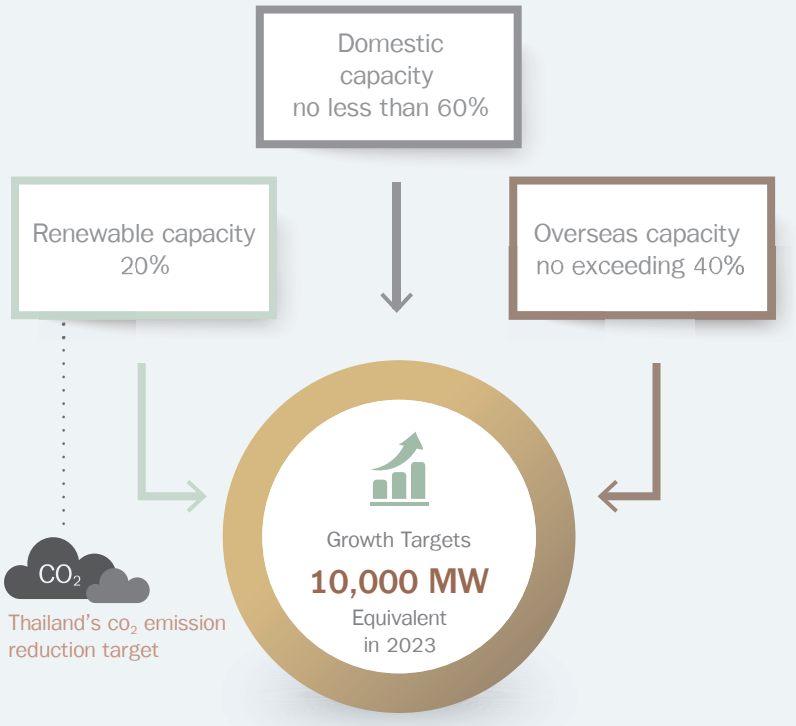


Nature of Business

This year, RATCH still focuses on optimizing its power generation business and power plant asset management. As an operating platform, Thailand has continued to contribute the lion's share of revenue and commands the biggest role in RATCH's growth. Others include Lao PDR, Australia, Japan, and China. Business expansion to other related businesses is also stressed.

Growth Targets and Strategies

Under its long-term strategic plan, RATCH's capacity will reach 10,000 MW or equivalent by 2023.



The target 10,000 MW or equivalent is based on RATCH's investment in power generation, energy and related business, and non-energy business. Domestic investment will maintain no less than 60% of the target; overseas investment, 40%. Renewable energy is set at 20% of overall targets in line with the targeted greenhouse gas (GHG) emission reduction by Thailand.

To achieve these targets, RATCH has laid out five strategies as follows:

Vision

To be a leading value–oriented integrated energy company in Asia–Pacific

Strategies

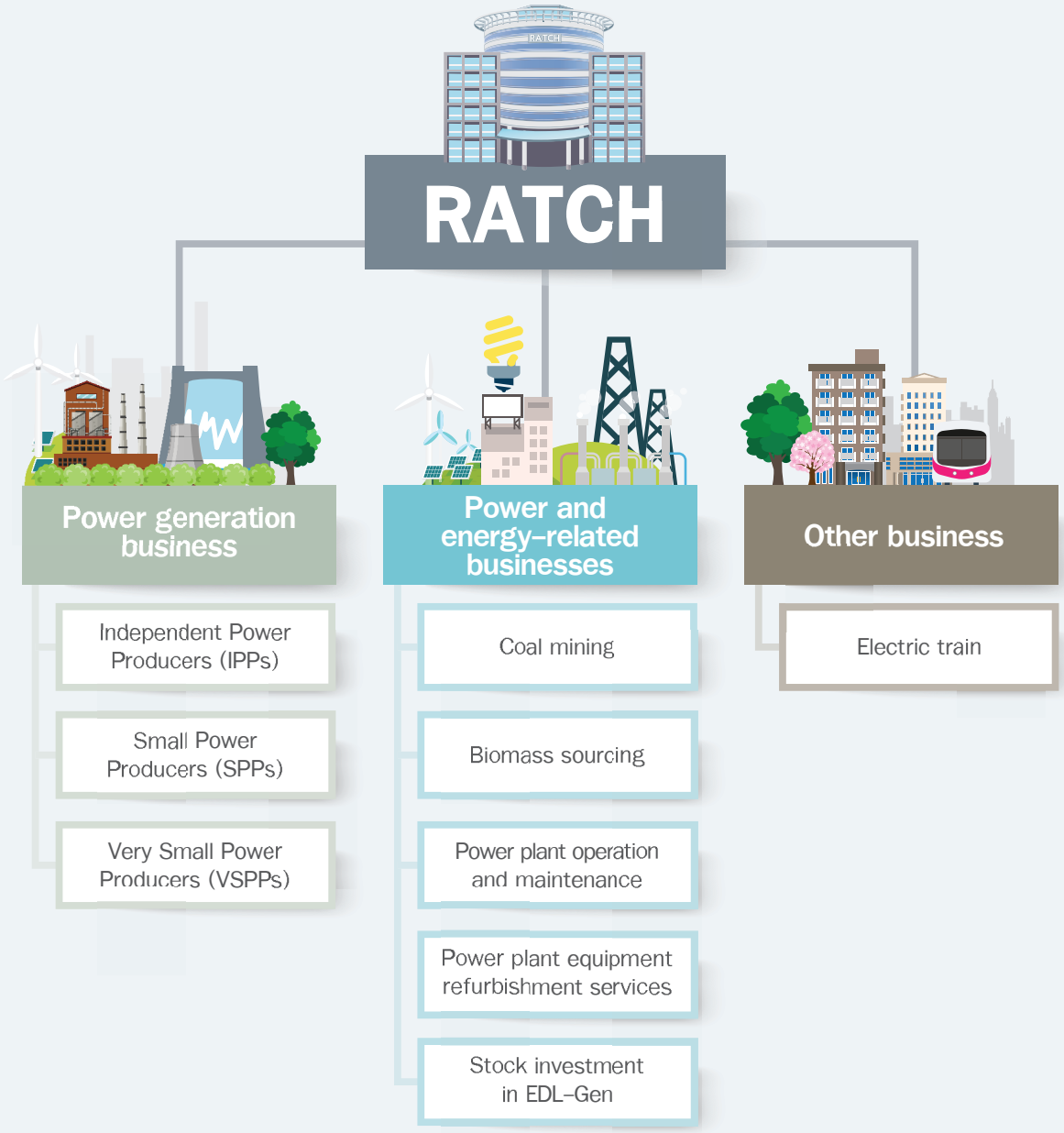
Optimize current asset management	Focus on the development of new power plants in established markets	Seek partners in the investment expansion of the power business in emerging markets	Increase value through business expansion in associated businesses	Enhance organizational capability
Improve utmost asset efficiency and maximize value creation	Investment in new potential projects in Thailand and neighboring countries with PPAs* with EGAT	Seeking new high–potential business partners for investment expansion to ASEAN markets	Enter the fuel–sourcing business through joint investment opportunities with overseas partners	Organization restructuring for greater efficiency Management processes Business development Partner relations management Human resource management Knowledge management Corporate culture
Maximize the use of existing assets	Focus on renewable energy development in Australia	Other countries beyond ASEAN market	Divert to other businesses, conduct R&D on future businesses	

** PPAs : Power Purchase Agreements*

In 2016, RATCH revised its long-term strategic plan to better suit and align with current competition and to enable stable growth in the midst of change. Directions and goals for each strategy were adjusted for clearer directions. A greater emphasis was given to other businesses as well as investigation and research on future businesses to drive sustainable growth.

Business Structure

Power generation remains RATCH's core business. Investment covers large-scale projects as well as very small ones, fired by fossil fuels and renewable energy. RATCH also expanded its investment to energy upstream and downstream businesses and expanded its bases to non-energy businesses to secure corporate income and increase enterprise value so as to achieve its goals by 2023.

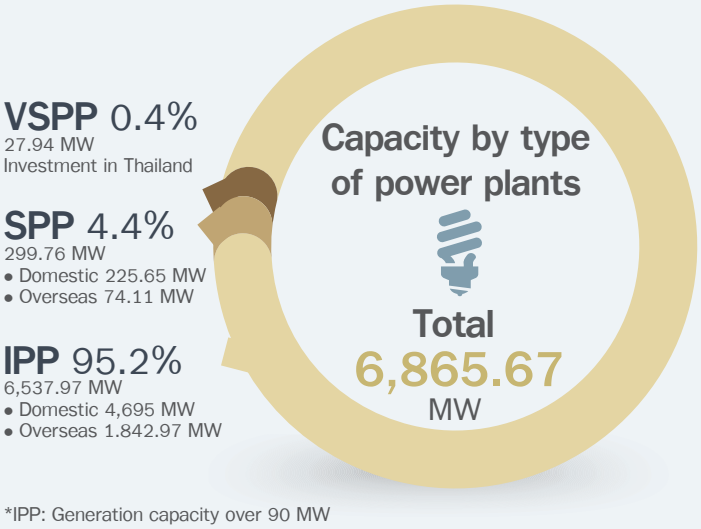


Power Generation Business

Power generation has been RATCH's core business since 2000, generating the bulk of its revenue. RATCH has invested in power plant projects with a total equity capacity of 6,980.03 MW. Of this, 6,442.42 MW (92.3%) is produced by commercially operating plants, and 502.61 MW (7.2%) and 35 MW (0.5%) will be contributed by power plants under construction and under development respectively.

Types of power plants

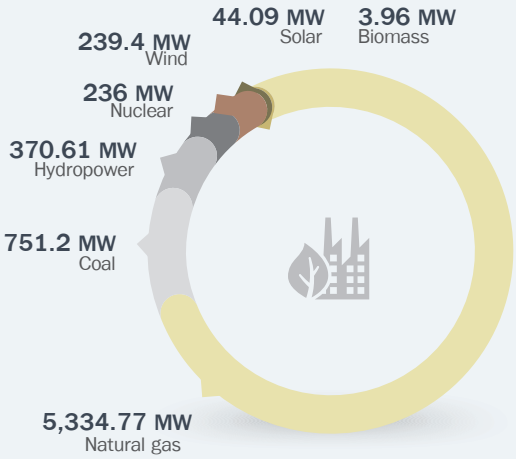
RATCH invests in domestic and overseas Independent Power Producers (IPPs), Small Power Producers (SPPs) and Very Small Power Producers (VSPPs). Its IPPs are fired by fossil fuels, hydropower, and nuclear power, while SPPs are cogeneration and wind energy, and VSPPs are fired by solar and biomass energy. RATCH's total equity capacity is 6,865.67 MW (EDL-Gen's capacity from stock investment excluded).



*IPP: Generation capacity over 90 MW
*SPP: Generation capacity 10–90 MW
*VSPP: Generation capacity less than 10 MW

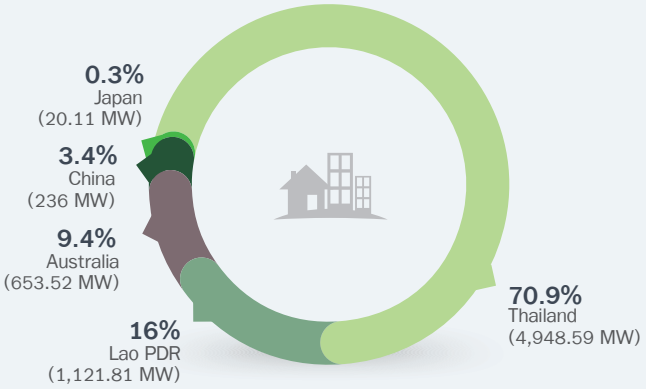
Fuel types

Fossil fuels (natural gas and coal) are the main fuels used for power generation, accounting for 87.2% of its total equity capacity of 6,980.03 MW, while renewable energy and nuclear power account for the remaining 12.8%.



Investment bases

Thailand is the main investment platform with 70.9% (4,948.59 MW) of total equity capacity (6,980.03 MW), followed by Lao PDR with 16% (1,122.81 MW), Australia 9.4% (653.52 MW), China 3.4% (236 MW) and Japan 0.3% (20.11 MW).



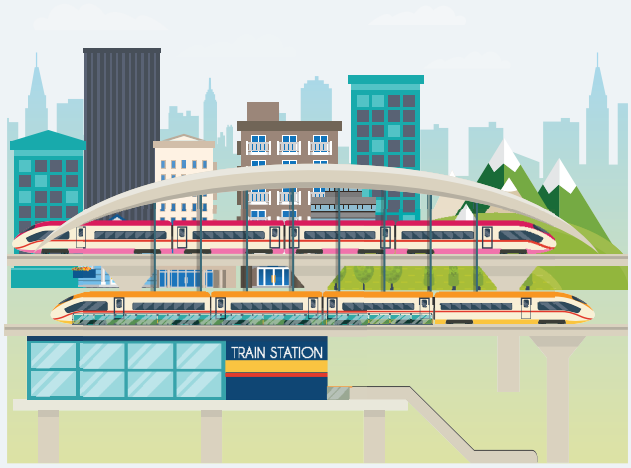
Energy-Related Businesses

RATCH aims to expand investment from power generation to the energy business to complete the circuit from fuel and energy sourcing to transmission and distribution systems. Generating revenue and adding value, this would lead to investment expansion and growth.

Type of Business	Company Name	Shareholding	Nature of Business	Location	Registered Capital	Investing Year
Power plant operation and maintenance	Chubu Ratchaburi Electric Services Company Limited	- RATCH 50% - Chubu Electric Power (Thailand) Co., Ltd. 50%	Operating and maintaining the 1,400-MW Ratchaburi-Power power plant	Ratchaburi Province	20 million baht	2005
Power plant equipment refurbishment services	EGAT Diamond Service Company Limited	- RATCH 10% - EGAT 45% - Mitsubishi Heavy Industries Ltd. 30% - Mitsubishi Corporation 15%	Providing gas turbine refurbishment service for Asian countries	Nonthaburi Province	623 million baht	2009
Fuel supply	Phu Fai Mining Company Limited	- RH International (Singapore) Corporation Pte.Ltd. 37.5% - Banpu Power 37.5% - Lao Holding State Enterprise 25%	Holding a lignite mining concession and supply coal to the 1,878-MW Hongsa Thermal Power Plant	Lao PDR	50,000 US Dollar	2009
Stock investment in EDL-Gen	EDL-Generation Public Company (EDL-Gen)	- RH International (Singapore) Corporation Pte. Ltd. (subsidiary) 4.46% - RATCH-LAO Services Company Limited (subsidiary) 5.65%	EDL-Gen, a unit under a state corporation, Électricité du Laos, operates electricity generation in Lao PDR, with dividend payment policy of no lower than 50% of the net profit	Lao PDR	Stock investment	2011
Fuel supply	Songkhla Biofuel Company Limited	- RATCH 40% - Precise Power Producer Co., Ltd. 40% - As-siddeek Savings Cooperatives Ltd. 20%	Supplying biomass material sourcing (rubberwood slab and root) to Songkhla Biomass Power Plant (9.9 MW)	Songkhla Province	1 million baht	2012

Other Businesses

Under its revised long-term strategic plan, RATCH has put a greater emphasis on seeking new investment opportunities in other businesses besides power generation and energy, aiming to diverse risks and create a new major source of stable income for its security and sustainable growth in the long run. At this initial stage, RATCH has focused its interest in the infrastructural business, where RATCH can leverage its expertise and experience, especially in engineering, toward project successes.



This year, RATCH participated in a bid offered by the Mass Rapid Transit Authority of Thailand for the concession of two electric rail lines: the Pink Line monorail project (Khae Rai-Min Buri section) and the Yellow Line monorail project (Lat Phrao-Samrong section). The bid was submitted by the BSR Joint Venture, led by BTS Group Holdings Public Company Limited, with Sino-Thai Engineering and Construction Public Company Limited and Ratchaburi Electricity Generating Holding Public Company Limited in the joint venture. The project would represent RATCH's additional source of income under the 30-year concession, which would contribute to RATCH's continuous growth and business strength. BSR has passed the selection process and is now under the negotiation process, expected to be concluded in the second quarter of 2017.

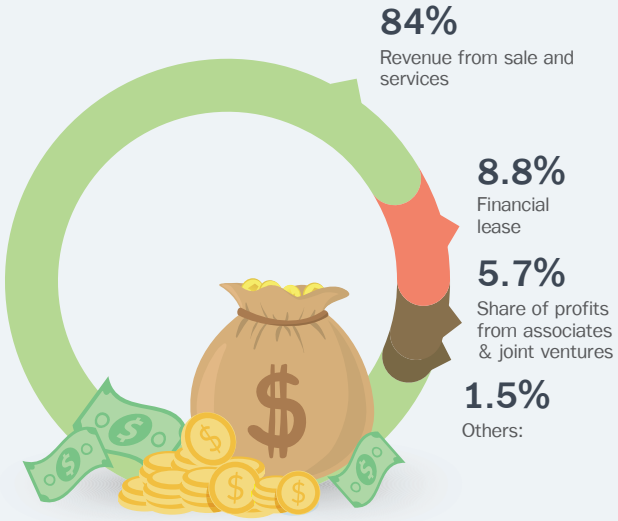
RATCH also values the investigation of technological trends and new business models to be prepared for future changes. Tasks were seriously undertaken in the year.

Revenue Structure

Under business structure, RATCH's main sources of revenues are from its investment in the power generation business from its power plants. Its revenue structure can be broken down into four sources: revenue from sale of electricity and related services from its controlled power plants, which accounts for about 84% of the total revenues; revenue derived from financial leases, 8.8%; share of profit from investment in associates and joint ventures, 5.7%; and other revenue (that is, revenue from management services, dividend, and interest), about 1.5%.

Revenue structure for 2016

Total revenues: 51,279.88 million baht



Power Facility Information

Thailand

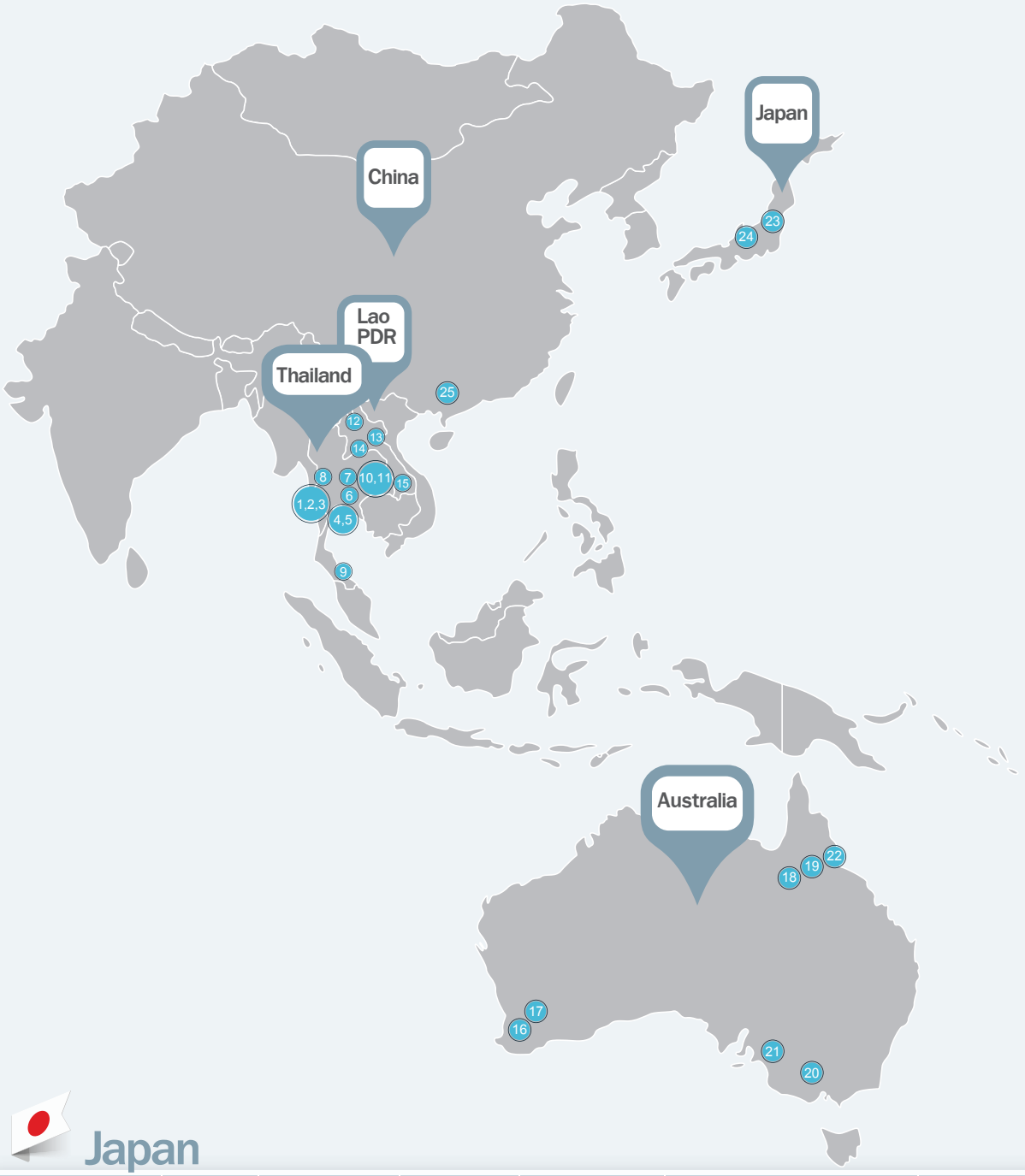
Project	Equity (%)	Installed Capacity (MW)	Equity Capacity (MW)	Location	Operator / investor	Commercial Operation (Year)
Natural Gas						
1. Ratchaburi	99.99	3,645	3,645	Ratchaburi	Ratchaburi Electricity Generating Company Limited	2000-2002
2. Tri Energy	99.99	700	700	Ratchaburi	Ratchaburi Electricity Generating Company Limited	2000
3. Ratchaburi Power	25	1,400	350	Ratchaburi	Ratchaburi Electricity Generating Company Limited	2008
4. Ratchaburi World Cogeneration	40	234	93.6	Ratchaburi	Ratchaburi World Cogeneration Company Limited	2014-2015
5. Berkprai Cogeneration	35	100	35	Ratchaburi	Berkprai Cogeneration Company Limited	Under development, operation scheduled for 2019
6. Nava Nakorn Electricity Generating	40	139.13	55.65	Pathum Thani	Nava Nakorn Electricity Generating Company Limited	2016
Solar						
7. Korat 3, Korat 4, Korat 7	40	18	7.2	Nakhon Ratchasima	Solar Power Company Limited	2012
8. Solarta (8 projects)	49	34.25	16.78	Suphan Buri Ayutthaya Nakhon Pathom	Solarta Company Limited	2011-2012
Biomass						
9. Songkhla Biomass	40	9.90	3.96	Songkhla	Songkhla Biomass Company Limited	2015
Wind						
10. Huaybong 2	20	103.5	20.7	Nakhon Ratchasima	KR2 Company Limited	2013
11. Huaybong 3	20	103.5	20.7	Nakhon Ratchasima	First Korat Wind Company Limited	2012

Lao PDR

Project	Equity (%)	Installed Capacity (MW)	Equity Capacity (MW)	Location	Operator	Commercial Operation (Year)
Coal						
12. Hongsa	40	1,878	751.2	Xayaburi	Hongsa Power Company Limited	2015-2016
Hydro						
13. EDL-Gen	10.11	1,131.15	114.36	Vientiane	RATCH-LAO Services Company Limited, RH International (Singapore) Corp. Pte. Limited	* Securities investment through Lao Securities Exchange
14. Nam Ngum 2	25	615	153.75	Vientiane	Nam Ngum 2 Power Company Limited	2011
15. Xe-Pian Xe-Namnoy	25	410	102.5	Champasak and Attapeu	Xe-Pian Xe-Namnoy Power Company Limited	Under construction, operation scheduled for 2018

Australia

Project	Equity (%)	Installed Capacity (MW)	Equity Capacity (MW)	Location	Operator	Commercial Operation (Year)
Natural Gas						
16. Kemerton	80	300	240	Western Australia	RATCH-Australia Corporation Limited	2005
17. BP Kwinana	24	118	28.32	Western Australia	RATCH-Australia Corporation Limited	1996
18. Townsville	80	234	187.2	Queensland	RATCH-Australia Corporation Limited	2005
Wind						
19. Windy Hill	80	12	9.6	Queensland	RATCH-Australia Corporation Limited	2000
20. Toora	80	21	16.8	Victoria	RATCH-Australia Corporation Limited	2002
21. Starfish Hill	80	34.50	27.6	Victoria	RATCH-Australia Corporation Limited	2003
22. Mount Emerald	80	180	144	Queensland	RATCH-Australia Corporation Limited	Under construction, operation scheduled for 2018



Japan

Project	Equity (%)	Installed Capacity (MW)	Equity Capacity (MW)	Location	Operator	Commercial Operation (Year)
Solar						
23. Iwaki	60	22.68	13.61	Fukushima	RICI International Investment Pte. Ltd	Under construction,operation scheduled for 2017
24. Ueda	60	10.83	6.5	Nagano	RICI International Investment Pte. Ltd	Under construction,operation scheduled for 2018

China

Project	Equity (%)	Installed Capacity (MW)	Equity Capacity (MW)	Location	Operator	Commercial Operation (Year)
Nuclear						
25. Fangchenggang Phase 2	10	2,360	236	Guangxi Autonomous Region	RATCH-China Power Limited	Under construction, operation scheduled for 2021

Sustainable Development Strategies

Corporate sustainability being RATCH's ultimate goal, the company has dedicated various resources to drive itself toward secure growth. It applied sustainable development as a guide for business along with a decision-making process with due regard for value and balanced socio-economic-environmental achievement.

This year RATCH prepared a written scope for sustainable development as the basis for its group business in its Code of Conduct, which has been formally rolled out.

RATCH Group's scope of sustainable development

- On the basis of socio–economic–environmental responsibility, RATCH is committed to sustainable development to guide its businesses.
- RATCH makes its decisions with primary regard for economic, hygiene, safety, environmental, and social issues.
- To maintain stakeholders' acceptance and trust, all RATCH activities are based on sustainability and targeted for sustainable outcomes.
- All executives and employees are responsible for regularly forging good relations with stakeholders related to their duties.
- All executives and employees are responsible for strictly conforming to RATCH's occupational health, safety, security, and socio–environmental responsibility requirements.
- RATCH's businesses are to forge sustainable social benefit through stewardship of the occupational health and safety of employees, business partners, communities; minimized impacts on communities and process greenhouse gas emissions; protection of the ecology and biodiversity to the best of its ability; and achievement of maximum efficiency of energy, water, and other resource consumption.

Sustainable Development Goals and Strategies

At RATCH, for business sustainability, three key goals are to be achieved. First, the company must establish economic growth while enhancing national power security. Second, the company must win community and social acceptance, which leads to business continuity. And third, the company must be environmentally responsible and play a part in countering global warming. To this end, RATCH has defined its strategies for each sustainability goal as follows.

Economic growth & national power security

- Domestic investment of at least 60%
- Neighboring countries are the primary goals for investment expansion growth
- Grow investment in renewables by 20%
- Develop efficiency management standard and asset revenue performance
- Achieve fuel security for RATCH Group's power plants by investing in the fuel supply business
- Engage in integrated energy business investment
- Investigate business models of the next 10–15 years and craft investment opportunities for new technologies
- Develop corporate and project risk management systems to accommodate future business growth

Social acceptance & business continuity

- Maintain the reliability of power plants that can generate contractual power (25 years)
- Upgrade the standards for safety and occupational health together with the work environment of power plants and offices
- Communicate and strengthen relations with neighboring communities for trust and acceptance
- Manage mutually beneficial relationship with business partners across the business supply chain
- Develop employee capacity–building and enhance employee engagement
- Pursue high–potential allies and business partners and maintain long–term relationship
- Comply with laws and maintain good governance in corporate management and anti–corruption
- Disclose information and provide complaint–handling channels for stakeholders

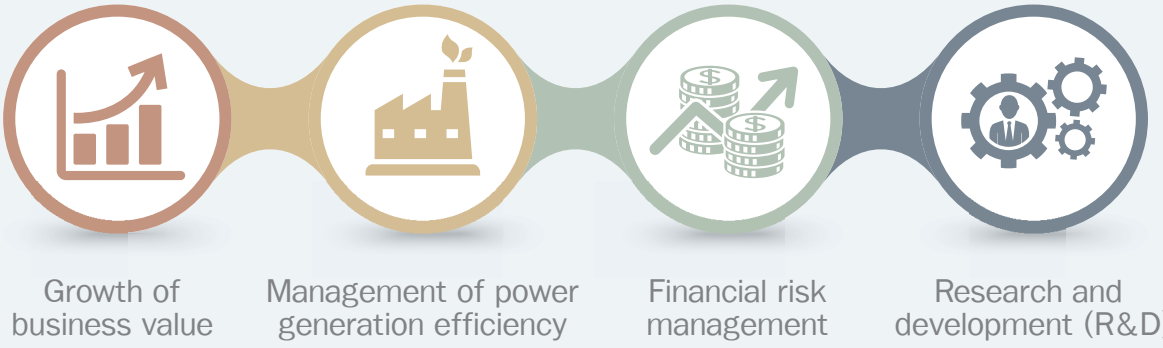
Good environment & mitigation of global warming

- Relentlessly develop and improve process efficiency to lower its consumption of fuels, energy, water, and other resources for power generation
- Control and manage process–based environmental impacts to surpass legal requirements
- Research GHG reduction approaches in response to national goals and mitigation of climate change
- Comply with environmental laws and upgrade environmental management on a par with international standards
- Regularly disclose environmental data to stakeholders

These strategies are to be revised yearly with input from internal and external factors, missions, goals, and corporate strategic plans as well as corporate risks to ensure that RATCH's strategies can most effectively meet goals.

Material Sustainability Aspects for 2016

Below are this report's significant material aspects that could affect RATCH's sustainability, with input from internal and external risk factors, stakeholders' views and expectations, with weight given to economic growth.



To maintain continued growth and long-term security, RATCH has defined its approaches for these aspects.

Growth of Business Value

RATCH has amended its strategic plans by extending investment to embrace the integrated energy sector and diverted investment to other businesses in Thailand and Asia-Pacific for greater investment opportunities while setting a growth goal at 10,000 MW or equivalent in 2023, when the domestic investment proportion should be no less than 60% of the consolidated goal. At the same time, international investment should account for no less than 40% of the consolidated goal, and about 20% is to be from renewables (including hydropower projects).

This year the company invested in the domestic electric train (mass transit) business through a joint venture with partners in concession bidding for Bangkok's Yellow Line and the Pink Line, for which the outcomes of negotiation should be concluded in the second quarter of 2017. In Australia, RATCH invested in two renewable-energy projects, namely the Mount Emerald wind farm (144 MW) and the Collinsville solar farm (42 MW). RATCH also investigated the opportunities and feasibility of investment in public utility projects and power plant projects in Lao PDR, Indonesia, and the Philippines.

Management of Power Generation Efficiency

Since power plants represent RATCH's primary income and economic growth generators, power generation efficiency management is the crux of its drive for economic growth and security.

This year RATCH investigated the ISO 55000 asset management system to guide its generation efficiency, profitability, and cost reduction. It expects to implement the system in 2017.

RATCH also focused on preventive maintenance along with its development of knowledge and skills for commissioning and maintaining power plants that must operate for a long time to maintain reliability. This also prevented and lower power generation risks affecting customers and RATCH's income. Target plants consist of Ratchaburi (3,645 MW), Tri Energy (700 MW), and Hongsa (751 MW equity capacity).

Financial Risk Management

Investigating financial tools and capital sources with acceptable costs, both domestic and international, RATCH undertook financial planning for investment growth in line with the 10,000-MW growth goal or equivalent. The sources included financial institutions and debentures. RATCH's loan-securing ability is currently considered good, evident in the following indices:

- Debt-to-equity ratio of 0.54 times
- Debt-service coverage ratio of 3.27 times
- Domestic and international ratings agencies by reputable institutes:
  - TRIS Ratings = AAA
  - S&P Ratings = BBB+
  - Moody's Ratings = Baa1.

Also investigated were risks arising from forex and interest rate volatility associated with not only RATCH's foreign-currency loans and revenue, but also its increasing overseas investment proportions. Also, the pros and cons of financial hedging tools were revisited to help RATCH avert or transfer risks to manageable levels apart from the "natural hedge" in use.

Research and Development (R&D)

In a bid to supplement business value, RATCH investigated investment opportunities as a result of disruptive technologies. This year it defined strategies and goals for the start-up business model involving emerging technologies that are close to its own skills and experience.

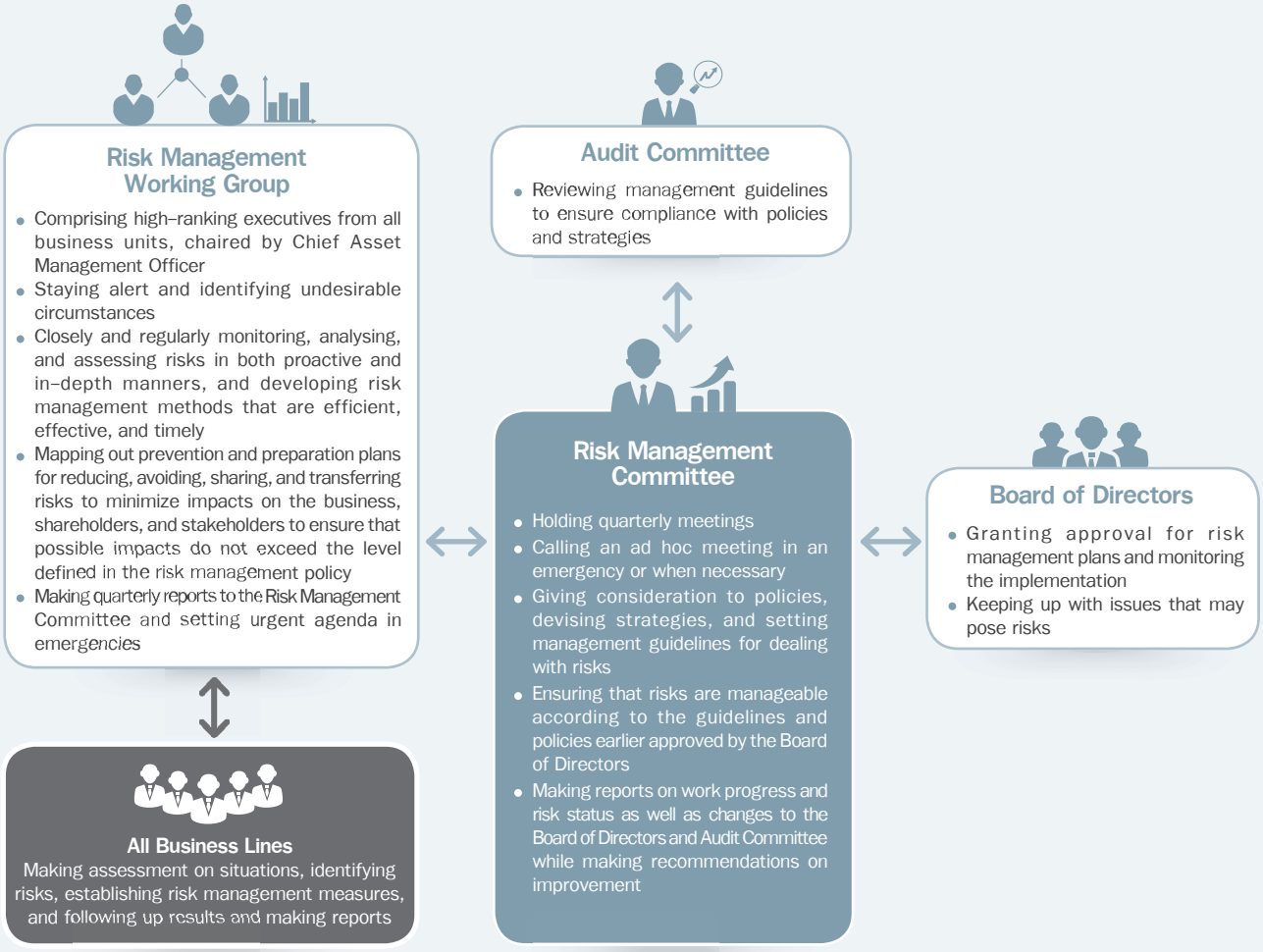
Besides, it selected target technologies for in-depth investigation and commerciality assessment, with a goal to advance to the investment analysis stage in 2017.

Risk and Crisis Management

With an aspiration to attain a production target of 10,000 MW or equivalent by 2023, under which overseas investment and diversification into businesses beyond electricity are required, risk management has become a key mechanism to ensure both smooth operations and goal achievement. The Risk Management Committee therefore has stepped up its monitoring and supervision on RATCH's project-level risk management to ensure that before each investment decision is made, all dimensions of risk have already been vetted. The risk management process involves analysis, assessment, and identification of opportunities which could bring positive impacts and risks, together with negative impacts or losses to the business. Also included in the process is the formulation of a prevention plan, which involves risk reduction, risk avoidance, risk sharing, and risk transfer, to keep risks manageable.

The prime objective of risk management is to avoid risks harmful to business existence or business continuity. Risk avoidance will, at the same time, enable effective decision-making and business administration while increasing long-term values for the business, which will eventually result in business sustainability.

Composition of risk management



In 2016 the Risk Management Committee held four meetings with emphasis on keeping track and assessment of changes, both internal and external, to ensure complete identification of all risks. The committee also monitored and followed up the results of risk management in factors, as detailed below, for which RATCH had earlier mapped out preventive measures.

1) Risk from domestic and overseas competition

Considered an external risk or strategic risk

Risks identified

- The Power Development Plan (PDP 2015), which focuses on striking a good balance among various sources of fuels for power generation to enhance energy security, becoming a barrier for further investment in IPPs 10 years from now
- Tougher competition, both domestic and overseas, particularly competition with Chinese investors who have both technological and financial advantages as well as competition with new players in the market
- The GHG emission target set by the COP meeting, which focuses on the energy sector; Thailand is a member country joining the signing to reduce carbon dioxide emission

Impacts

Impacts in economic dimension since the above-mentioned risks could obstruct growth and production capacities from fossil fuels, which may consequently affect the ambition to add value to the business

Preventive measures and risk management

- ✓ Extend the strategies to cover investment in both the energy business and other infrastructure related to energy
- ✓ Increase domestic renewable-energy projects--SPPs and VSPPs-because, under the PDP 2015, SPPs and VSPPs are allowed to expand their generated capacity with support from the government thanks to feed-in-tariffs (FiTs)
- ✓ Seek overseas investment opportunities
- ✓ Join hands with strong business allies and develop relationships for being joint-venture partners for investment in the energy business and other infrastructure related to energy, such as joint investment in the Pink and Yellow city train lines
- ✓ Running simulated situations to analyze and assess vulnerability and trends, as well as uncertain factors of risks already identified, to identify the severity of possible impacts on the economy and investment in order to keep the risks manageable

Probability and impact

Risk can be controlled, within 5 years, with no significant impact on the financial status (not over 5%)

2) Financial risk

Risks identified

- The strategy that aims to increase overseas investment by 40% in 2023
- Uncertainty in the world economy that brings about fluctuation of exchange rates, oil prices, fund flow, and interests

Risks identified

- Global trends, such as Brexit and the result of the US presidential election, which may cause impacts on business finance

Impacts

Impacts in economic dimension, particularly cost, cash flow, and profits

Preventive measures and risk management

- ✓ Devise a plan on sources of fund and financial instruments that are adequate to run the business with suitable costs and debt/equity ratios
- ✓ Maintain adequate liquidity to support business expansion and opt for cautions financial policy with budget control
- ✓ Keep up with economic, social, and political movements, as well as other surrounding circumstances, both domestic and overseas, that may affect money and capital markets for analysis and for timely prevention and mitigation of possible damage while keeping risks manageable
- ✓ Maintain financial strength and business performance at the projection or better
- ✓ Manage debts, interests, and exchange rates with natural hedges, and use derivatives to prevent financial risk, such as swap contracts for interest and foreign exchange

Probability and impact

Risk can be controlled, within 3 years, with significant impact on the financial status if risk occurs (10% upward)

3) Operational risk

Risks identified

- Dwindling natural gas from Myanmar and the delayed launch of the petroleum concession round in Thailand, which could affect RATCH's power plant located in the Western Region
- Community opposition to power plants
- Concern about human right violation
- More stringent laws and standards for safety
- Competition in technology prices and competition among companies doing engineering, procurement, and construction (EPC) businesses

Impacts

Impacts in economic and social dimensions that could affect business continuity and the license to operate

Preventive measures and risk management

- ✓ Devise an investment policy and measures on selection of investment partners, covering project selection, project development and construction, and project operation until expiration
- ✓ Monitor and cooperate with various parties, public and private, to obtain up-to-date, accurate, and complete information useful for risk assessment, and draw up corrective actions to reduce the vulnerability of any situation that may affect the project being developed and the company's investment
- ✓ Analyze and assess the efficiency of technologies chosen for projects which will affect productivity and profits

Preventive measures and risk management

- ✓ Keep control of EPC companies at all stages of work to ensure their compliance to contracts so that machinery and equipment procured may be ready to function at their full capacity and can even be upgraded to generate a steady income
- ✓ Appoint executives who have an insight and experience in the business and local culture to work overseas so that they can manage, analyze, and closely monitor the business environment to discern the real situation while being able to design suitable management methods that can keep pace with the situation
- ✓ Engage in contracts on fuel supply or invest in a fuel business to support business security, thus making the operations ready to respond to EGAT's order
- ✓ Cooperate and communicate regularly with all stakeholders, namely investment partners, construction contractors, subcontractors involved in operation and maintenance work, society and communities around each project, to ensure their proper understanding and smooth operations
- ✓ Devise a careful, efficient operation plan with supplies of equipment and labor that can ensure timely maintenance and acceleration of the operation, since this is vital to both revenues and expenses of a project
- ✓ Devise a plan on community relations, provide information, and forge understanding and trust in the project operation
- ✓ Strictly follow corrective and preventive measures involving impacts on the environment as stated in the EIA to ease community people's worries and be able to control impacts on community people's ways of life and the environment for smooth operations
- ✓ Devise a plan for community relocation (if needed) under the laws and regulations of each country while seeking advice and cooperation from government agencies concerned
- ✓ Strictly follow safety regulations and keep control of operators and subcontractors working under the same provisions of labor and safety laws, and study safety measures of international standards for application to the operation to achieve highest efficiency
- ✓ Produce a manual on operations and maintenance of engines in use for longer than 10 years to keep them in good conditions, not only to create revenue but also to minimize risk for accidents while ensuring safety for workers doing maintenance work of ageing power generators

Probability and impact

Risk can be controlled, with highly significant impact on the financial status and the corporate value if risk occurs.

4) Personnel risk

Risks identified

- Strategic goal that focuses on expanding investment in integrated energy businesses, as well as other businesses, while increasing overseas investment
- The ageing society, which will cause the population at working age to shrink, bringing about higher labor cost
- Simultaneous retirement of executives on various positions

Impacts

Impacts in economic dimension that could result in higher costs, which will consequently affect business potential and competitiveness as well as goal attainment

Preventive measures and risk management

- ✓ Hire experienced HR experts for workforce planning, starting from recruitment, selection, succession, to career path design, in order to retain capable personnel while boosting staff morale
- ✓ Keep a good balance between the number of staff and business goals, both short and long terms, while maintaining appropriate age gaps of staff at each level
- ✓ Review remuneration packages and welfare to maintain competitiveness against other companies in the same industry
- ✓ Promote cross-functional culture, enabling employees to work at their full capacity, which will lead to successful improvement of works and the organization development
- ✓ Communicate the organization's goal and strategy to forge understanding for employees and put it into practice to drive RATCH toward its growth goals
- ✓ Develop and enhance staff's knowledge and potential through on-the-job training, job rotation, and language skill development to have capable, well-rounded personnel in the pipeline for succession in response to business needs

Probability and impact

Risk can be controlled, with very slight impact on the organization's operation.

5) Corporate reputation and image risk

Risks identified

- Business trends that recognize responsibility for society and the environment, as well as good corporate governance on the path toward sustainability, both in and outside Thailand

Impacts

Impacts in social dimension that could tarnish the company's reputation and credibility, which would compromise the ability to achieve long-term success

Preventive measures and risk management

- ✓ Devise proactive and in-depth community relation plans to minimize risks from public opposition and environmental impacts and to promote corporate governance principles at all stages of project development, from before the development takes place, during construction, commercial operations, to contract expiry
- ✓ Consider laying down continued community relation measures after project expiration to prevent any undesired events
- ✓ Improve the anti-corruption system and fraud risk assessment method according to the standards of Private Sector Collective Action Coalition against Corruption Council (CAC) to be CAC-certified

Preventive measures and risk management

- ✓ Comply to obligations, laws and regulations, and requirements, as well as measures to minimize environmental impacts as stated in EIAs
- ✓ Disclose adequate, timely, and factual information to stakeholders
- ✓ Review the crisis communication plan by assessing risks against the organizational strategy and cascade the plan to subsidiaries for systematic, efficient risk management procedure
- ✓ Promote community relations by paying visits, listening to opinions, and giving support to local traditions, as well as other social and community activities regularly to nurture mutual trust

Probability and impact

Risk can be controlled, with much less significant impacts on corporate image (acceptable level)

6) Compliance risk

Risks identified

- Movements in domestic politics which entail consequent changes to policies, laws and regulations governing the business
- The strategy to expand overseas investment which causes concerns over different laws and regulations, different conditions for doing business, and different priorities of issues (economic, social, and environment issues) in each country

Impacts

Impacts in the corporate governance dimension that can either lead to business success or undermine the organization's credibility

Preventive measures and risk management

- ✓ Assign all related units and personnel to thoroughly study laws and regulations, as well as rules that apply to business operations
- ✓ Thoroughly review conditions and regulations involving business transactions to prevent non-compliance
- ✓ Cooperate closely with various parties in both public and private sectors as well as stakeholders in investment areas in order to be informed of movements, laws and regulations, and requirements so that timely corrective actions can be made
- ✓ Seek and strengthen ties with local business allies in countries where each investment is made when reviewing local laws and regulations to confirm understanding
- ✓ Hire local legal consultants in countries where investment is made to ensure that the company fully complies with local laws and regulations to prevent future prosecution which could affect the business

Probability and impact

Risk may occur in the next 3 years, with very slight impact.

Emerging Risk

In addition to these six factors of risk, RATCH envisages future risks emerging from global changes in various aspects, the so-called megatrends, that may affect business sustainability.

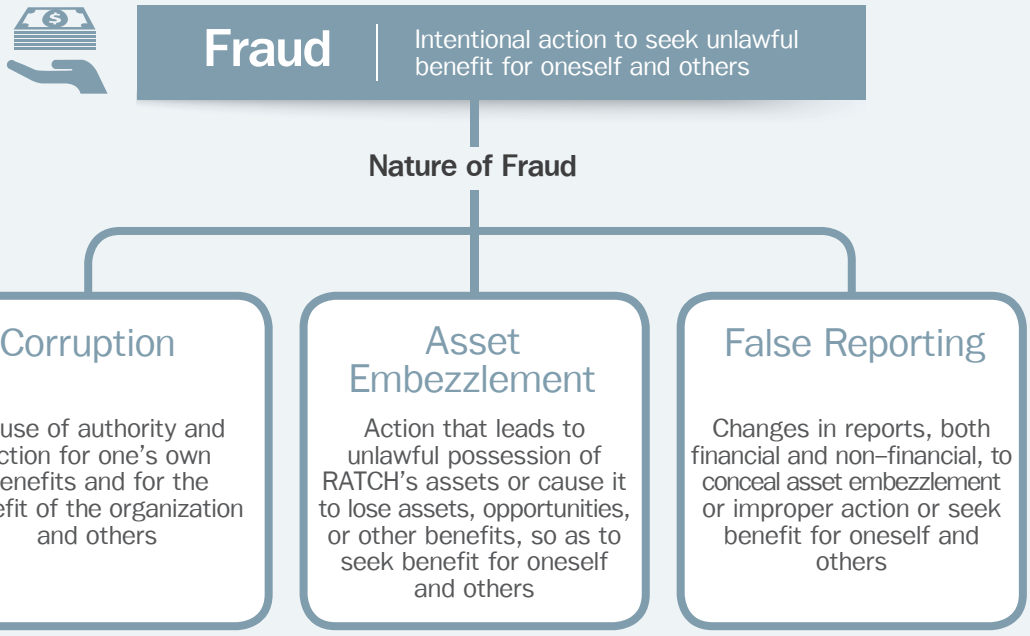
The three emerging risks that need close monitoring, with which RATCH has already made some certain preparations to cope, are as follows.

Risk	Risk management method
Disruptive technologies, such as electrical vehicles, energy storage systems, and micro-grids	✓ Study and follow up technological development in the energy sector and assess its commercial viability to be ready to grasp investment opportunities ✓ Include technological development as part of the business strategy and assign a responsible unit with a clear timeframe set ✓ Study and analyze business models in the energy sector for the next 5-10 years to early seize investment opportunities ✓ Study factors or issues required for the investment assessment to prevent and mitigate investment risk
Natural disasters, such as floods, drought, earthquakes, and storms caused by climate change	✓ Focus on proactive prevention to minimize impacts on projects managed by RATCH and its subsidiaries ✓ Study geographical data, climate, and disaster statistics in targeted investment areas to have a thorough understanding about their respective vulnerabilities, such as floods, earthquakes, drought, and storms ✓ Study various methods and tools for risk insurance, such as non-life insurance, and arrange for risk transfers ✓ Design project structures and opt for technologies that can counter or reduce impacts or increase machinery efficiency during natural disasters ✓ For drought, search for other possible sources of raw water while pursuing technology and development that can reduce water consumption in power generation processes ✓ Produce a manual and plan on natural disaster response
Terrorism and riots Terrorism and riots, both in and outside Thailand, are increasing, while power plants are considered a strategic target vulnerable for national security	✓ Risk that requires the project-level management since the feasibility study ✓ Study and analyze political issues, social structures, conflicts, and statistics on turbulences in countries targeted for investment with detailed assessment indicators, particularly countries with social diversity ✓ Design projects with efficient access control and tight security systems to reduce risks ✓ Study various methods and tools for risk insurance, such as non-life insurance, and arrange for risk transfers ✓ Produce a manual and plan on terrorism and riots response

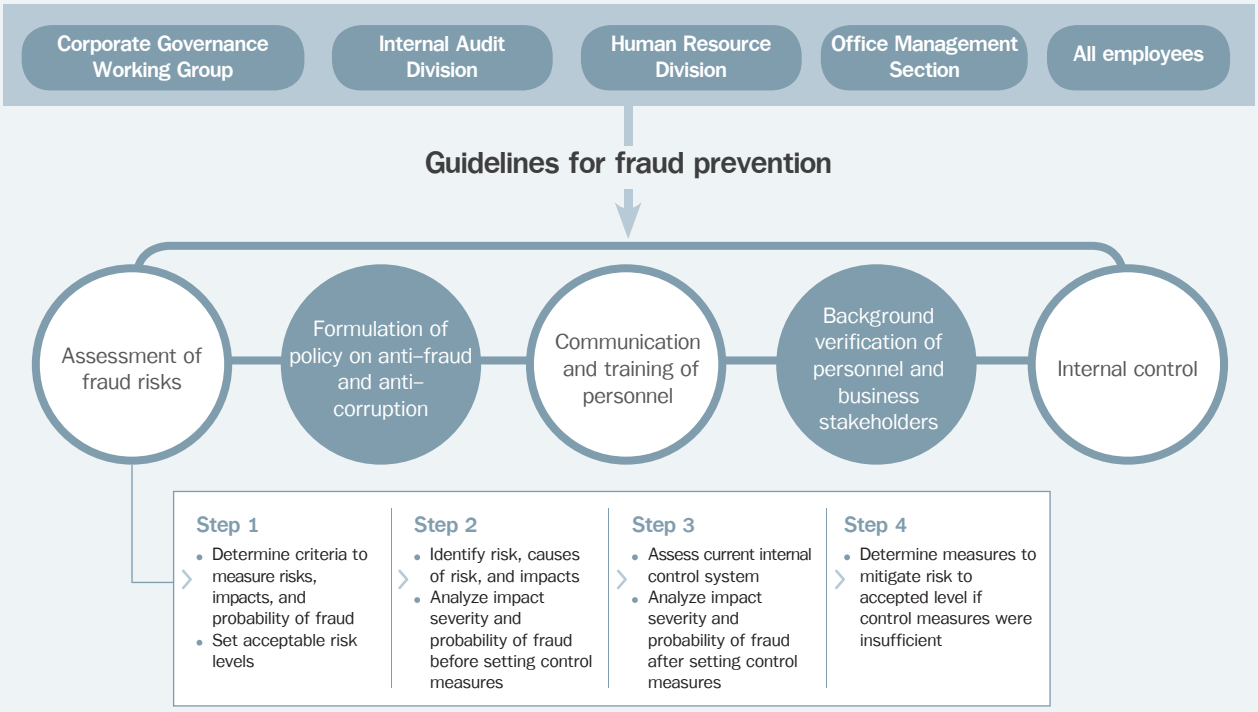
Fraud Risk Management

This year RATCH issued an order on fraud risk management to put in place concrete anti-fraud operation and upgrade corporate direction in line with international practices. The order stipulated activities and procedures for employees in the prevention and detection of fraud risks and response to them. The duties and responsibilities of units and employees, as well as implementation guidelines in case of doubt or detection of actions relating to fraud, were clearly defined.

The definition of "fraud" in RATCH's context was as follows:



RATCH has established five measures for fraud risk prevention with directly responsible units. Those who performed their work are required to acknowledge the measures and respond to its policy.



Progress updates this year

Assessment of fraud risks

- All units conducted assessment and identified work-related fraud risks
- Documented corporate fraud risks
- Chart on risks with registration of fraud risks was prepared.

Formulation of policy on anti-fraud and anti-corruption

- Review and improvement of RATCH's relevant policies, regulations, and orders.
- Enforcement of the revised Code of Conduct; Anti-Corruption Policy; No-Gift Order; Order on donation, entertainment, fraud risk management.

Communication and training of personnel

- Training for acknowledgment and awareness
- Executives and employees attended relevant training courses organized by IOD
- Formulation of communication plan on anti-fraud for 2016.
- Establishment of media and communication channels (monthly newsletters and posters)
- Establishment of system to test employees' knowledge and understanding through e-Learning and link them to performance appraisal system
- Written notification of RATCH's Anti-Corruption Policy to business partners and stakeholders

Background verification of personnel and business stakeholders

- Addition of qualifications and criteria of business partners' anti-corruption in procurement terms
- Visits to business partners' facilities with high procurement value
- Improvement of HR information system to review and update information on all employees

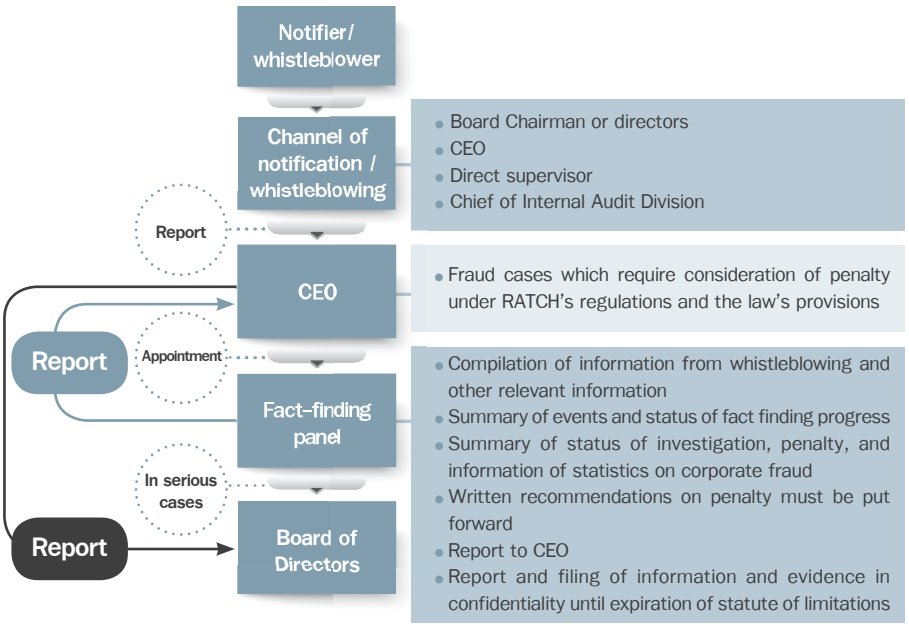
Internal control

- Board
- Audit Committee
- Corporate Governance & Social Responsibility Committee
- Management Team
- Corporate Governance Working Group
- Internal Audit Division
- Written work instruction with all processes prepared by all units to prevent or detect fraud risks

Mechanism of Notification or Whistleblowing and Report Fraud

RATCH promotes and encourages all employees to recognize any action leading to fraud and corruption. Apart from strict implementation of the Code of Conduct, policies, regulations and orders, as well as communication and essential training, the company has provided the channel for whistleblowing and reporting on fraud that internal and external persons can freely.

Process of Notification and Report on Fraud



The investigation is to be based on neutrality and devoid of bias. RATCH will impose the maximum penalty on the guilty person if the investigation findings confirm wrongdoing. Moreover, it provides protection to employees who deny corruption even if such denial would deprive of business opportunities. The company also provides protection and safety to whistleblowers according to the standard stipulated by law.

In 2016, the experimental program of notification system was launched for efficiency improvement, with communication about this system for both internal and external stakeholders. Therefore, the outcome cannot be reported at present.

Remedial Measure and Information Disclosure

After the investigation, relevant units are to conduct a joint review and consider remedial measures derived from fraud, covering policy revision, and extend investigation to other related fraud. Moreover, RATCH has defined the practice of information disclosure concerning the event, which is considered its confidential

Investigation

- Compilation of information, evidence, and fact–finding
- Penalty if found guilty
- Filling of information and maintaining of information in confidentiality

Remedial measures derived from fraud

- Policy revision
- Internal control improvement
- Change of methods of performing duties
- Undertaking of legal action and criminal or civil prosecution
- Extension of investigation to detect related frauds

Information disclosure

- Approval must be sought from CEO
- Person assigned by CEO to be particularly responsible

Future Action

- Review the risk factors of corporate fraud under revised strategic plans and the organizational structure
- Provide training to communicate knowledge and raise awareness of anti-corruption and cultivate ethics and integrity to strengthen the corporate culture
- Conduct performance assessment of executives and employees by setting indicators on anti-fraud and corruption in such assessment
- Improve notification system to suit the users' needs and communicate any updates to relevant persons

Crisis Management

Crisis management is an essential mechanism for management of unforeseen incidents to end, mitigate, or limit loss, damage, as well as direct and indirect impacts on the economy, society, community, and the environment to a minimum. As a result, RATCH manages to operate business on a continuous and sustainable basis. It has defined the guidelines for crisis management in its Code of Conduct as follows:

- Formulate crisis management and communication plans to overcome severe incidents to reduce its damage and losses, as well as reducing risks of impacts on its stakeholders
- Regularly revise and improve such plans to keep abreast of events and fit its situations of each period
- Link management to emergency plans of RATCH's affiliates
- Educate its relevant teams and employees for efficient management and communication in times of crises.

This year RATCH reviewed the update of simulations in its crisis management and communication plans compared with current corporate risk factors and the world's major events or changing trends, and considered the revision of the plan to respond to unforeseen incidents, including accidents or disasters derived from uncontrollable risks.

RATCH has planned to improve its handbook on crisis management and communication and expects to finish it by 2017. It will also link and integrate the plan with its affiliates.

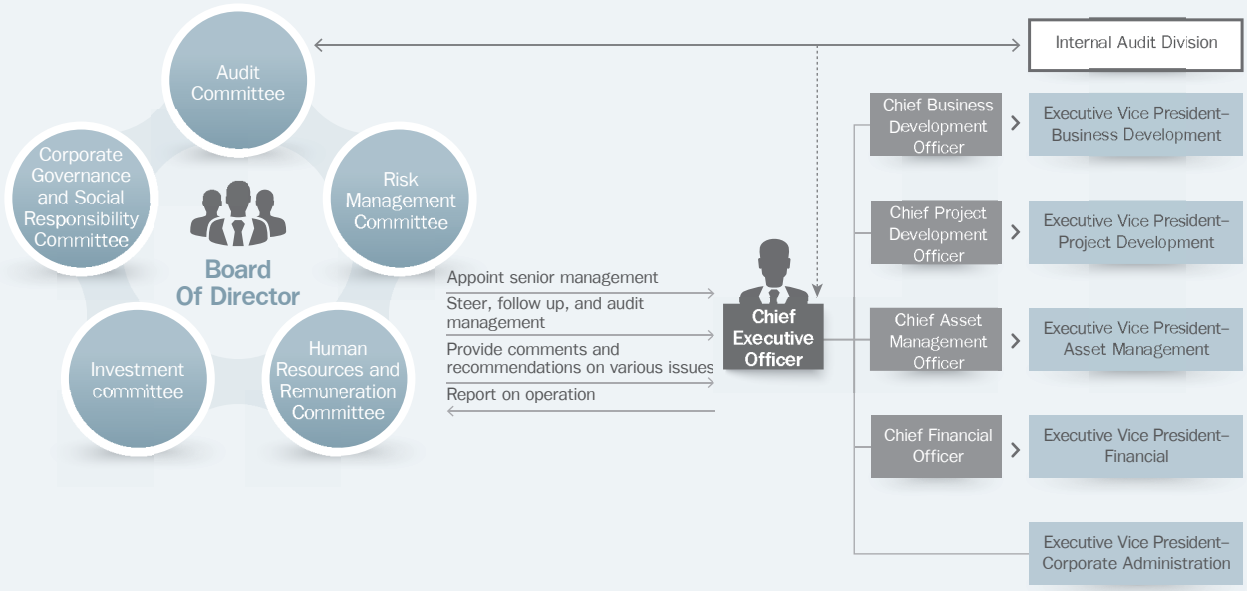
Corporate Governance

The Board of Directors is RATCH's the highest governing organization, with commitment to corporate growth, in order to fulfill its vision and maximum expectations of shareholders and stakeholders (whether directly or indirectly), in the supply chain of RATCH's business, as well as adherence to environmental responsibility and corporate governance.

Every director is committed to independence in decision-making and aware of duties and responsibilities for shareholders, who are business owners that appoint directors to represent them. The Board performs its duties taking into account the following principles:

1. Perform duties with caution
2. Perform duties with integrity, devoid of conflicts of interest
3. Comply with laws, objectives, regulations, and resolutions of shareholders' meetings
4. Disclose information, based on accuracy, completeness, and transparency

Corporate Governance Structure



The consideration and decision-making of the Board cover all economic, social, and environmental issues with significant impacts, both positive and negative. Committees supervise and monitor each dimension as specifically assigned by the Board before tabling the issues to the Board for consideration and acknowledgement. For preventing Directors' any conflict of interest, the company's regulations specified that the chairman and the CEO must not be the same person. Directors are responsible for voting for required matters, but each director must abstain from voting on any matter he/she has conflict of interest. Detailed was mentioned in the 2017 Annual Report and www.ratch.co.th.

The appointed committees are responsible for consideration of and decision-making on important issues relating to the economy, society, and the environment. The responsibilities are as follows:

Committee	Economic	Social	Environmental
Audit Committee	✓		
Risk Management Committee	✓	✓	✓
Human Resources and Remuneration Committee	✓	✓	
Investment Committee	✓	✓	✓
Corporate Governance and Social Responsibility Committee		✓	✓

Roles and duties of the Board and the committees appear in the Annual Report 2016 or at the www.ratch.co.th website.

Composition of the Board

In 2016, the Board consisted of 13 directors:

Each of the 13 directors possesses multidisciplinary knowledge and extensive experience that effectively contribute to RATCH's drive for growth and meet goals in economic, social, and environmental aspects. The knowledge of the directors in major fields is divided as follows:

Performance Summary of 2016

The duties of the Board are executed through meetings to acknowledge progress, problems, and obstacles in the operation of the management, as well as providing comments and recommendations beneficial to operations, solutions to problems and obstacles, including risk management with impacts on the economy, society, the environment, and RATCH's reputation. As a result, RATCH successfully operates its business while maintaining growth and sustainability to benefit the shareholders, the stakeholders, and society at large.

In 2016 the Board and the committees convened meetings to supervise, monitor, and follow up the operation of the management as follows:

Board of Directors 13 directors	Audit Committee 3 directors	Risk Management Committee 3 directors	Human Resources and Remuneration Committee 3 directors	Investment Committee 3 directors	Corporate Governance and Social Responsibility Committee 3 directors
• 13 total meetings* • 1 meeting(s) of non–management directors* • A site visit to monitor the construction progress of Xe–Pian Xe–Namnoy hydroelectric power project, Lao PDR • A study tour to Ishikawa power plant, Japan	• 7 meetings (quarterly)	• 4 meetings (quarterly) • A site visit to Solarta Co., Ltd.'s three solar farms • Monitoring the operation of RATCH–Australia Corporation Limited • Seminar on "Thriving in a changing world", England	• 8 meetings	• 5 meetings	• 1 meeting

** RATCH's regulations stipulate that the Board should meet at least once a month and non-management directors meet at least once a year.*

Moreover, this year the Board supervised operations and made decisions on significant issues with positive impacts on RATCH as follows:

Strategic Modification

- Brainstorm with the management to formulate long–term strategies and business directions.
- Add strategies of great urgency and importance to strengthen competency and capability.
- Clarify goals and direction

The Board of Directors and the management team had a discussion on RATCH's strategic plan revision

Organizational Restructuring

- Align with redefined strategies
- Set up a process–based structure to facilitate and render more efficient investment

Project Monitoring

- Construction of 410–MW Xe–Pian Xe–Namnoy hydroelectric power plant in Lao PDR
- Visit and monitor the operation of RATCH–Australia Co., Ltd.'s power plants

Risk Management

- Monitor water level at Solarta Co.,Ltd.'s solar farms including 3-MW Sai Sena in Phra Nakhon Si Ayutthaya, 5-MW Sai Saphan 1, 2-MW Sai Saphan 2, 1-MW Sai Tatong in Saphan Buri, and find out their flood prevention measures
- Proactively and thoroughly monitor operating facilities and project construction and development; RATCH-Australia's operation, Hongsa thermal power plant, Ratchaburi power plant, NNEG power plant, Xe-Pian Xe-Namnoy project; Berk Prai Cogeneration project and Yellow and Pink line electric transit trains in order to reduce economic risks
- Proactively monitor and find out the prevention measures for drought and flood that will likely intensified and may affect RATCH's domestic and overseas projects
- Monitors and change in regulations and law as well as the criteria and conditions of CAC and ensure the strict compliance by relevant units and officers

The Board of Directors and executives visited and monitored the Xe-Pian Xe-Namnoy hydroelectric power plant's construction.

The Board of Directors visited Ishikawa power plant, Japan.

Code of Conduct Revision

- Align with long-term strategic plan to expand business overseas
- Improve to align with the international context that values sustainable development

Performance Assessment and Compensation of Directors

RATCH's regulations stipulate that the Board should conduct performance assessment of itself and the committees every year. So far, performance assessment has been conducted both as a group and for individuals and constantly disclosed in the Annual Report and the Sustainability Report. The performance outcomes for 2016 are summarized below:

Committee		Full Score	2016				2015			
			the whole		Individual		the whole		Individual	
			Score	Level	Score	Level	Score	Level	Score	Level
	Board of Directors	100	**95.02**	**Excellent**	**95.46**	**Excellent**	98.40	Excellent	94.13	Very Good
The Sub-Committee	1. Human Resources and Remuneration Committee	Y2016 = 100 Y2015 = 50	**93.83**	**Excellent**	**93.83**	**Excellent**	49.33	Excellent	50.00	Excellent
	2. Audit Committee	30	**28.00**	**Excellent**	**28.00**	**Excellent**	27.00	Excellent	29.00	Excellent
	3. Corporate Governance and Social Responsibility Committee	30	**28.00**	**Excellent**	**28.00**	**Excellent**	29.00	Excellent	29.00	Excellent
	4. Investment Committee	30	**28.75**	**Excellent**	**28.50**	**Excellent**	29.00	Excellent	29.30	Excellent
	5. Risk Management Committee	30	**28.50**	**Excellent**	**28.50**	**Excellent**	27.25	Excellent	27.25	Excellent

Compensation of Directors

RATCH's regulations stipulate criteria for compensation, with the following factors taken into account:

- Goals and operating performance of RATCH Group
- Levels of assigned responsibility in comparison with similar standards or lines of business
- Ability to persuade and inspire qualified and experienced personnel to contribute to RATCH's success.

Directors' compensation consists of two parts, namely regular compensation, and bonus and others (if applicable). Made up of two parts, regular compensation is paid monthly: The first portion is fixed at 75% and the second at 25% with meeting attendance.

Directors' compensation in 2016 is disclosed in the Annual Report 2016. Remuneration for Directors must be approved by the annual general meeting of shareholders. Management team will ask the Human Resources and Remuneration Committee's approval before submission to the Board of Director for their consideration.

Corporate Government Award and Performance in 2016

Activity/ Project	Progress/Outcome
2016 Sustainability Assessment	
RATCH participated in the Stock Exchange of Thailand's sustainability assessment for Thailand Sustainability Investment (THSI) 2016 program and SET Sustainability Awards 2016. The company was categorized in the group, with market capitalization between 30-100 billion baht.	• RATCH's score totaled 88 out of 100, higher than the group's average score of 79. • Listed on Thailand Sustainability Investment (THIS) 2016. 
2016 Sustainability Report Award	
organized by CSR Club of Thai Listed Companies Association, the Securities and Exchange Commission, the Stock Exchange of Thailand and Thaipat Institute All listed companies are encouraged to arrange the corporate social responsibility report based on business and social sustainability that should be incorporated into the organization's strategy. Followed the Ceres-ACCA Sustainability Reporting Awards criteria, this project also aims to promote and upgrade sustainability report's quality, with annual disclosure of materiality.	RATCH won the "Outstanding" Sustainability Report Award for four consecutive years. 

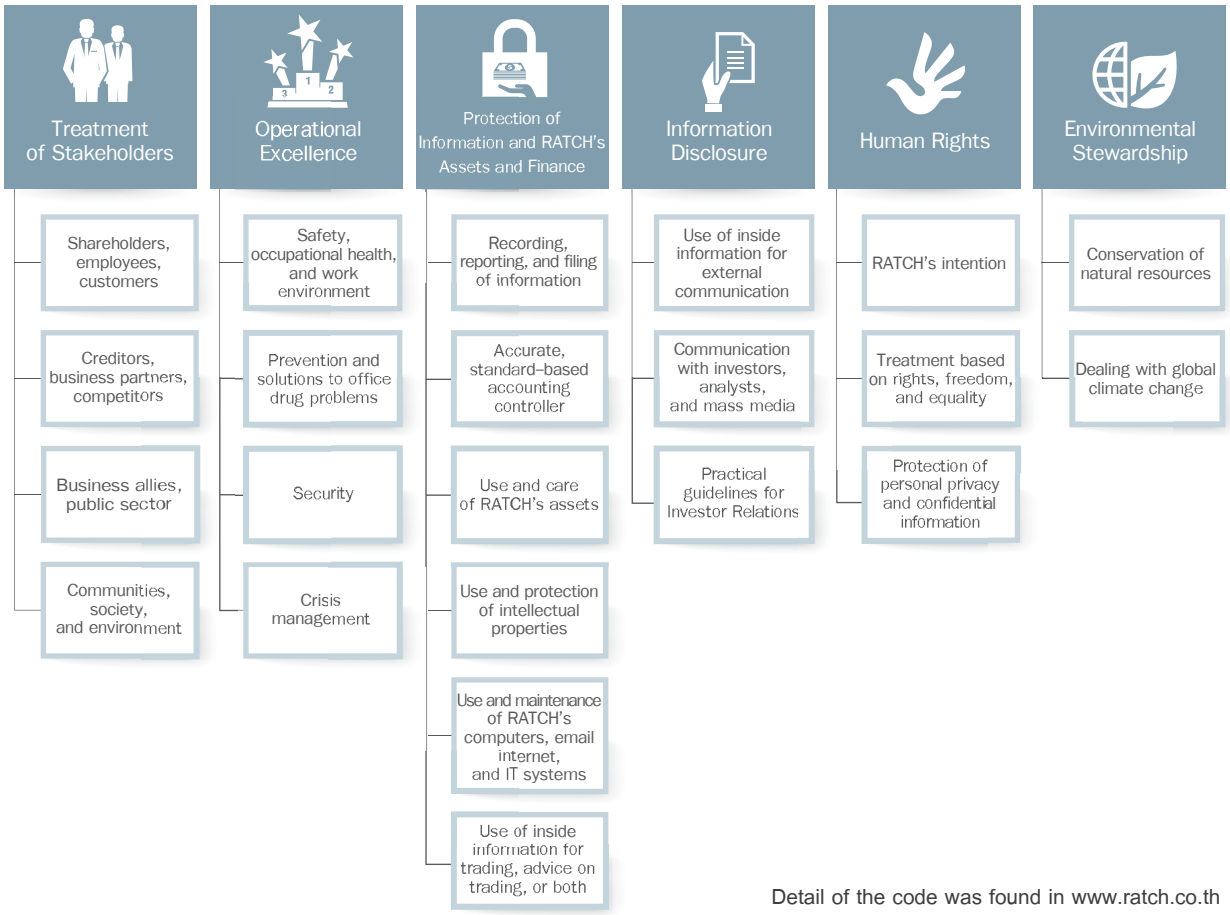
Code of Conduct and Anti-Corruption

As a result of RATCH's revised long-term strategies in view of expanding its business base into integrated energy businesses and other new ones both at home and abroad in pursuit of growth, it is vital to lay down a framework of business operation in line with international practices and sustainable development. RATCH has therefore revised and improved its code of conduct approved by the Corporate Governance and Social Responsibility Committee, the Audit Committee, and the Board respectively.

The new version of the Code of Conduct was revised with a conviction to operate businesses based on integrity, honesty, ethics, and morals; awareness of duties and responsibilities for the country, religion, and monarchy; compliance with national laws and order; fair and equitable treatment of stakeholders; and support of the economic, social, and environmental development for long-term value creation and value-added to the corporation for secure and sustainable growth.

Implementation guidelines of business operations as specified in the new code cover the following issues:

Moreover, RATCH laid down implementation guidelines in the code for compliance by and practice of directors, executives, personnel, and temporary workers.



Detail of the code was found in www.ratch.co.th

Message from the Chairman

RATCH firmly believes that the adherence of business operations to ethics, morals, and integrity, combined with sound management systems and good corporate governance, is key to success for supporting sustainable growth and maintaining business leadership.

RATCH's Code of Conduct was compiled from best practices for business conduct. Under its rules and regulations, this code was modernized and reclassified to meet international standards, as well as enhancing practicality and readability. Responsible for thoroughly studying the contents, all executives and employees including related parties must proceed with strict adherence to the code.

It is RATCH's hope that all executives and employees will commit themselves to studying and complying with the code to achieve RATCH's goals and mission for promoting business security and sustainable growth.

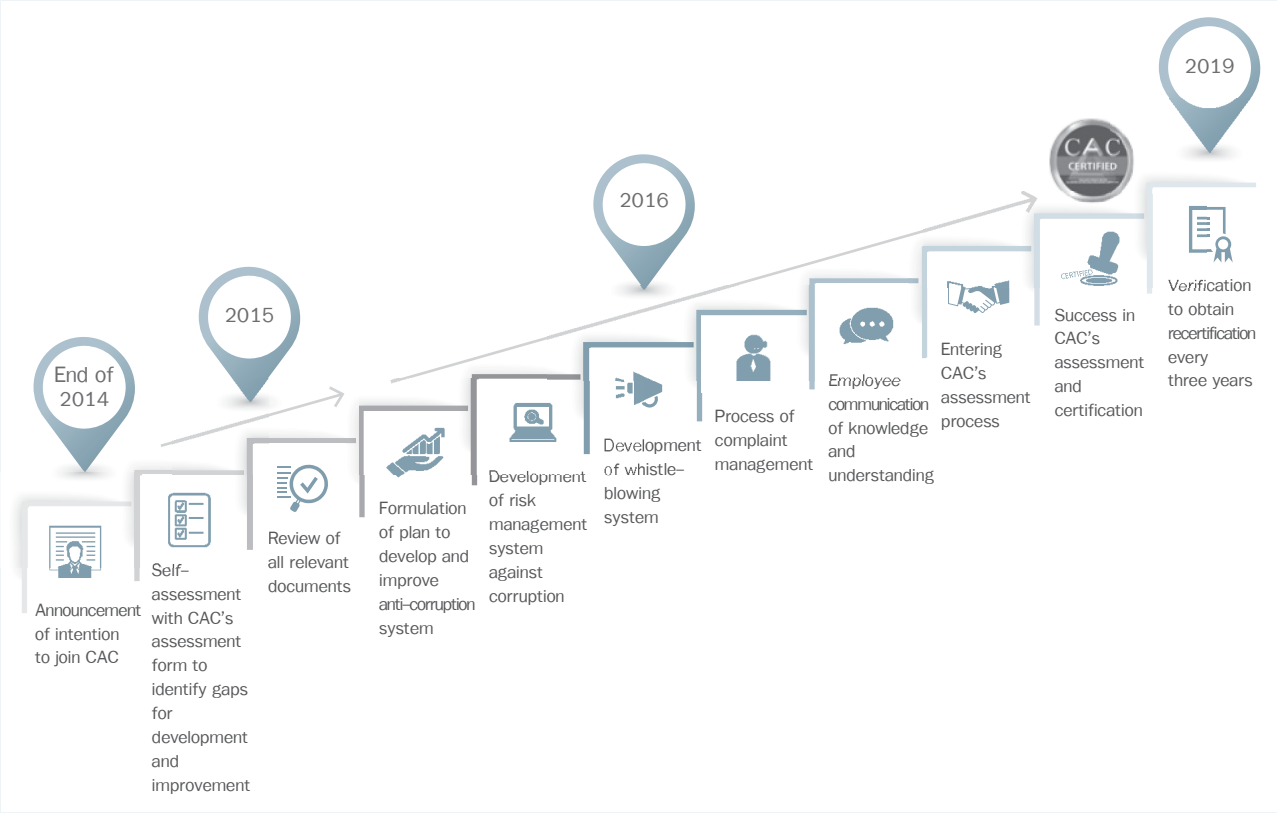
(Mr.Sutat Patmasiriwat)
Chairman of the Board of Directors
Ratchaburi Electricity Generating Holding Public Company Limited
February 18, 2016

The Code of Conduct was announced and enforced on February 18, 2016

Anti-Fraud and Corruption

This year RATCH continued development from the previous year to fight corruption. It reached its goal by passing the assessment and receiving a CAC (Thailand's Private Sector Collective Action Coalition against Corruption) certificate as planned.

Development of Anti-Corruption System Roadmap (CAC standard)



Anti-Fraud and Corruption Policy of RATCH Group

The policy stipulates that RATCH will not engage in fraud and corruption, whether directly or indirectly, throughout its business operation with either the public or the private sector. It prohibits all employees (from directors, executives, to staff) from requesting, engaging in, or accepting any fraud or corruption for their own benefit or for the benefit of others, including families, friends, or acquaintances. The Board approved the policy and made a formal announcement on February 25, 2016. The policy can be summarized as follows:

- Foster an anti-fraud and anti-corruption culture
- Define clear principles, processes, and implementation guidelines for business operation to prevent risks of fraud and corruption
- Establish an internal control system, taking into account risks of fraud and corruption
- Determine criteria, audit, and supervision to ensure appropriate compliance with the policy
- Establish written regulations to ensure compliance by executives, as a risk control measure of operation fraud.

Key Measures for Corruption Prevention

Regulations

- **Code of conduct** » Framework and practical guidelines of RATCH and its personnel, focusing on integrity and honesty
- **Company regulations** » Tenets of RATCH's operation prohibiting fraud, which is subject to disciplinary punishment
- **Indemnity of directors and the management** » Indemnity against liability or demand for compensation from directors and the management for performing duties of a given position
- **Procurement** » Definition of criteria and practical guidelines for procurement and contracts by setting ceilings for procurement and approval authority
- **Accounting, finance, and budgeting** » Criteria for the control and audit of RATCH's disbursement and budget
- **Supervision of subsidiaries, associates, and joint ventures** » Framework for management and control of subsidiaries, associates, and joint ventures to ensure adherence to business integrity, in line with the parent company

Orders

- **Entertainment expenses** » Criteria for entertainment, expense limits, and approval
- **Donation for charity and support funds** » Criteria for donation and support for charity, expense limits, and approval, with no policy of political support
- **Giving and receiving gifts and tokens** » Criteria for giving and receiving gifts, tokens, and other benefits, by specifying values and types of tokens

RATCH's Chairman of the Board accepted a membership certificate of Thailand's Private Sector Collective Action Coalition against Corruption (CAC) from the Board of Thailand's CAC in April 2016.

Internal Promotion of Ethics and Integrity

RATCH recognizes that adherence to the Code of Conduct, policies, regulations, and orders concerning anti-corruption is the heart of its growth and sustainability. It therefore places a stronger emphasis on the promotion and cultivation of morality and honesty as part of its culture.

Various activities were held this year to promote morality and integrity in the organization, as summarized below:

- Publishing and distributing the Code of Conduct to all employees

- Requiring all employees to master this code, followed by a written acknowledgment of the consequence of its violation

- Requiring all employees to take a test on the knowledge and understanding of RATCH's anti-corruption efforts using the e-Learning system, linked to their annual performance assessment. A minimum score of 80% is considered the bottom line

- Arranging delivery of RATCH's Anti-corruption Policy to business partners and stakeholders

- Sending out an e-bulletin with information on anti-corruption moves to all monthly

- Encouraging employees to recognize their responsibility for society. They are required to take part in RATCH's volunteer activities for five days a year, linked to their annual performance assessment

- Issuing a company-wide announcement of the No-gift Policy on 2017 New Year's Day occasion, with a copy sent to all stakeholders

- Making the corporate governance issue part of the corporate risks for which all business units must devise preventive measures and file a quarterly report for the Risk Management Committee to keep them updated

- Establishing a Corporate Governance Working Group as a mechanism for managing risks concerning fraud while improving anti-corruption procedures

- Providing anti-corruption training

- Improving the annual performance assessment process with employee behavior taken into account, which will take effect from 2017 onwards

The above guidelines and activities will be carried on and improved further to refine employee behavior. It is believed that, through such practice, RATCH will have not only capable but also conscientious human resources.

Plan for 2017

- Roll out employee assessment with KPIs on behavior and participation
- Developing and improving risk management to deal with fraud
- Reviewing alignment between corporate values and the revised strategic plan
- Continuously promoting anti-corruption practices and business ethics.

Economic Performance

Economic Data

Item	Unit	2016	2015	%
Revenue from sale and rendering of services	million baht	**43,087.04**	52,171.44	-17.41
Revenues	million baht	**51,279.88**	59,326.30	-13.56
Operating Cost	million baht	**41,623.27**	50,616.66	-17.77
EBITDA	million baht	**9,323.54**	8,644.78	7.85
EBIT	million baht	**8,338.23**	5,808.67	43.55
Income before Tax and minority interest	million baht	**6,935.79**	4,422.65	56.82
Net income	million baht	**6,165.72**	3,187.87	93.41
Earnings per share	baht	**4.25**	2.20	93.18
Dividend per share	baht	**2.35**	2.27	3.52
Cash provided by operating activities	million baht	**8,706.42**	9,256.17	-5.94
Return on Asset *	%	**6.26**	4.61	35.79
Return on Equity *	%	**9.81**	7.48	31.15

** Excluding the effect of foreign currency exchange rate*

Contribution to Stakeholders

Stakeholders	Unit	2016	2015	%
Employees	million baht	**639.39**	624.26	2.42%
Government agencies	million baht	**1,054.91**	1,829.75	-42.35%
Creditors	million baht	**1,388.21**	1,308.73	6.07%
Shareholders	million baht	**3,407.50**	3,291.50	3.52%

2016 Operating Performance

Power plants in commercial operation

In 2016, RATCH's power plants in commercial operation accounted for 27 sites with a combined capacity of 6,328.06 MW by equity, as detailed below:

19 sites in Thailand with a combined equity capacity of 4,913.59 MW comprising:

- 5 fossil-fuel power plants
- 14 renewable-energy power plants (solar, wind and biomass)

2 sites in Lao PDR with a combined equity capacity of 904.95 MW comprising:

- 1 fossil-fuel power plant
- 1 hydropower plant

6 sites in Australia with a combined equity capacity of 509.52 MW comprising:

- 3 fossil-fuel power plants
- 3 wind-power plants

There are two plants with a combined equity capacity of 306.05 MW that started commercial operations during 2016.

Hongsa Power Plant, Unit 3 (626 MW), Lao PDR Equity capacity of 250.4 MW COD in March 2016

Nava Nakorn Power Plant (139.13 MW) Nava Nakorn Industrial Zone, Pathum Thani Equity capacity of 55.65 MW COD in June 2016

Hongsa Power Plant houses three units, of which Unit 1 and 2 had started their commercial operations in 2015.

Net Actual Power Generation

This year, power plants under joint ventures registered combined net actual generation of 43.6 million megawatt hours (MWh), an increase of 25.82% from 2015. Of the total capacity, 2.5 million MWh was produced from renewable-energy power plants, comprising hydro, solar, wind, and biomass, and accounting for 5.8% of the total net actual generation. Most of the capacity from plants in Lao PDR was sold to EGAT.

Power plant	Net Actual Generation (MWh)	
	2016	2015
Thailand	**31,092,659.20**	29,041,639.27
Ratchaburi (99.99% share)	**17,109,009.69**	15,669,733.10
Tri Energy (99.99% share)	**3,118,930.00**	3,515,689.40
Ratchaburi-Power (25% share)	**8,781,534.00**	8,185,741.70
Ratchaburi World Cogeneration (40% share)	**1,292,376.53**	1,249,724.28
Nava Nakorn (40% share)	**386,654**	0
Huay Bong 2&3 (20% share)	**236,008.17**	315,405.65
Solarta (8 projects) (49% share)	**65,836.04**	68,051.60
Solar Power Khorat 3, 4, and 7 (40% share)	**33,540.68**	34,123.54
Songkhla Biomass (40% share)	**68,770**	3,170
Lao PDR	**11,009,410.66**	4,407,468.92
Nam Ngum 2 Hydropower (25% share)	**1,947,720.66**	2,160,648.92
Hongsa (40% share)	**9,061,690**	2,246,820
Australia	**1,491,940**	1,197,770
Power plants belonging to RATCH-Australia Corporation (80% share)	**1,491,940**	1,197,770
Total	**43,594,010.16**	**34,643,708.19**

Power plants under development and under construction

RATCH has six more projects in the form of joint investment currently in their development and construction stages, both in and outside Thailand. These projects have a combined equity capacity of 537.61 MW.

Project	Location	Equity Capacity (MW)	Status	COD
Iwaki Solar Farm (60% share)	Japan	13.61	Under construction	2017
Ueda Solar Farm (60% share)	Japan	6.50	Under construction	2018
Mount Emerald Wind Farm (80% share)	Australia	144	Under construction	2018
Xe-pian Xe-Namnoy Hydropower (25% share)	Lao PDR	102.5	Under construction	2019
Berkprai Cogeneration (35% share)	Thailand	35	Under development	2019
Fangchenggang Nuclear Power (10% share)	China	236	Under construction	2021

Renewable energy development and other investments

By 2023, RATCH plans to increase power generation from renewable energy to 20% of the target of 10,000 MW or equivalent. One objective is to increase revenue, and the other is on the environmental front-to reduce greenhouse gases (GHG) and mitigate global warming. RATCH, moreover, aims to expand its business base to other potential areas to increase its enterprise value to meet the target set for 2023. It has made analyses and studies into investment feasibility of renewable energy and other businesses, both domestic and abroad, with major milestones elaborated below:

Investment in Mount Emerald Project in Australia

Mount Emerald Wind Farm has an installed capacity of 180 MW, considered a large-scale wind power project. It is situated on a 2,400-hectare plot of land north of Queensland, Australia. Of the total 350-million Australian dollar project value, RATCH's equity represented about 160 million Australian dollar. The project took two years for construction and came on stream in 2016. Electricity will be generated by 53 wind turbines, each of which has a capacity of 3.45 MW.

The project is planned for commercial operations in September 2018. Ergon Energy Queensland (a state enterprise of Queensland, Australia) will be the buyer of the electricity and the project's Green Energy Certificate for 13 years from September 2018 to December 31, 2030.

Mount Emerald Project is wholly owned by RATCH-Australia Corporation Ltd., a subsidiary where RATCH holds 80% equity. The project is RATCH's mechanism to expand its business base in Australia, particularly in renewable-energy projects which show vast investment opportunities and potential. This is the fourth investment project in wind power in Australia, raising RATCH's total capacity from wind power to 126 MW.

Collinsville Solar Plant in Australia

Collinsville Solar Plant, situated in the north of Queensland, has an installed capacity of 42 MW. The project is operated by RATCH-Australia Corporation Ltd., a subsidiary where RATCH holds 80% share. RATCH-Australia aims to make optimal use of the decommissioned site of the Collinsville coal power plant while adding value to the unoccupied area and infrastructure readily available. As many as 180,000 photovoltaic cells will be installed to generate electricity to supply 15,000 households.

In 2016, Collinsville Project was selected by Australian Renewable Energy Agency (ARENA), an Australian public agency dealing with promotion of renewable project development, to receive government funding of 9.5 million Australian dollar, thus dropping the investment cost by around 10%. Now under way are negotiations between the company and power purchasers together with an application for loans to support construction. The construction is planned to start in 2017 with COD in 2018.

Participation in the bidding for Yellow Line and Pink Line electric city trains

RATCH joined BTS Group Holdings Pcl. and Sino-Thai Engineering and Construction Pcl. **under the name of 'BSR Joint Venture'** in submitting a proposal to the Mass Rapid Transit Authority of Thailand (MRTA) for joint investments in the Pink Line (Khae Rai-Minburi section) and Yellow Line city train (Lat phrao-Samrong section). BSR Joint Venture won the selection by MRTA's selection committee under Section 35 of Private Investment in State Undertaking Act B.E. 2556 ("PPP Act") with the highest assessment score in a search for a concessionaire for design and construction, procurement of an electric train operating system, passenger service, and maintenance of the Pink Line and the Yellow Line.

Negotiation is under way before the conclusion of both lines can be made and presented to the Cabinet for approval expected for April 2017. Investment in these two lines will be made in the form of PPP Net Cost, with the government sector investing in the cost of land required for the construction and funding for construction work with a budget ceiling of Baht 20.135 billion for the Pink Line and Baht 22.354 billion for the Yellow Line. The concessionaire will invest in the construction, procurement of electric trains and the operating systems.

The total investment (land, construction, and operating system costs) is Baht 53.490 billion for the Pink Line and Baht 51.810 billion for the Yellow Line. The concession will last 33 years and 3 months (three years and three months for the construction and 30 years for service). The concessionaire, in addition to managing the train operations and maintenance throughout the concession periods, will take charge of collection of the service fees as well as other revenues connected to the train system, which will be shared with MRTA.

If the project can proceed as planned, RATCH's business base will be expanded beyond the power sector and raise the values of existing businesses to the target.

Customer Satisfaction Management

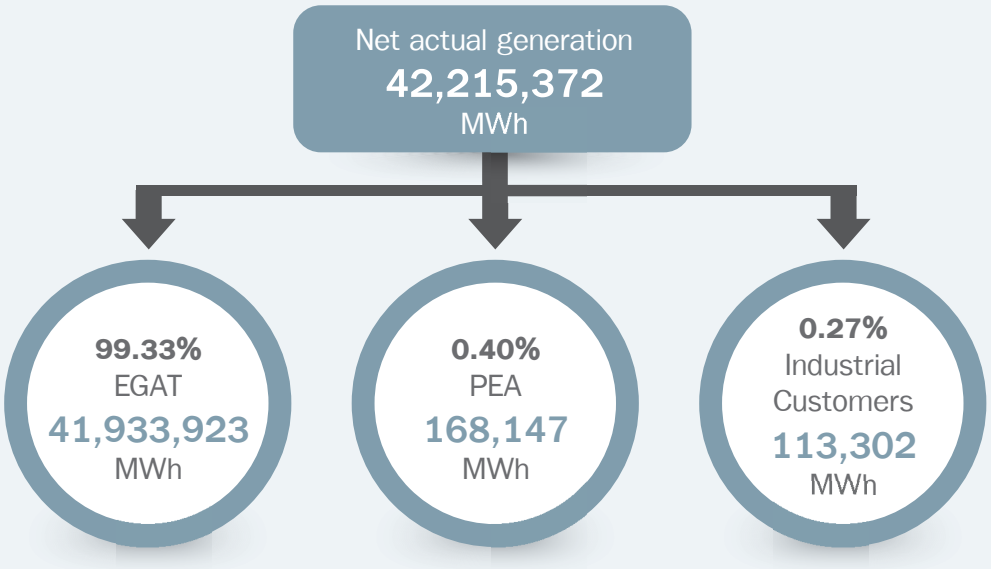
Power production is RATCH's core business, with 90% (5,790.6 MW) of the combined capacity sold to EGAT under long-term PPAs lasting 20-25 years.

Power plant	Equity	Equity Capacity (MW)	PPA period (years)
Ratchaburi	99.99%	3,645	25
Tri Energy	99.99%	700	20
Ratchaburi Power	25%	350	25
Huay Bong 2 & 3	20%	41.4	25
Ratchaburi World Cogeneration	40%	93.6	25
Nava Nakorn Electricity Generating	40%	55.65	25
Nam Ngum 2	25%	153.75	25
Hongsa	40%	751.2	25

EGAT is RATCH's major customer while the Provincial Electricity Authority purchases electricity from some of RATCH's renewable-energy plants, and a direct buyer of industrial sector.

Therefore, it is bound to fulfill PPAs with EGAT, whose mandate is to ensure the country's power supply security.

Power Purchaser in Thailand in 2016



Customer Relationship Management Approach

At RATCH, customer relationship management is carried out at the project level since each power plant has direct interface with its customers. A power plant has an obligation to meet customer satisfaction, which is to deliver electricity at quantities and quality required so that customers can fulfill their demand for electricity at anytime. A power plant also plays a role in maintaining the country's power supply security. Customer satisfaction is therefore a key performance indicator measuring customer relationship management success. RATCH's approaches for managing customer relationship is divided into four prime areas, as detailed below:

PPA management

Customers' three main concerns stated as PPA conditions that have to be fulfilled through the contract periods are:

Availability

Availability of supply is the prime factor for customer satisfaction. Power plants will set their annual target availability in accordance with their respective contracted availability hours (CAHs). If CAHs are not met, the power plant is subjected to fines.

Regarding 2016 performance, Ratchaburi power plant, RATCH's principal site, managed to maintain its average availability at 93.77%, higher than the average target availability of 86.11%.

Comparison of Ratchaburi power plant's availability, 2015 and 2016

Year	Availability		Remarks
	Target	Performance	
2015	84.30	85.51	Exceeded target
2016	**86.11**	**93.77**	**Exceeded target**

As for the two-year performance (2015-2016), availability was consistently found to exceed the target availability stated in the PPA. This demonstrates the plant's ability to deliver the product to customers as bound by the contract, thus meeting customers' expectations.

Reliability

Power plants are required to keep up its efficiency, ready to operate at anytime when dictated by customers' orders, as stated in the PPA. Still, there are uncontrollable external factors that could affect the operation, causing inevitable outages. Reliability of the plant must, therefore, be incorporated in the PPA.

Reliability means the number of operating hours versus hours spent on unplanned outages for maintenance. The number of unplanned outage hours is normally fixed at 3-5% of the total hours of availability. Unplanned outage hours are thus significant for the plant's availability.

Performance of Ratchaburi power plant

In 2016, Ratchaburi Power Plant achieved 96.42% reliability, higher than the target of 92.88%.

Comparison of Ratchaburi power plant's reliability between 2015 and 2016

Year	Reliability		Remarks
	Target (%)	Performance (%)	
2015	93.39	94.72	Exceeded target
2016	**92.88**	**96.42**	**Exceeded target**

Heat Rate

Heat rates reflect a given customer's cost of electricity. Power plants are obliged to operate at their maximum efficiency with minimum fuel consumption. The heat rate is therefore part of PPAs, meaning the amount of fuel consumed for producing one unit of electricity, including additional fuels required for starting up the generator. Heat rates are normally set in accordance with plant efficiency. In general, the lower the heat rate, the higher the plant efficiency.

Performance of Ratchaburi power plant

In 2016, the average heat rate at Ratchaburi Power Plant fueled by natural gas, fuel oil, and diesel was at 7,627 BTU/kWh, 10,171 BTU/kWh, and 8,391 BTU/kWh respectively, meet to what is required by the contract.

Comparison of heat rates at Ratchaburi Power Plant, 2015 and 2016

Year	Heat Rate (BTU/kWh)					
	Natural gas	Target	Fuel oil	Target	Diesel	Target
2015	7,764	9,794	9,719	9,719	8,914	8,914
2016	**7,627**	**10,899**	**10,171**	**10,171**	**8,391**	**8,391**

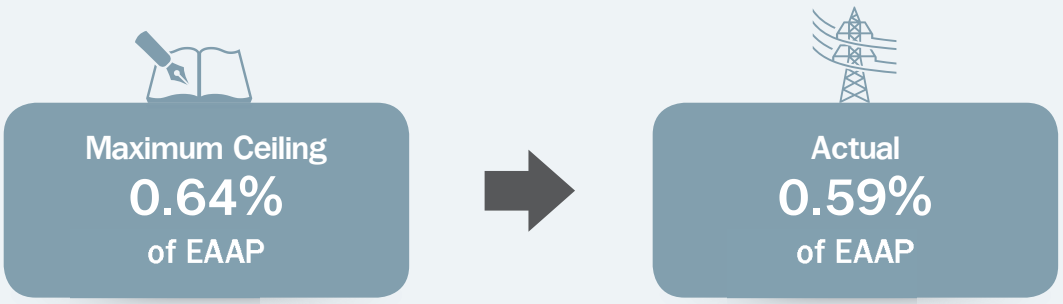
Remarks: At Ratchaburi power plant, natural gas is used as the main fuel. Fuel oil and diesel are backup fuels.

Management of Fines

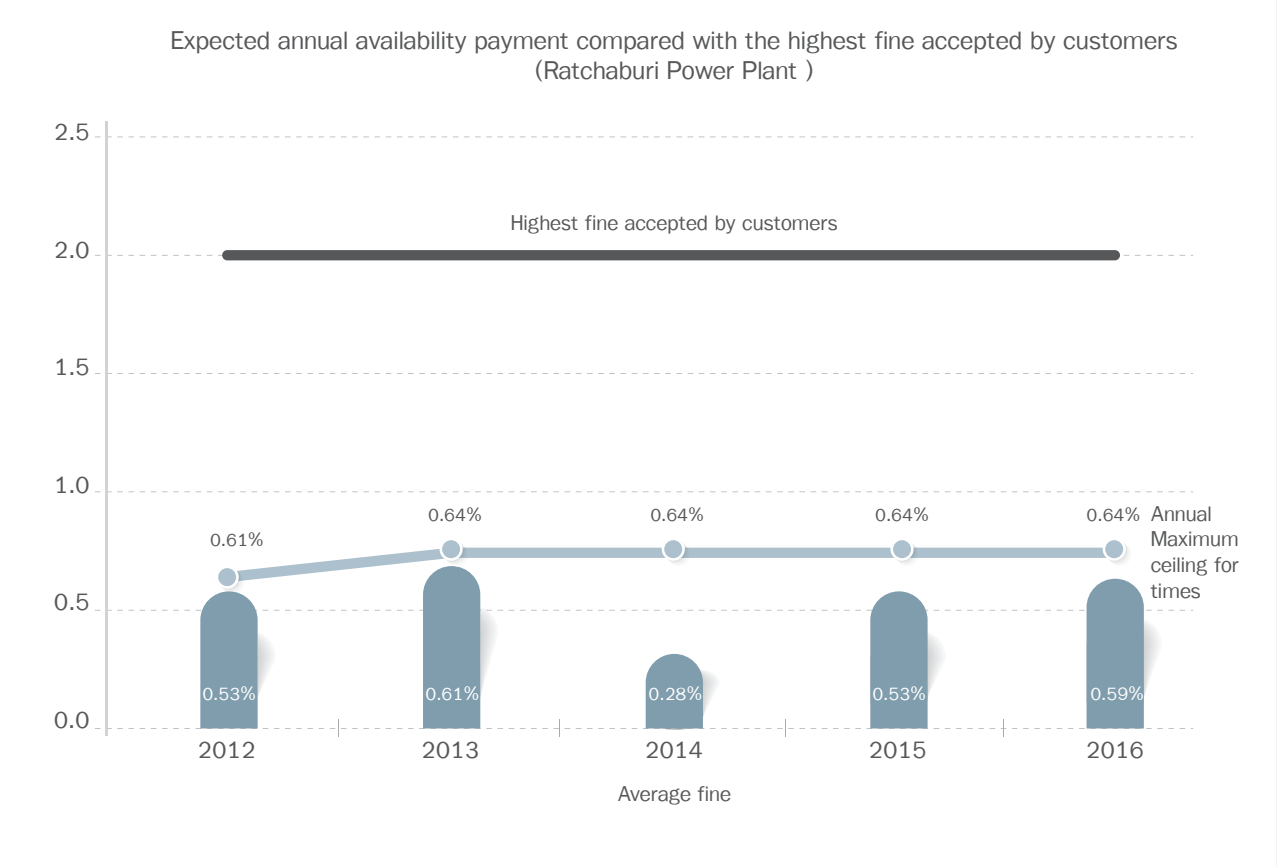
In PPAs between power plants and customers, fines normally range between 0.5%-2.0% of the expected annual availability payment (EAAP), which varies with impacts on customers but still meets customers' acceptance. Fines also reflect power plants' availability.

Performance of Ratchaburi power plant

In 2016, Ratchaburi Power Plant managed to keep fines within 0.59% of EAAP, considered lower than the maximum ceiling of 0.64%. Most of the fines occurred from aged equipment, subject to planned maintenance.



During the past five years, Ratchaburi power plant managed to keep fines below the ceiling target, reflecting its ability to maintain efficiency and good availability despite the plant's 16 years of service.



Improvement of power generation efficiency

As a rule, power plants hold an annual discussion with EGAT, who is the customer overseeing, ordering, and purchasing power, to seek suggestions and recommendations on the plant's efficiency and ability to meet customers' expectations. Suggestions and recommendations from EGAT are used for improvement of the operation and plant processes to best satisfy customers, which also means the security of the country's power supply.

Performance of Ratchaburi Power Plant

In 2016, Ratchaburi Power Plant held a timely meeting with EGAT's units in charge of PPAs, electric power system control, and system control and prevention to listen to their suggestions and recommendations for improvement of plant operations. Key issues discussed appear in the table below:

Issue	Suggestions for improvement
Principles for reduction in availability at combined-cycle power plant unit 1, caused by frequency excursions in the national grid	• Seek ways to respond to possible recurrence • Lay down practical measures for power plants • Install a temperature control alarm detector or any device to maintain the security of the country's power supply
Ways to solve de-rate loads of combined-cycle power plants to prevent impacts on customers if the power plant cannot meet the expected quality of products	• Seek ways to reduce the temperature of inlet air into gas turbine compressors to increase generation efficiency to meet EGAT's needs • Plan and implement daily online water wash of gas turbine compressors to increase generation efficiency and quality to meet EGAT's needs • Shut the steam system blow-down to reduce energy losses while increasing production from steam turbines to meet EGAT's order for full-load transmission • Whenever the quality does not meet EGAT's order, inform EGAT urgently (phone and fax) to minimize impacts and damage on the overall power capacity

Responsibility for customers

RATCH is determined to do its best in responding to customers with speed and quality products and services, which are regularly inspected to ensure compliance with the contracts. At the same time, it welcomes customers' complaints about its products and services through various channels. Moreover, RATCH's management and staff are instructed to maintain customers' privacy and are not allowed to abuse customers' confidential information for the benefit of their own or others. This is to maintain customers' satisfaction. The practices are also stated in RATCH's Code of Conduct.

Supply Chain Management

Business partners and suppliers are important stakeholders in RATCH's supply chain, since allies are first chain links essential to the development of RATCH's business and projects. Suppliers vary according to the types of products and services that they continually and effectively provide during the period of company's business. In short, they are key mechanisms for RATCH's success and sustainable growth.

In the Code of Conduct, RATCH sets guidance for business partners, suppliers, and creditors, who are all stakeholders in RATCH's supply chain. The Code of Conduct can be found at the company website www.ratch.co.th.

Partner Relationship Management

As an important part in the supply chain, business partners are one of the key factors driving business growth in pursue of the established strategy, with a significant role in supporting business expansion and sustainability.

The selection of business allies is normally included in the appropriateness assessment process. For considering and making investment decision, the company will assess and analyze relevant factors, including allies.

- Alignment with the government and the company's policy
- Law, requirements and relevant regulations
- Technology and the selection of EPC contractors
- Market condition and competition
- Financial status, with ROI analysis
- Impacts on community and environment as well as mitigation measures
- **Risk management**
  - Allies
  - Fuel
  - Project cost
  - Transmission line
  - Project location
  - Source of water
  - Others

Partner relationship management guidelines

To achieve investment success, the company and business allies must work in harmony and support each other, thus promoting the long-term synergy. The effort to seek mutual benefits for both parties is also needed. Therefore, RATCH focuses on four significant issues in managing partner relations:

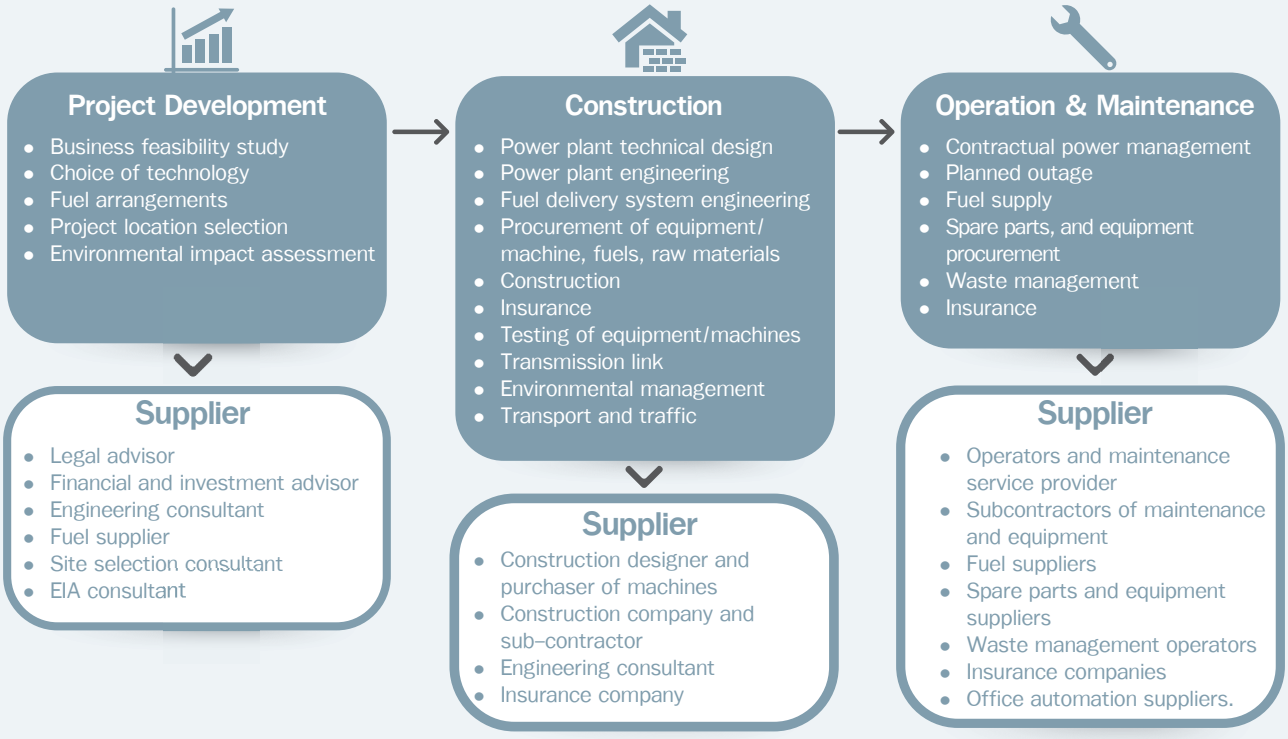
Issues	Management
Conflict of interest	• Procurement criteria, conditions and methods are clearly defined • Both parties must specify their role and responsibilities • Business decisions are made by consensus for the project success
Management and investment policies	• Both parties established consistent investment policies in the short- and long-run for supporting each other
Responsibility	• Role and responsibilities as well as division of work for each party must be clearly specified
Solution to disputes	• Pre- and post-project development expense management should be clearly specified • The exit plan from co-investment must be provided • Solutions to disputes must be identified and suitable for all

Implementation in 2016

- Continuously tie formal and informal relationship with existing partners.
- Seek new allies for supporting overseas competition.
- Develop and prepare competency development for project management team, which will implement in 2017.

Supplier Relationship Management

In RATCH's course of regular business, there are three main phases. In each phase, the stakeholders in the supply chain play important roles in business success and continuity, namely project development, construction and machine operation and maintenance. In each phase, there are two main suppliers: the supplier responsible for product sourcing and the service providers, as shown in the following diagram:



1) **Suppliers of goods and products**

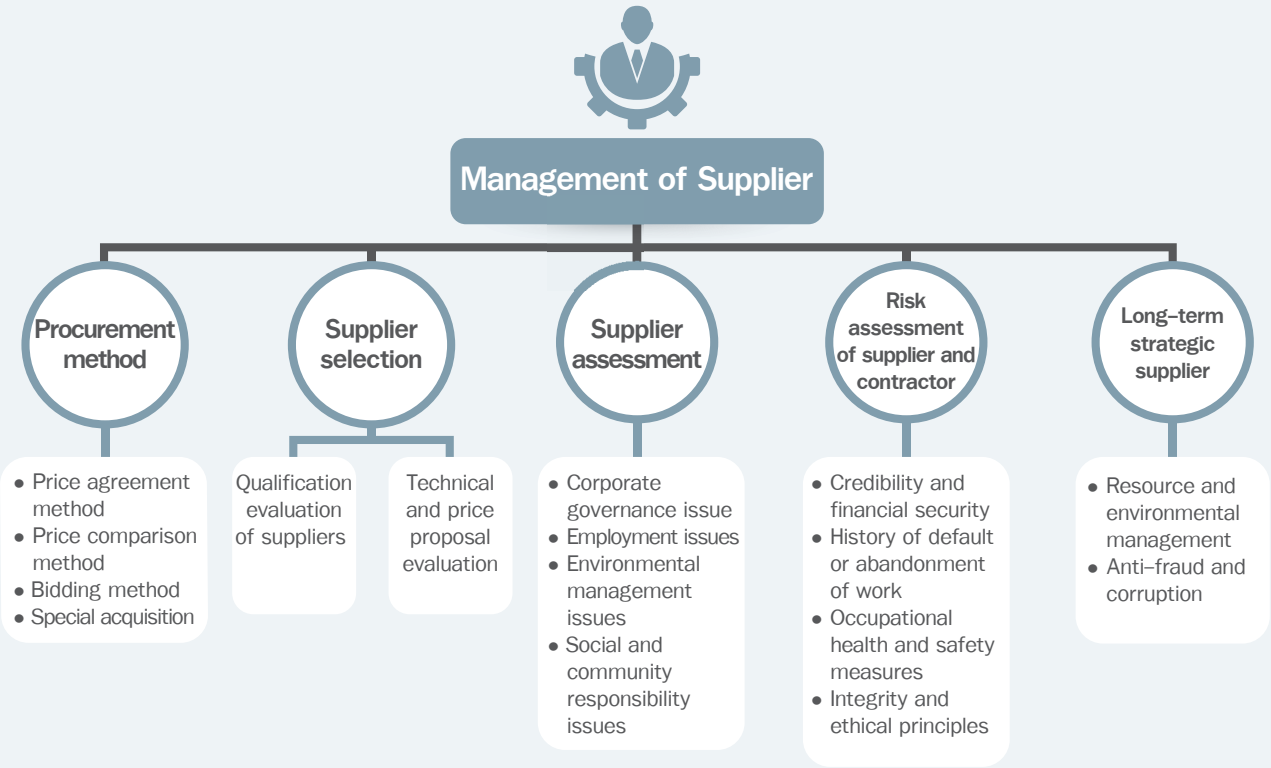
Key supplier are fuel suppliers, spare parts and equipment suppliers, office and machinery suppliers.

2) **Service providers**

Most are specific consultants such as finance, legal, environmental, engineering and construction as well as construction sub-contracting, power plant operators and maintenance, waste management service and financial institutions, and insurance companies.

Supplier Management Process

RATCH highly values quality, price, moral principles and ethics, labor protection, human rights and environmental management. Therefore, suppliers must comply with RATCH's requirements for suppliers management process. There are five phases as follows:



Evaluation

Qualification for selecting suppliers

In the procurement process, the company specifies the supplier's qualifications by taking into account economic, social and environmental dimensions. In 2016, the conflict of interest was added to the evaluation for screening preferred suppliers. Meanwhile, the company always informed suppliers whose qualifications passed or failed the evaluation of the company's opinions and improvement recommendations to enhance their chance to work with the company in the future. Based on the 100% full score, the company specified 10% for qualification evaluating, while the remainder is provided for the technical and price proposal.

Results

- RATCH evaluated the qualifications of 155 suppliers, or 77.89% of all 199 suppliers registered.
- The evaluation covered 84 former suppliers and 71 new ones.
- RATCH's subsidiary Ratchaburi Electricity Generating Company applied the same criteria.

Evaluation of suppliers 2016

Work Criteria	No. of suppliers who passed the evaluation criteria (from a total of 155)			
	Former	New	Total	%
Work integrity/transparency and responsibility				
- No prior history of corruption	83	71	154	99.35
- No prior history of work abandonment	84	71	155	100
Environmental management and responsibility				
- Received environmental standard certification or follow environmental regulations (ISO 14001/EIA)	10	2	12	7.74
- Compliance with environmental laws and regulations and EIA measures	84	71	155	100
Labor and social responsibility				
- No child or illegal migrant labor	84	71	155	100
- Respect of human rights of labor employees with no violation of basic human rights and with proper management	84	71	155	100
- Operate a business that expresses social responsibility and does not create undue impacts on surrounding community	84	71	155	100

Procurement

RATCH has determined a scope and practices in selecting suppliers and issued a procedure for supplies so that the purchasing method may be fair and transparent. The bottom line is to attain a suppliers with desired qualifications, with expertise in the desired work and can provide quality goods and services and in time.

RATCH's procurement process is divided into four methods according to the contract value:

- Price agreement method, for the contract value of up to 100,000 baht
- Price comparison method, for contract value of up to 5,000,000 baht
- Bidding method for the contract value of over 5,000,000 baht
- Special method can be used in urgent cases, or when products and services are specialized, with the contract value of more than 100,000 baht.

RATCH has determined approval limits and authorized persons to approve the procurement to ensure transparency and fairness.

In 2016, RATCH targeted reducing the number of special-method procurement and will use the method only for work that required specialized expertise.

Performance results

Suppliers went through the purchasing process, covering 323 items.

Supplier selection method	No. of supplies		Procurement value (Baht)	
	2016	2015	2016	2015
Price agreement method (up to 100,000 baht)	**225**	176	**6,120,360**	6,502,379
Special method (over 100,000 baht)	**55**	68	**45,700,519**	69,959,099
Price comparison method (up to 5,000,000 baht)	**39**	38	**44,466,952**	44,811,710
Bidding method (more than 5,000,000 baht)	**4**	7	**28,201,079**	52,130,738
Total	323	289	124,488,909	173,403,926

In 2016, the special-method purchase was used in 13 cases less than last year, at 19%. The total value of special-method purchase was reduced by 35 %.

Supplier risk management

RATCH has established measures to protect itself from supplier and contractor risks impacted to business continuity in aspect of the economy, society and environment as follows:

Risk Factor	Impact Aspect	Control and Management Method	Results in 2016
Default on date of delivery	Economic	• Establishment of penalty in case of late delivery at 0.1% per day and no more than the contact value. The supplier must be responsible for all costs that may arise from late delivery.	Two suppliers were late on delivery of goods and service because the quality of the goods had to be amended in line with company requirements.
Work abandonment	Economic	• Establishment of a guarantee bond and performance bond of 5% but no more than 10% of the value of the work • Establishment of advance payment of no more than 25% of total value of work by setting a guarantee bond for advance payment • Demote suppliers to a blacklist	None
Trustworthiness of suppliers	Economic/ social/ environment	• Establishment of a bid bond for price comparison and bidding process of 5% but no more than 10% of total value of work • Trade registration, tax documents, product and environmental certification, portfolios and clients must be provided • Supplier qualification evaluation process covering economic, social and environmental aspects • Work evaluation of suppliers by the task owner unit	RATCH evaluate the qualifications of 155 suppliers

Risk Factor	Impact Aspect	Control and Management Method	Results in 2016
Conspiration, price-fixing and conflict of interest	Economic/ governance	• Qualifications evaluation forms requiring complete suppliers disclosure • Examine boards and executives of suppliers participating in procurement process to ensure no connection and different person • Rechecking of work performance from former clients	None
Occupational health and safety	Social/economic	• Preparation of manual and procedures for risk assessment of suppliers and contractors who will be working in the power plant • Application of the OHSAS 18001 standard for operational requirements for suppliers and contractors • Assessment of risk from personnel, equipment, materials and environment (PEMEn), identification of risky incident to suppliers and contractors, and risk assessment review must be done every 1-2 years	Followed all requirements of RATCH's power plant

Supplier evaluation before/after work

Supplier and contractor evaluation before work

After RATCH has signed an agreement to buy or sell supply or service with the supplier or the contractor, it will allow the supplier or contractor to assess risks from its own work, especially for work in the power plant, to ensure that the work is safe and can be handed over in time as required.

The process of evaluation of suppliers before work is as follows

Topic for	Requirement
Checking personal background of workers hiring by contractor's and subcontractor before entering site in order to prevent risks arising from the use of illegal labor.	• Must not be illegal aliens • Must be at least 18 years old • Must be 60 years or younger • Must subscribe to insurance under the Office of Social Security • Must undergo physical examination before performing risky works. • Must hold a valid driver's license if driving within the plant, messengering, vehicle service
Promote understanding and awareness of safety and the environment	• They must receive orientation and training in occupational health and safety in line with the work that will be done every time, such as wearing protective gear, do's and don'ts while working, waste management, and emergency handling. • Must pass all orientation
Review risk and preventive measures	• Review the understanding of work risk if there is high risk, and ensure understanding for contractors in detail before actual work operation • Check readiness and adequacy of safety accessories or equipment needed for work. • Check the safety of all equipment and machine before work
Monitor the work of the contractor	• Must follow legal and standard procedures of OHSAS 18001 and ISO 14001 applied by the power plant • Pass the random checks by Safety Officers of Occupational Health, Safety and Environment Committee • If a breach of regulations or operating risk is found, the supervisor will stop the work in order to correct the situation before resuming work • Evaluate the work performance after completed

Supplier and contractor evaluation after work

After delivery of supply or service by the responsible units, evaluation will focus on the quality of the work, product, delivery and operational results of suppliers or contractors. Evaluation results will be recorded in the supplier registration for consideration in the next purchase or hiring. Those who do not pass the evaluation criteria will be recorded in the blacklist.

In 2016, RATCH evaluated the work of 123 suppliers, and two suppliers received recommendations for improvement.

Forming long-term strategic supplier

RATCH desires long-term suppliers that have similar business philosophy and sustainable development approach for long-term operation. In 2016, RATCH's work on this concept is described as follows:

Assessment of suppliers' environmental management

RATCH uses this approach to instill cooperation with suppliers in its business supply chain to improve their environmental management and, at the same time, to prevent and control any environmental and community impacts in the course of their work. This cooperation also directly fulfills RATCH's objective to be responsible for the environment and society.

In 2016, RATCH piloted supplier environmental management assessment by selecting a supplier with a contract value of 1 to 5 million baht. The evaluation covers three main issues: pollution prevention and control system as required by law, waste management system, and energy management.

The supplier passed all the environmental management assessment criteria

The conduct of assessment expanded cooperation in waste recycling. The suppliers has initiatives of recycle and recovery of its used product collected from its customers.

Next year, RATCH has plans for more suppliers for environment assessment.

Promotion of awareness of anti–corruption for suppliers

Anti–corruption Commitment of RATCH

RATCH is fully aware of the importance of the adverse impacts of corruption. After having declared its intention to be part of CAC on November 21, 2014, RATCH has declared its anti–bribery and anti–corruption policy as well as amending regulations and related orders to ensure that company operation is committed to transparency and fairness.

RATCH is determined to oppose corruption and will remain above bribery or corrupt practices of all forms in both private and public dealings.

Therefore, business allies or other personnel acting on behalf of RATCH must follow the law and must not offer or accept bribes as corruption. Appropriate measures must also be undertaken in preventing the offer and acceptance of bribes and other corrupt acts. Moreover, RATCH accepts the offer or receiving of assets or gifts/souvenirs in accordance with local customs and culture.

Nevertheless, RATCH does not want executives or employees to receive gifts or mementos that are of inappropriate value from business–related persons. RATCH forbids all personnel to give or accept gifts or payment for entertainment or other benefits that may be considered bribery or corruption or special exchanges or business deals that will significantly impact decisions of executives, employees or outside personnel.

Results

- Included an anti-corruption and conflict of interest criteria in the qualifications of suppliers
- Informed suppliers to follow the anti-fraud and anti-corruption policy when working with RATCH
- Informed suppliers of company guidelines in offering and accepting gifts and souvenirs.
- Informed suppliers of no- gift policy on the occasion of New Year 2017.

Engagement and Networking

The company puts the best efforts consistently in building a network with relevant stakeholders in its business chain. It has association in various forms with public, private agencies, non-profit associations and institutions to support the business achieve its economic, social and environmental goal sustainably. Below are the organizations with which RATCH engaged this year.

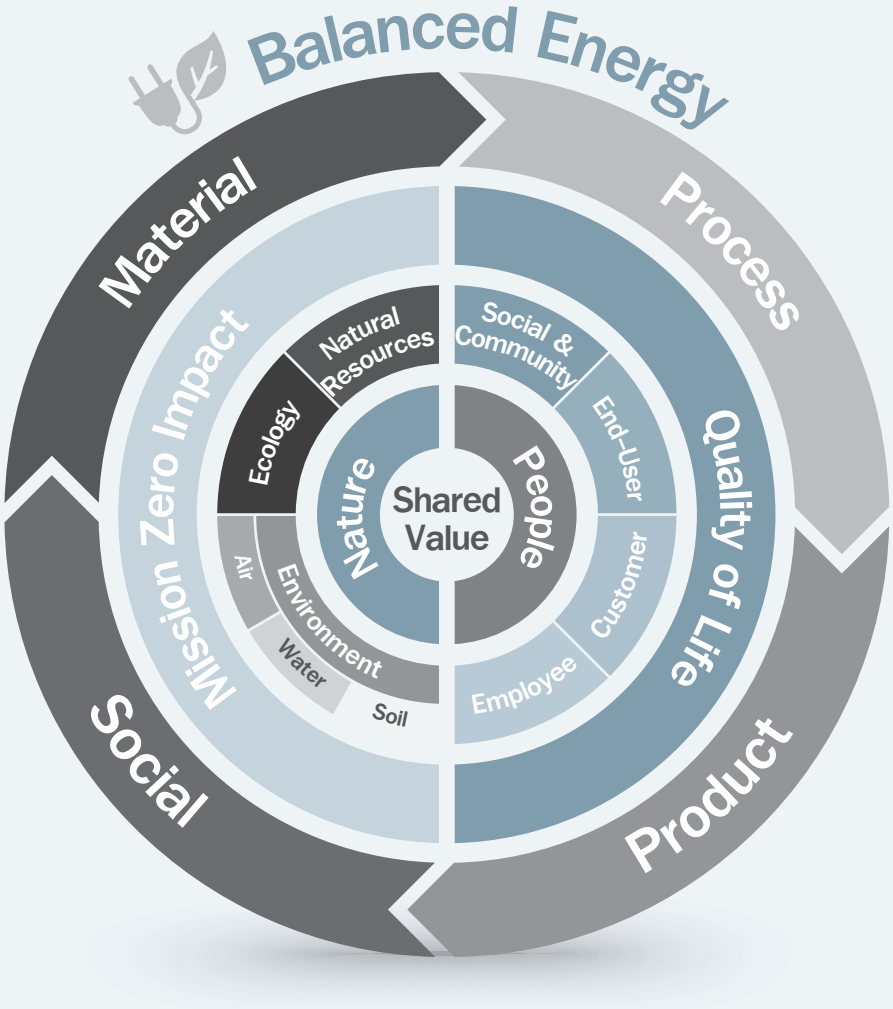
Organizations	Status	Form of engagement
Thailand Management Association (TMA)	Member	• Meetings and seminars to enhance business management knowledge and participation in activities to build a network
Thai Institute of Directors (IOD)	Member	• Join a Declaration of Thailand's Private Sector Collective Action Coalition against Corruption. • Training and seminars on corporate governance intended for executives, directors and relevant officers
Thai Listed Companies Association	Member	• Meetings and seminars to update stock market movement • Participation in activities to strengthen networking
Thailand's Private Sector Collective Action Coalition Against Corruption Council	Certified member	• Participation in the anti-corruption assessment of Collective Action Coalition against Corruption and being certified by the Council in 2016 • Meeting and seminar to enhance understanding of fraud and corruption prevention

Organizations	Status	Form of engagement
Association of the Electricity Supply Industry of East Asia and Western Pacific (AESIEAP)	Member	• Sharing knowledge about the regional power industry • Meetings, seminars, and study tours on regional power supply technology
• International Chamber of Commerce (ICC Thailand National Committee) • The Thai Chamber of Commerce	Member	• Meetings, seminars and activities • Giving in-kind support and assistance
Thailand Electricity Supply Industry Association	Board member	• Promoting technology in the power supply industry; sharing knowledge, experience, research, and technology in all branches of engineering • Training to enhance professional engineering skill and competency
Thailand Business Council for Sustainable Development (TBCSD) and Thailand Environment Institute (TEI)	Member and ally	• Serving as a council member, associate member, and public relations member • Participation in a project to promote community solar energy in Ban Hua Ha community, Mae Hong Son province • Participation in a project to promote women's roles in natural resource and environmental management called Phumari Project…Power of Women.
The Federation of Thai Industries (FTI)	Participant	• Participation in a project of the Carbon Footprint for Organizations in industrial sector (phase 5 expansion project)
Thailand Greenhouse Gas Management (Public Organization)	Participant	• Ratchaburi Power Plant and Tri Energy Power participted in the pilot project of Thailand Voluntary Emission Trading Scheme.
Department of Industrial Works, Ministry of Industry	Participant	• Participation in Corporate Social Responsibility scheme of Department of Industrial Work (CSR-DIW)
Community Forest Management Bureau, Royal Forest Department, Ministry of Natural Resources and Environment	Ally	• Co-organizing the environment conservation project tiled "Love the Forest and Community" and the community forest study on CO_2 capture capacity and biodiversity
Department of National Park, Wildlife and Plant, Ministry of Natural Resources and Environment	Ally	• Co-organizing in reforestation project in watershed area to create carbon sink, Nan province
Provincial Energy Office, Ministry of Energy	Ally	• Corporation in community energy conservation project in Ratchaburi, Kanchanaburi and Petchaburi provinces.

Environmental Management

The challenge in power generation is to forge balance between the benefit to society and the environment. In other words, electricity generation must improve the wellbeing of society and minimize environmental impacts.

To shape this balance, RATCH is committed to mutual valuation between nature and people. It has consistently focused on improving the efficiency of its processes, optimizing energy and resource utilization, and controlling waste so that it generates and delivers high-quality and environmentally friendly electricity in parallel with its stewardship of society.



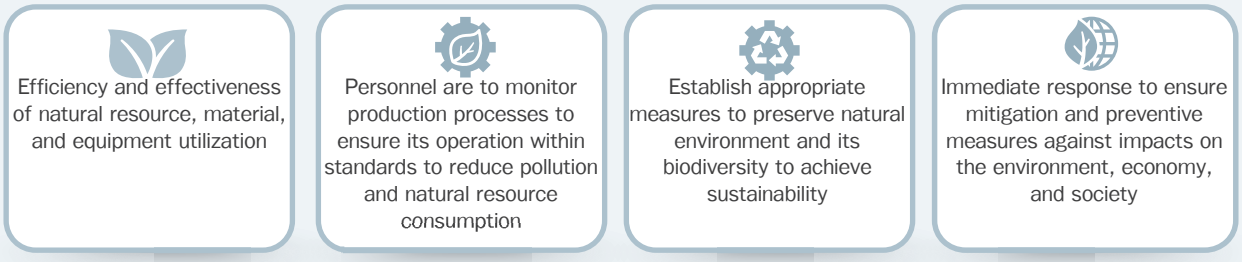
Stakeholders pay considerable attention to the environmental management in the power generation industry because of their concerns over the negative impacts to the environment. This could be based on the fact that the industry is large and consumes a high quantity of natural resources. Recognizing this concern, RATCH operates under stringent laws and regulations and rigorous control by the government. In addition, various control measures have been put to function to manage environmental concerns as follows.

Concerns	Control Measures
Energy Consumption Water Consumption Air Emission Management Wastewater and Solid Waste Management	✓ Factory license and permit (Raw Ngaw 4) ✓ Preventive, mitigation measures and environmental monitoring in accordance with the approved EIA and its recommendations from the Office of Natural Resources and Environmental Policy and Planning ✓ Implementation of ISO 14001 Environmental Management System standard ✓ Environmental Manager, Pollution Control System supervisor, and operators ✓ Environmental Management Committee

In 2016, RATCH strictly complied with all laws and regulations, thus there was no citation or fine for non-compliance or violation.

For RATCH Group's power plants, their environmental operation follows the Code of Conduct guidelines, as described below:

Natural Resource Conservation



Sustainable Environment Guidance

The management of sustainable environment has been executed under four components:

1) Operating efficiency in
   - Input
   - Process
   - Output
2) Reduction of impacts on the environment and communities
3) Reduction of impacts from climate change
4) Cost reduction for raw materials, pollution prevention and waste disposal

RATCH

Reduction of greenhouse gases and climate change

Production efficiency

Input
- Fuels
- Water
- Equipment and machinery
- Electricity
- Chemicals

Process
- Fuel combustion
- Water quality improvement
- Wastewater treatment system
- Waste Management
- Scheduled equipment and machinery maintenance

Output
- Emission from combustion
- Treated discharged water
- Solid waste

Managing environmental impacts and cost reduction

Reduction of resource consumption
- Heating Value management to reduce fuel consumption
- Reduce water per unit for generating electricity
- Appropriate usage of chemical to water properties

Environmental management while building power plant
- Flue gas desulfurization: FGD (when using fuel oil)
- Dry Low NO_x and Low NO_x Burner to control nitrogen oxides from combustion (when using gas as fuel)
- Injection of demineralized water control nitrogen oxides (when using diesel as fuel)

Pollution emission reduction
- Reuse of treated waste–water with RO system, wetland system, and plant watering to reduce water consumption and wastewater release
- Waste management by Reuse/Recycle/Recovery
- Usage of combustion for spirulina platensis to capture CO_2

Management for Sustainability

Air Emission Management

Both Ratchaburi Power Plant (3,645 MW), which is the principal company asset, and Ratchaburi Power (1,400 MW), the subsidiary responsible for operation and maintenance, have installed equipment and systems to control air emission as follows:

Type	System/Equipment
Removal and control pollutants from combustion	✓ Flue Gas Desulfurization System (FGDs) at Ratchaburi Power Plant when using fuel oil. Efficiency of the system averaged 95.14% (EIA requirement mandated at least 90%) ✓ Nitrogen oxide control during combustion (Dry Low NO_x and Low NO_x Burner)
System for tracking efficiency of pollutant control and monitoring air quality in the communities	✓ Continuous Emission Monitoring Systems (CEMs) in accordance with EIA requirements and Ministry of Industry Announcement ✓ Five stations of Ambient Air Quality Monitoring System (AAQMs) in the community covering all wind directions as a precaution

Emission monitoring system (CEMs and AAQMs) have been tested every six months and 100% passed its function and accuracy in accordance with U.S. EPA standard. This was audited by external inspectors registering with Department of Industrial Works, ensuring accurate audit results on a par with established standards.

Accuracy verification of Continuous Emission Monitoring Systems (CEMs)

Accuracy verification of Ambient Air Quality Monitoring System (AAQMs)

2016 Air Emission Monitoring Result

Stacks Emission Monitoring

Monitoring Indicators include:

- Nitrogen Oxide (NO_x)
- Sulfurdioxide (SO_2)
- Opacity

Gas-fired power plants require only NO_x measurements. According to the 2001 Ministry of Industry Announcement, power plants must install equipment to automatically measure the quality of air emission. Air emission monitoring data from our power plants were displayed online in the power plant's control rooms and Department of Industrial Works's office to verify and validate the quality of air emission, operating conditions and compliance.

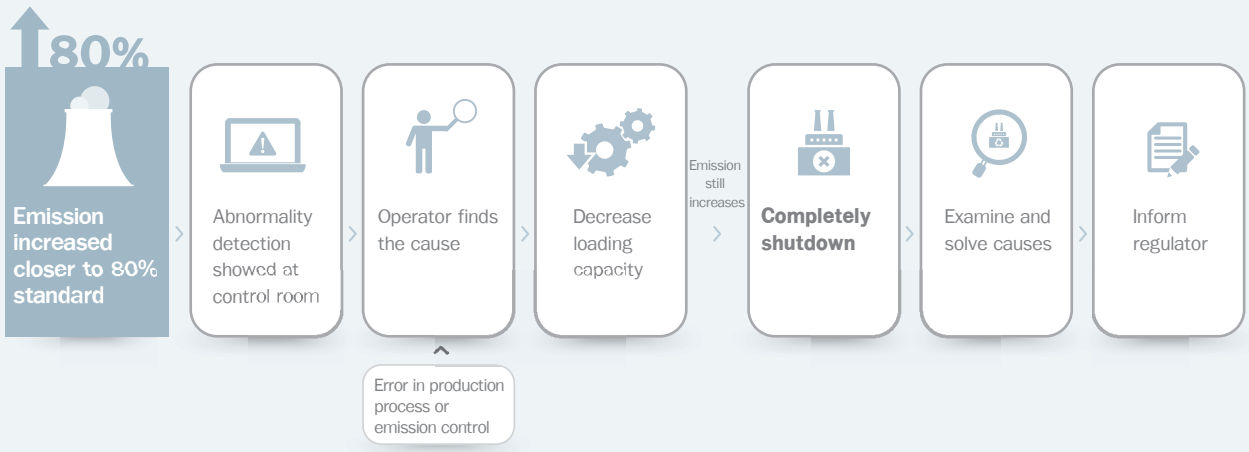
All stack emission indicators from RATCH's power plant were all within legal standards.

Power Plant	Average concentrated emissions from combustion released from the power plant				
	NO_x (ppm)		SO_2 (ppm)		Backup fuel
	Natural gas	Oil	Natural gas	Oil	
Ratchaburi Thermal plants	2.98	19.78	0.72	18.87	Fuel oil
Ratchaburi Combined-Cycle plants	21.26	89.43	1.40	4.79	Diesel
Tri Energy	30.07	20.46	0.39	-	Diesel
Ratchaburi-Power	47.18	None	1.86	None	Diesel
Standard *	**120**	**180**	**20**	**320**	**–**
Ratchaburi World Cogeneration	20.63	None	0.40	None	None
Nava Nakorn Electricity Generating	33.83	None	0.19	None	None
EIA Standard	**60**	**–**	**10**	**–**	**–**

Note: **Standard under the 2004 Ministry of Industry Announcement governing emission released from power plant or distribution process*

Abnormality Detection for Stack Emission Monitoring System

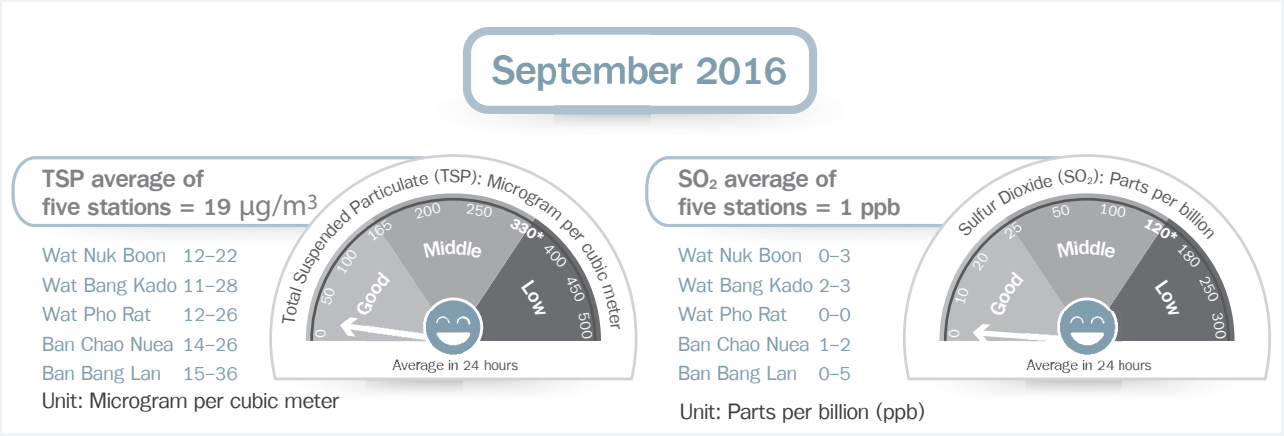
Steps taken when abnormal emission occurs during production



In 2016, there was no abnormality for operation that causes completely stop.

Ambient air quality monitoring result were communicated through the Ban Rao journal to all households in nine districts surrounding the power plants every three months to ensure communities' understanding on RATCH's continuous environmental management efforts.

Example of air quality monitoring results published in Baan Rao journal



Water Management

The water management targets for Ratchaburi Power Plant (3,465 MW), Tri Energy Power Plant (700 MW), Ratchaburi-Power Power Plant (1,400 MW) are as follows:

- Reduce water consumption per unit of power produced
- Reduce raw-water consumption from the Mae Klong River, which is that main source for power generation
- Prevent water conflicts with communities, especially when Thailand faced El Niño in 2016
- Reduce wastewater discharge to public waterways

There were two approaches in water management as follows:

Water Quantity Management

- Continuous monitoring and analysis of water utilized per unit of power produced
- Development of Water Reduction Project
- Water Reuse and Recycle Project

Water Quality Management

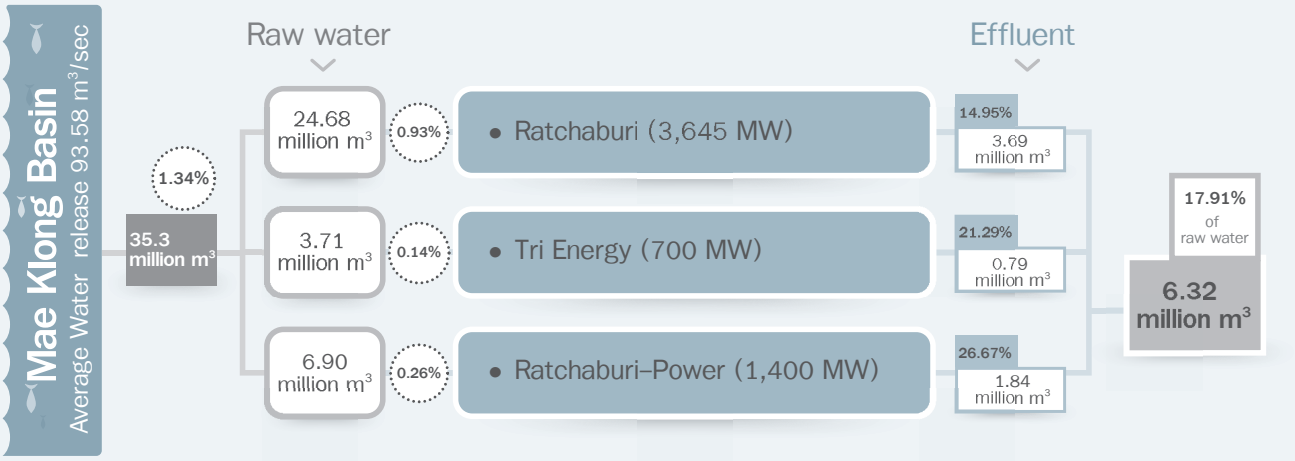
- Monitor appropriate level of chemicals used to improve each type of water
- Design and operate wastewater treatment system to improve water quality close to natural conditions prior to discharging to the environment

commitment to the environment and the public

"ZERO Discharged"

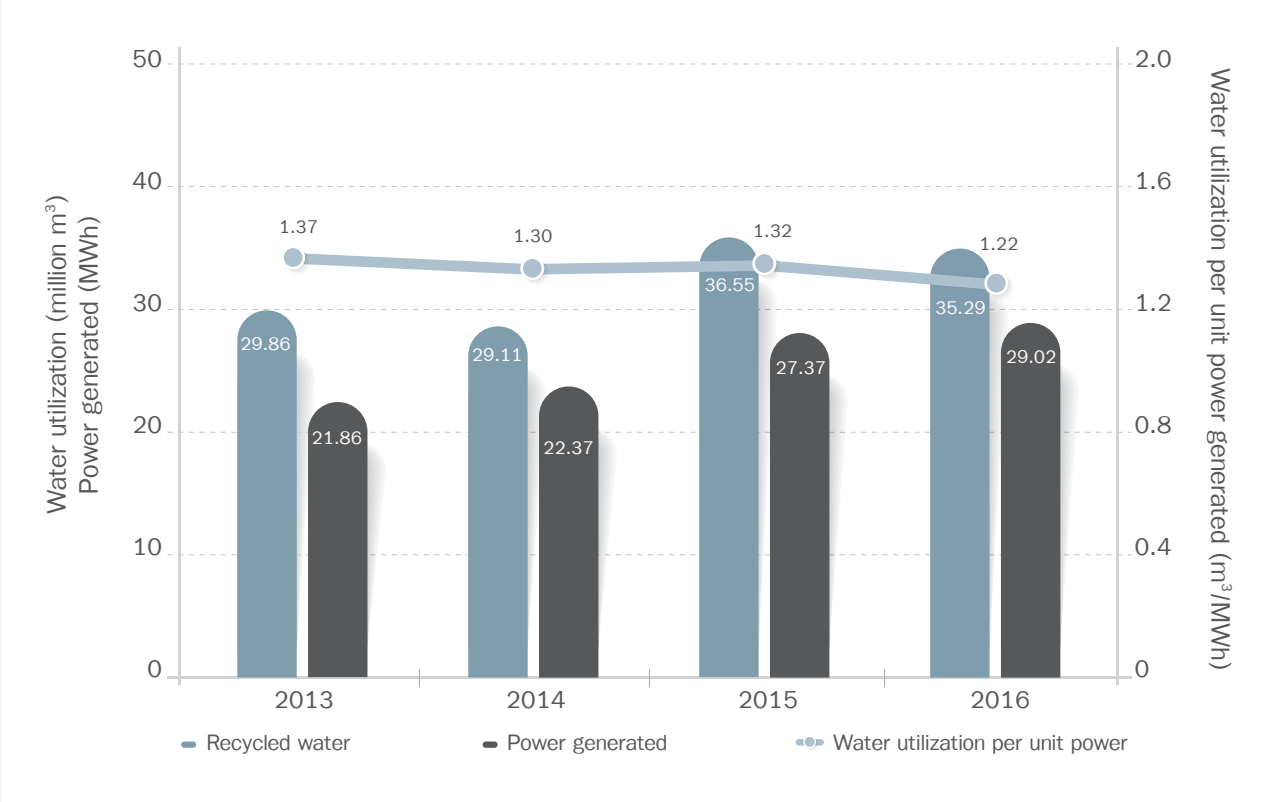
2016 Water quantity management

The power plants in Ratchaburi (Ratchaburi, Tri Energy and Ratchaburi-Power) used 35.3 million cubic meters of water for power generation from the Mae Klong River in 2016. This represented 1.34% of river water, which was reduced from 2015 using quantity of 36.22 million cubic meters (1.72% of river water). Compared 2015, the water use from Mae Klong River in 2016 decreased 21.7%. Moreover, in 2016, there was more upstream dam water release from 77.1 to 93.6 cubic meters per second, or 21.4% more than last year. As a result, there was no water conflict between RATCH and communities.



In 2016, the raw-water utilization per unit of electricity (1 MW-hour) was 1.22 cubic meters, which was lower than that of last year.

Relationship between water utilization and electricity generated (Net) in 2013-2016

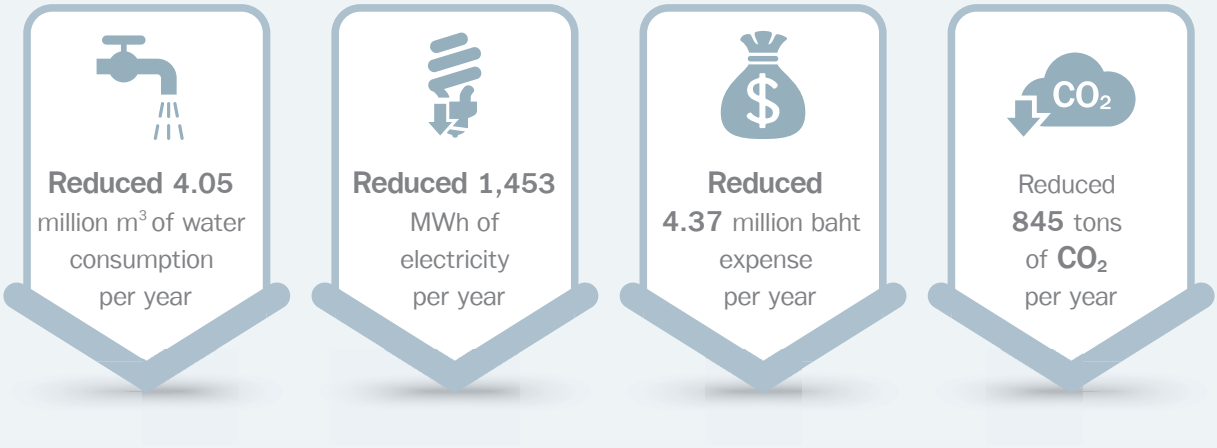


RATCH successfully recycled water by Reverse Osmosis (RO) and wetland to 3.39% of river water utilization in 2016. From 2013-2016, RATCH Group was able to accumulatively reduce river water consumption by 6.52 million cubic meters. This demonstrates that RATCH strived to reduce water consumption.

2016 Achievement highlights

Implementation of Acidic System in the Cooling Tower for Ratchaburi Power Plant

Based on research and statistics from 2014 to 2015, Ratchaburi Power Plant (3,645 MW) decided to replace its alkaline system with an acidic system firstly in the cooling tower of the thermal plant in October 2016. If the system is replaced in all five plants, it will increase water usage cycle from 3-4 cycles to five. As a result, the Ratchaburi power plant was able to reduce electricity and other expenses together with greenhouse gases. However, the usage cycle typically depends on raw water quality varying across the seasons.



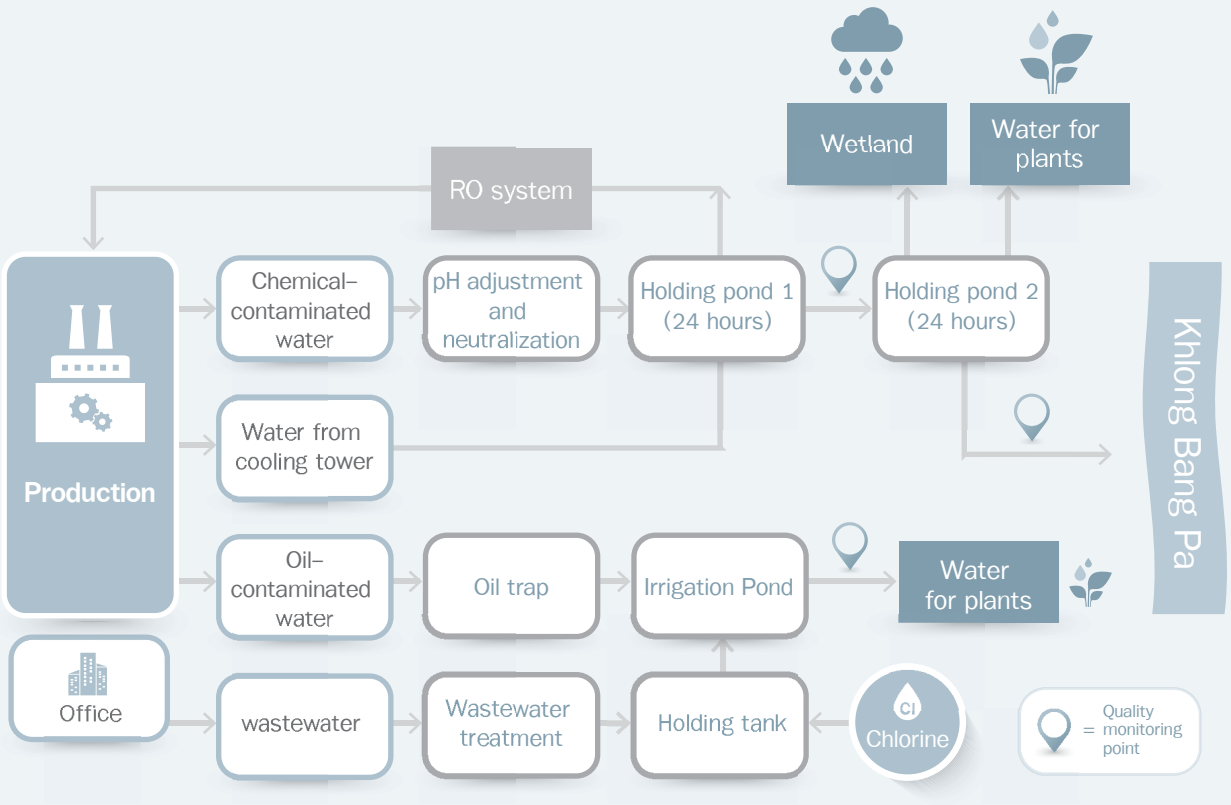
Average water usage cycles in the cooling tower, 2013-2016

Power Plant	2013	2014	2015	2016	Cooling System	Target
Ratchaburi	3.16	3.12	3.22	**3.10**	Alkaline	3-4
Tri Energy	4.46	4.5	4.86	**4.68**	Acid	4-6
Ratchaburi-Power	4.44	4.29	4.62	**4.71**	Acid	4-6
Ratchaburi World Cogeneration	-	5.8	6.21	**6.80**	Akaline	7

Note: *Ratchaburi Power Plant installed acid control system for the cooling tower during October-December 2016 and the experimental program is now carry out.*

Water quality management

As a rule, all used water is treated according to its characteristics.



2016 Ratchaburi Power Plant water management

- 14% of the treated water was treated with Reverse Osmosis (RO) and Ultra Filter (UF) for reuse in the production process.
- 5% of the treated water was used in wetlands areas and for watering trees surrounding the plant.
- The remaining 82% of the treated water was discharged to public waterways.

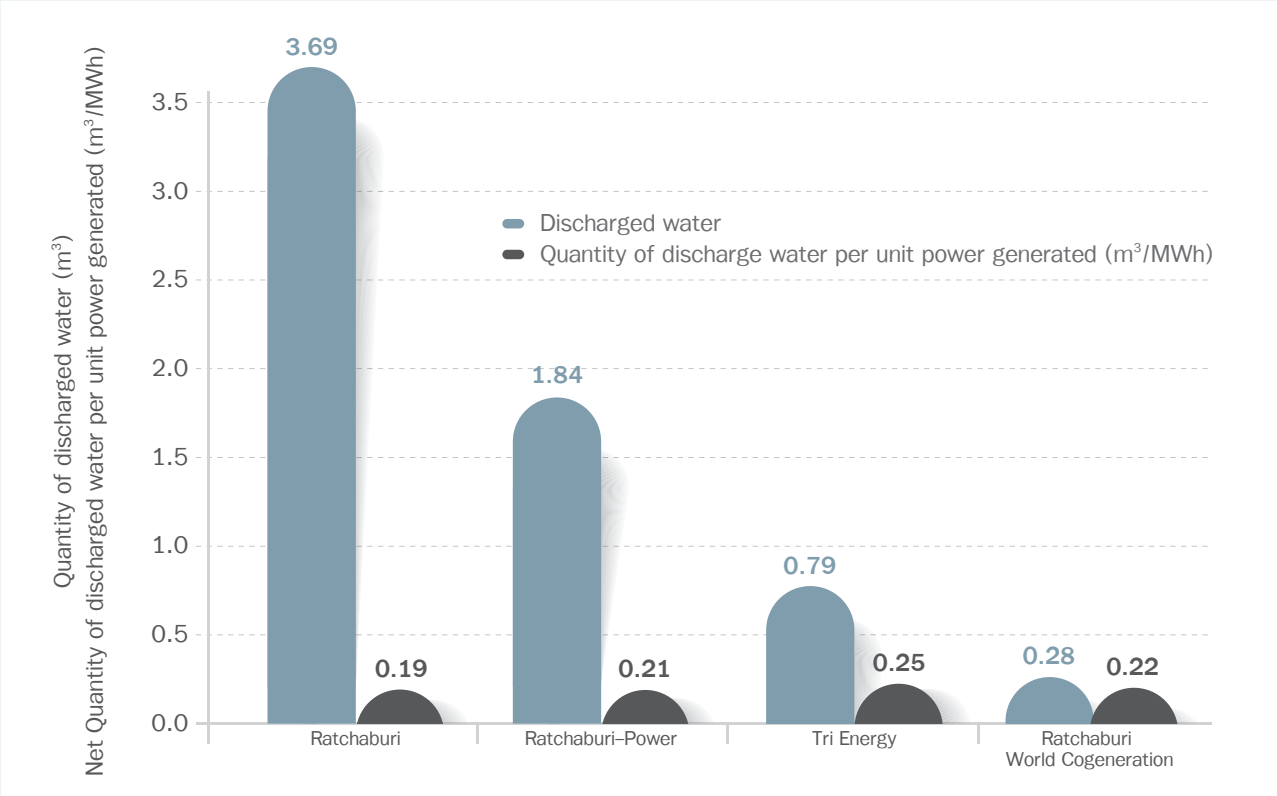
All discharged water proceeded to one last water quality monitoring system before discharge according to the parameters described below:

- pH testing
- Temperature
- Dissolved oxygen
- BOD
- COD
- Conductivity

Only BOD and COD measurements from Ratchaburi and Ratchaburi-Power were reported online to the Department of Industrial Works.

Ratchaburi Power Plant not only continued water quality monitoring in accordance with the EIA requirements, but also additionally monitored water quality monthly before it left the drainage pipe to Bang Pa canal. RATCH monitored Bang Pa canal water quality three times a year upstream of the discharge point, at the discharge point, and downstream of the discharge point. The water quality of Bang Pa canal remained below the surface water criteria according to the National Environment Board No. 8 (1994) Announcement governing surface water quality (Type 3). The monitoring results were reported to the Office of Natural Resources and Environmental Policy and Planning.

Quantity of water discharged from power plants in Ratchaburi in 2016



The discharged water quality control from all power plants was in satisfied level compared to standards established by the Ministry of Industry and the Royal Irrigation Department, ensuring minimal effects on the environment and communities.

Average effluent quality discharged from Ratchaburi and Ratchaburi-Power power plants in 2016

Index	Result	Unit	Royal Irrigation Department standard	Ministry of Industry standard
Temperature	31	°c	≤ 33 (standards only for Ratchaburi power stations) (Others: up to 40)	≤ 40
pH	8.06	-	6.5-8.5	5.5-9.0
BOD	3.3	mg/l	≤ 20	≤ 20

Index	Result	Unit	Royal Irrigation Department standard	Ministry of Industry standard
COD	32.7	mg/l	≤ 100	≤ 120
TDS	577	mg/l	≤ 1,300	≤ 3,000
Conductivity	900	µS/cm	≤ 2,000	Not specified

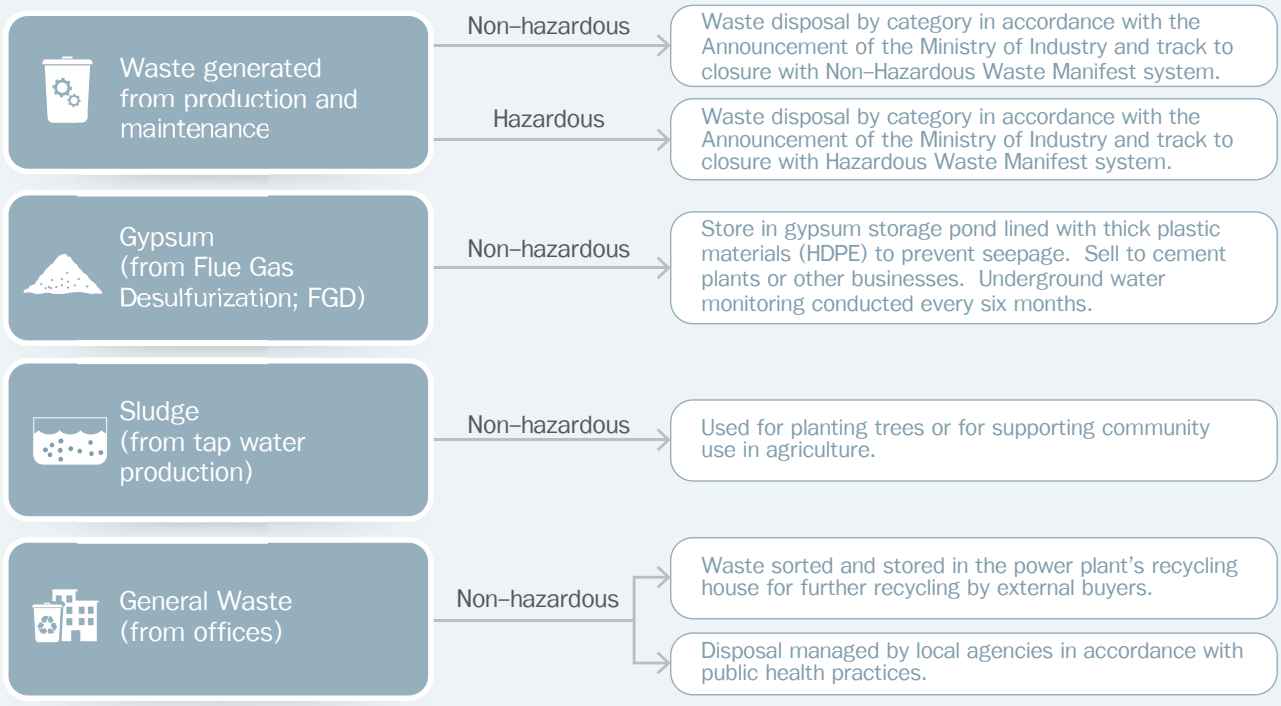
Note: *Biochemical Oxygen Demand (BOD) is the amount of dissolved oxygen needed by aerobic biological organisms to break down organic materials present.*
Chemical Oxygen Demand (COD) is the amount of oxygen required to oxidize an inorganic compound.
Total Dissolved Solids (TDS) is the combined contents of all inorganic and organic substances dissolved in water.

- *Order of the Royal Irrigation Department No. 73/2011 regarding prevention and mitigation of poor quality discharge into irrigation canals and waterway linked to irrigation canals.*
- *Ministry of Industry standard follows Order No.2 (1996) of Factory Act 1992 regarding released water quality properties from plants.*
- *Ratchaburi and Ratchaburi Power share the wastewater treatment system and water discharge drain pipe.*

Waste Management

Most of the solid waste was generated during the plant's maintenance during major overhauls planned every six years and minor inspection planned every two years. Therefore, the power plants generated different quantities of waste each year.

Waste management of Ratchaburi Power Plant



The quantity of waste generated from RATCH's power plants in Ratchaburi province in 2016:

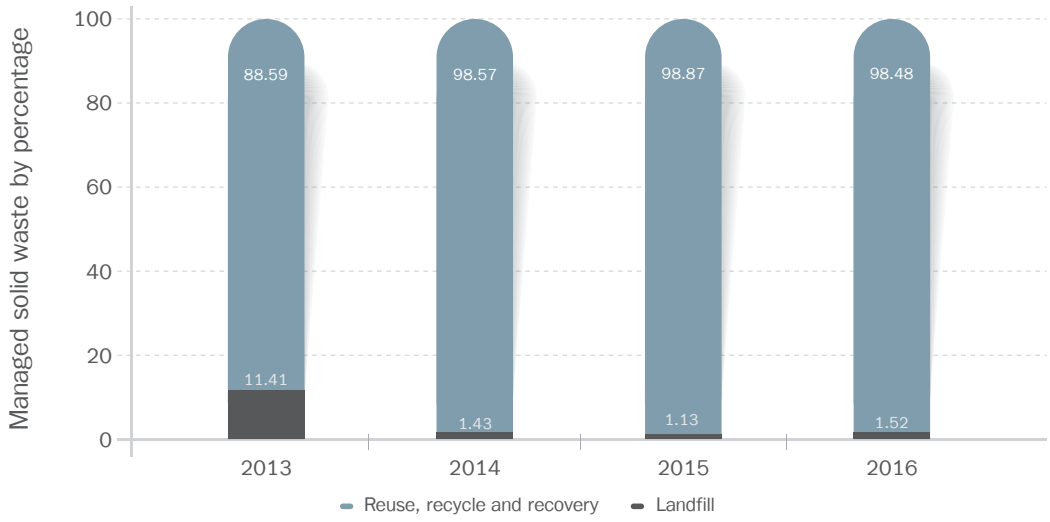
Type of waste	Hazardous waste: 1,121.65 tons		Non-hazardous waste: 6,476.71 tons	
Management	Quantity (tons)	%	Quantity (tons)	%
1) Reuse	630.65	56.22	-	-
2) Recycle	18.84	1.68	5,769.97	89.09
3) Recovery or use as fuel	447.48	39.89	616.07	9.51
4) Dispose at secured landfills	24.69	2.20	90.67	1.40

Not only RATCH commissioned licensed waste disposal contractors approved by Ministry of Industry, but the selection of contractors was based on their capability to reuse, recycle or recovery the waste, including waste combustion for steam generation. This is in alignment with RATCH's relentless commitment to the reduction of waste disposal volumes to landfill that may affect environment over the long run. Moreover, Ratchaburi Power Plant aims and put efforts to achieve zero secured landfill.

Solid waste management

Scrap, representing 85% of the total waste generated, was non-hazardous. At Ratchaburi Power Plant, the quantity of gypsum represented 80% of the total waste. It was generated from sulfur dioxide removal during combustion. Since gypsum was valuable, the plant retailed 5,768 tons to The Siam Gypsum Industry (Songkhla) Co., Ltd. for the production of gypsum boards. This was approved by the Department of Industrial Works.

Solid waste from all RATCH Power Plants, 2013-2016



Noise Control Management

As a rule, RATCH's power plants employ three approaches in managing noise levels.

Noise reduction at its source
- Install silencer at its source.
- Install mobile silencer at its source during maintenance.
- Install silencer around piping at water pumping stations.

Noise reduction along path way
- Establish buffer zones between the plant and communities.
- Noise absorbing through plantation strips around each plant.

Reduction of noise exposure to personnel
- Provision of personal protective equipment (PPE) such as ear plugs and ear muffs to the workforce.
- Install warning signs and require the workforce to wear protective gear before working in high–noise areas.

Results of noise level measurement

To ensure no noise impact and assure communities' confidence, moreover, the company conducted noise level monitoring to measure the peak levels and a 24-hour averages every three months in both the plants and nearby communities. In 2016, a 24-hour average for Ratchaburi Power Plant peaked at 62.3 decibels (A), 61.6 decibels (A) at Ban Chao Nuea and 59.6 decibels (A) at Ban Sam Rueon. All noise levels were below the standard established at 70 decibels (A) by the National Environment Board.

Location Monitoring	24–hr average noise level	Peak noise level
	Measurement (decibel A)	
Ratchaburi Power Plant	57.8 – 62.3	60.4 – 91.0
Ban Chao Nuea	59.5 – 61.6	72.5 – 106.2
Ban Sam Ruean	54.5 – 59.6	57.0 – 101.2
Standard	70	115

Note: *Noise levels announced by the National of Environment Board, No. 15 (1997)*

Conservation of Biodiversity

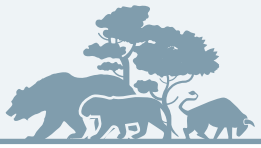
Ratchaburi Power Plant (3,645 MW), which is RATCH's principal asset, continues to rehabilitate and preserve the natural environment and biodiversity around it. It has implemented a wetland area development project since 2008 which also included a natural water reservoir, a rainwater reservoir and water storage pond. The objective of this project is to create an ecosystem and a habitat for animals. Today, both the wetland areas and water reservoirs have become a habitat for wildlife of both domestic and migratory animals, especially waterfowls.

From the construction of Ratchaburi Power Plant in 1997-1999 until the start of operations in 2000, the plant has monitored the impacts of the plant on wildlife twice a year in the rainy season in August and the dry season in December. The monitoring program focused on surveying of diversity, types and distribution of birds surrounding the plant.

According to the studies and observation in 2016, there were 108 species of wildlife within buffer zone in 1 square kilometer area. It can be categorized into nine species of amphibians, 11 species of reptiles, 83 species of birds, and five species of mammals. Each species is categorized according to its conservation status as described below.

85
species

are protected wildlife under the Wildlife Preservation and Protection Act of 1992



27
species

have the following biodiversity conservation status (2007):

- 1 endangered species
- 4 near-threatened species
- 2 vulnerable species
- 19 least-concern species
- 1 data-deficient species.

97
species

have the following conservation status according to IUCN (2016)

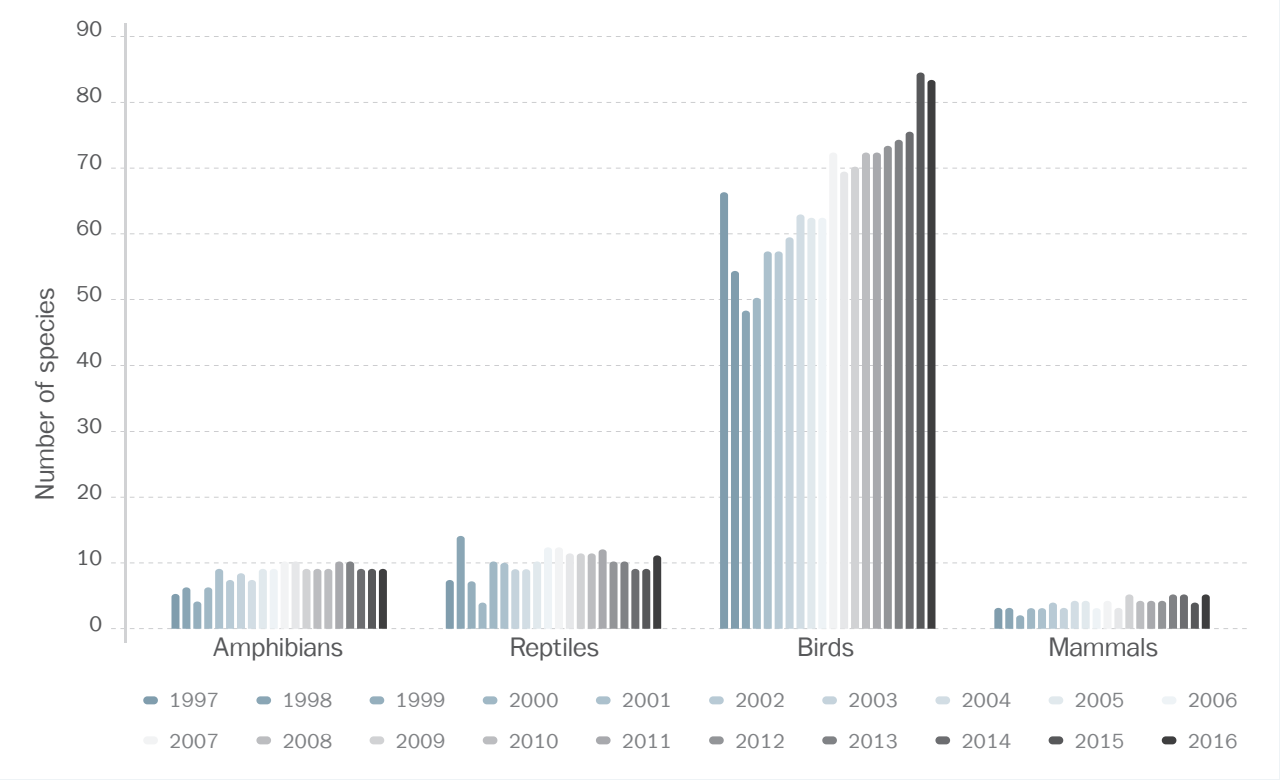
- 2 near-threatened species are *Anhinga melanogaster* and *Ploceus hypoxanthus*
- 95 least-concern species consist of:
  - 5 species of mammals such as *Callosciurus caniceps*, *Callosciurus finlaysonii*, and *Rattus rattus*
  - 79 species of birds
  - 2 species of reptiles
  - 9 species of amphibians.

** IUCN : International Union for Conservation of Nature*

Asian Golden Weaver

Snakebird

Outcomes of wildlife studies and observation around Ratchaburi Power Plant during 1997-2016



Ratchaburi Power Plant has been applying this information to improve operating efficiency and effectiveness to ensure natural environmental protection and preserve biodiversity for areas nearby. From 16 years of studies and observation, the data clearly indicates that the environmental protection programs and activities by Ratchaburi Power Plant are so good that it creates and continues enhancing nature and the plant's peaceful co-existence.

Due to the said efforts, RATCH Group won EIA Monitoring Awards 2016. the awarded operations are listed below:

1) Ratchaburi Power Plant Project (Outstanding)

2) 700-MW natural gas-fired combined-cycle Tri Energy Power Pant (Outstanding)

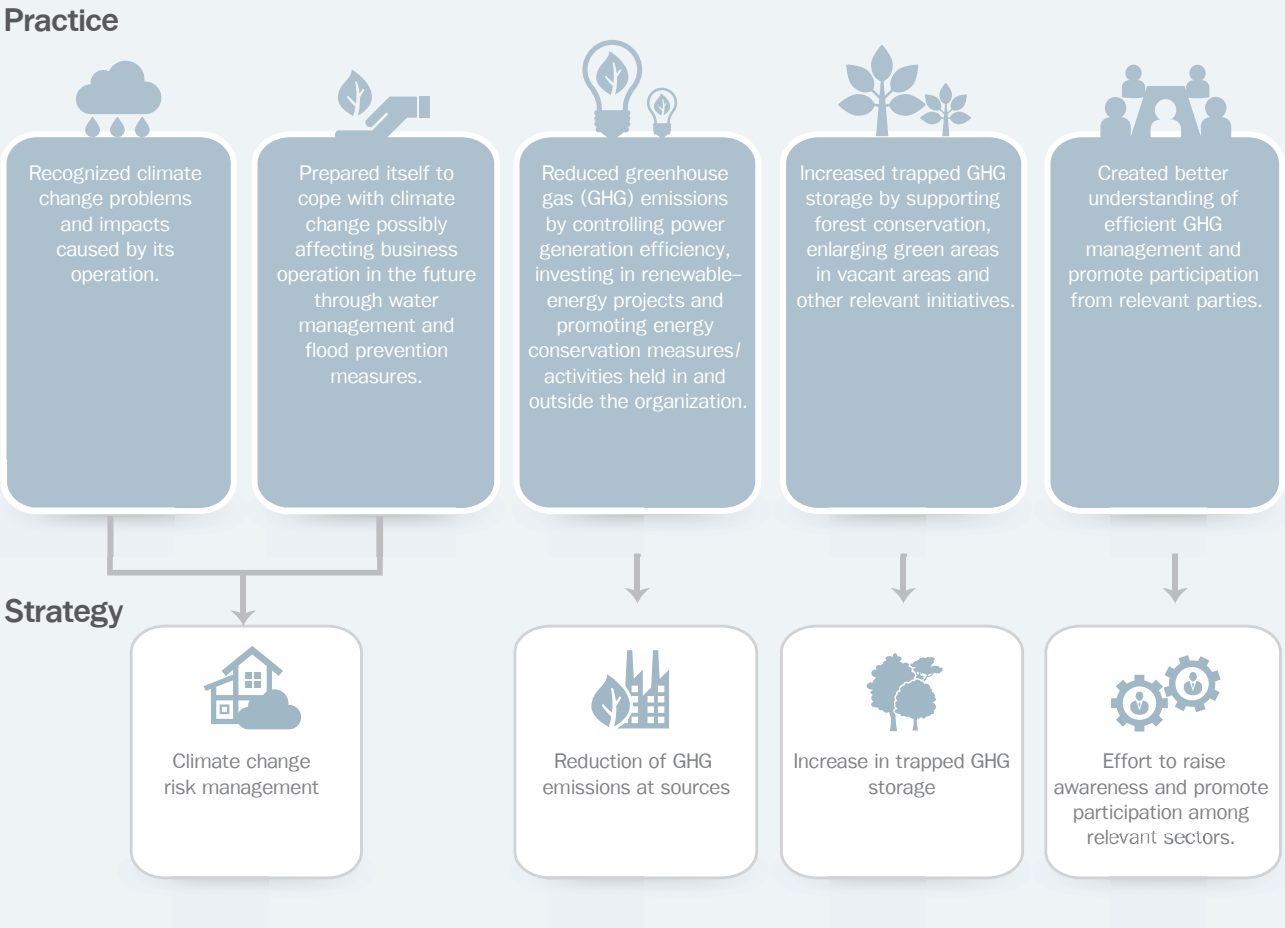
3) Bunker oil delivery project for the thermal Ratchaburi Power Plant, unit 1 and 2 (Highly Commended)

Management to Cope with Climate Change

Although electricity is regarded as basic infrastructure for national economic and social development, power generation involves consumption of natural resources, particularly fuel and water, as well as causing environmental impacts. Power demand typically increases in line with economic growth, which results in more natural resource consumption.

Currently, climate change impacts and declining fuel reserves pose a challenge to RATCH's business operation over the long run. The company has consequently optimized resource utilization in its operation processes as well as promoting stakeholders' awareness and practices toward resource and energy efficiency, to mitigate climate change impacts and conserve fuel resources for the future generations. To this end, the operation processes have been redesigned to cope with climate change.

In addition, the company defined the climate change management practices in the Code of Conduct as its operating guidelines.



RATCH adheres to four guidelines for supporting its GHG management strategies: 1) Reduction of GHG emissions at sources 2) GHG trapping storage expansion 3) Increasing awareness and encouraging participation among relevant sectors 4) Climate change risk management.

Goal

Limit carbon footprint per unit of electricity generated to below the country's GHG emission rate.

Increase renewable–energy portion of power generation to 20% of overall targets in 2023

GHG management strategy

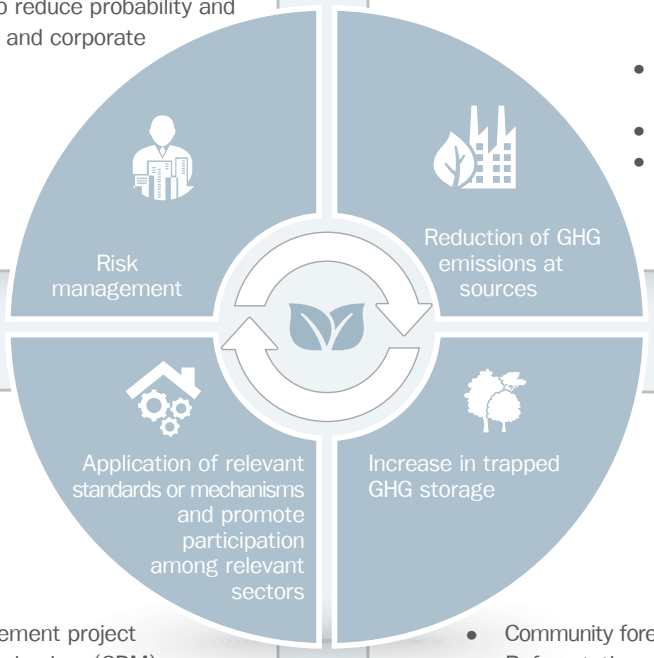
- Reduce GHG emissions at sources
- Increase trapped GHG storage
- Apply relevant standards or mechanisms and promote participation among relevant sectors

Risk management

- Assess possibility and risks for the project and the organization
- Risk management at the project and corporate levels

2016 performance

The key work plan was carried out in response to the company's goal and four established strategies.



- Probability and impact assessment at the project and corporate levels
- Preventive measures to reduce probability and impacts at the project and corporate levels

- Renewable–energy development
- Power plant's efficiency enhancement and energy efficiency
- Energy–saving at the headquarters building
- Community energy project
- Solar Energy Project in Ban Hua Ha community, Mae Hong Son province

- Corporate GHG management project
- Clean Development Mechanism (CDM) project of Solarta's solar farm
- Carbon Disclosure Project (CDP)

- Community forest promotion and conservation
- Reforestation project in watershed forests and enlarging green area

Due to activities implemented under its four key strategies in 2016, the company's GHG management outcomes can be summarized as follows:

Outcome	2016	2015
Electricity reduction (MWh)	**751,458.76**	787,293.50
Carbon dioxide emission reduction (tCO_2e)	**488,083.65**	511,436.10
Ratchaburi Power Plant's carbon footprint per electrical energy unit, compared to Thailand's GHG emission rate of 0.5813 tCO_2e/ MWh *	**0.4433**	0.5490
Electricity generated from renewable energy (based on equity capacity) (MWh)	**732,203.83**	781,270.06
GHG emission reduction due to renewable-energy generation (tCO_2e per year)	**476,884.12**	507,927.82

***Source:** *Thailand Greenhouse Gas Management Organization (Public Organization), November 2015*

Activities to Reduce GHG Emissions at Sources

Nine activities carried out in 2016 can reduce the GHG emissions by 488,083.65 tCO_2e:

Project/ Activity	GHG emission reduction (tCO_2e per year)		Co-benefits
	2016	2015	
Renewable energy development for power generation	**476,884.12**	507,927.82	• Reduced import of fossil fuels for power generation • Reduced pollution with environmental conservation • Won community acceptance
Ratchaburi and Tri Energy Power Plants' energy efficiency	**11,170.80**	3,463.64	• Reduced energy costs • Employees' participation in creating energy-saving initiatives • Benefited the power plant's image due to its social responsibility implementation
Energy-saving at the headquarters building	**22.09**	37.78	• Reduced energy costs • Benefited the power plant's image due to its social responsibility implementation
Solar energy project in Ban Hua Ha community, Mae Hong Son province	**6.64**	6.64	• Reduced the community's fuel expenses • Improved the community's quality of life

Renewable–energy development for power generation

With a commitment to partially generating power from renewable energy in order to mitigate climate change, the company established a renewable-energy target of 20% out of the growth target of 10,000 MW in 2023. Currently, power generation from renewable energy at home and internationally, including wind, solar, hydropower and biomass totals 658.06 MW, accounting for 9.43% of the entire equity capacity. Of this, 391.45-MW capacity comes from operated projects; and 20.11 MW, 144 MW and 102.5 MW from projects under construction and development scheduled to be finished during 2017-2019 respectively.

Reduction of GHG emissions due to renewable-energy power generation in 2016

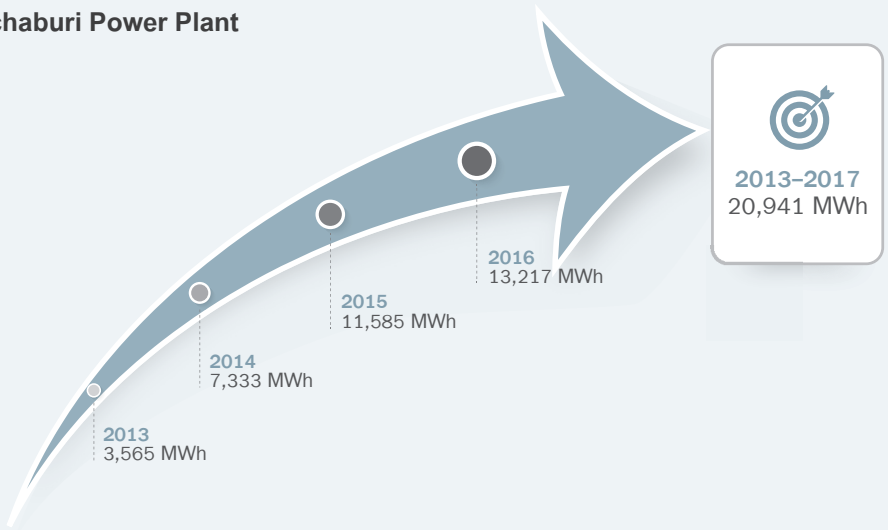
Country	Electricity generated (based on equity capacity) (MWh)	GHG emission reduction (tCO_2e)
Thailand	120,385.66	69,980.19
Australia	124,888.00	123,851.43
Lao PDR*	486,930.17	283,052.50
Total	732,203.83	476,884.12

** EDL-Gen's capacity is excluded.*

Reduction of electricity consumption at Ratchaburi and Tri Energy Power Plants

3,645-MW natural gas-fired Ratchaburi Power Plant

According to its five-year Energy Conservation Plan (2013 – 2017), Ratchaburi Power Plant defines a five-year target of cumulative energy saving of no less than 20,941 MWh. From the inception of the plan in 2013 to 2016, Ratchaburi Power Plant's cumulative energy-saving stood at 13,217 MWh, equivalent to GHG reduction of 7,683 tCO_2e.



Projects implemented in 2016 at Ratchaburi Power Plant

Project	Electricity reduction (MWh)	GHG emission reduction (tCO_2e)	Cost saving (Baht)
Switch to energy-efficient LED bulbs	1,631.64	948.47	4,894,929.62

700-MW natural gas-fired Tri Energy Power Plant

Tri Energy Power Plant was in process of formulating its Energy Conservation Plan and defining goals. In 2016, it reduced the use of electricity by 17,585.29 MWh, equivalent to GHG reduction of 10,222.33 tCO_2e.

Projects implemented at Tri Energy Power Plant in 2016

Project	Electricity reduction (MWh)	GHG emission reduction (tCO_2e)	Cost saving (Baht)
Improving operating efficiency: two projects			
Change of gas turbine's air inlet filter to HEPA filters	16,537.62	9,613.32	41,178,666.82
Switch-off room space heater in GT compartments	115.02	66.86	286,399.80
Switching to energy–efficient light bulbs and improving the ventilation system for four projects	932.65	542.15	2,322,310.08
Total	17,585.29	10,222.33	43,787,376.70

Reduction of energy consumption at headquarters building

RATCH's headquarters formulated an Energy Conservation Plan with a goal to reduce the use of electricity by 2% from 2015.

Activities	Outcome	GHG emission reduction (tCO_2e)
• Switching to energy-efficient appliances and LED bulbs • Building management, such as turning off light bulbs when not in use, cleaning air-conditioner systems, and unplugging electrical appliances after business hours. • Fostering energy conservation behavior among personnel • Peak demand management	• Employees' electricity consumption decreased by 1.78%, compared to 2015. • The company reduced the use of electricity by 38,000 kWh • The electricity expenses decreased by 743,315.87 baht.	22.09 tCO_2e

2017 Plans

- Change of electrical appliances, lighting and ventilation systems in order to enhance work efficiency and reduce electricity consumption
- Peak demand management to lessen the office electricity expenses

Community energy project

This project encouraged communities to value energy, optimize the use of local energy resources, use appropriate energy technology, as well as sourcing local energy which enables them to be more self-reliant.

Project Details

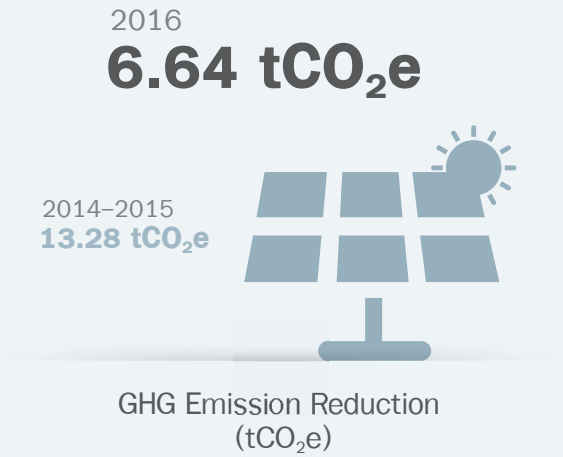
Partner	Provincial Energy Office, Ministry of Energy
Target areas	✓ Tambon Nam Phu, Amphoe Muang, Ratchaburi ✓ Tambon Tha Mai Ruag, Amphoe Tha Yang, Phetchaburi ✓ Tambon Nong Rong, Amphoe Phanom Thuan, Kanchanaburi
In 2014 The project kicked off.	✓ There were 92 community energy volunteers participating in this project. ✓ The company offered 288 items of energy community technology including energy-saving light bulbs, solar dryers, biomass fermentation pits, horizontal and vertical charcoal furnaces, highly-efficient charcoal stoves, and biomass stoves. ✓ This project reduced GHG emissions by 76 tCO_2e per year.
In 2015 Equipping the community with relevant knowledge.	✓ 59 local technicians participating in training courses created appropriate technology for commercial purposes and household usage. ✓ The community energy volunteers participated in training courses, enabling them to share knowledge as lecturers. ✓ The company offered 81 items of energy community technology. ✓ This project reduced GHG emissions by 123 tCO_2e per year.
In 2016 Developed the project in form of knowledge sharing	✓ The company supported the establishment of 15 community learning centers to share energy conservation and local power generation knowledge in three tambon: Tambon Nam Phu, Amphoe Mueang, Ratchaburi; Tambon Tha Mai Ruag, Amphoe Tha Yang, Phetchaburi; and Tambon Nong Rong, Amphoe Phanom Thuan, Kanchanaburi. ✓ A community learning center contest was organized under four criteria covering energy management, sufficiency economy, sustainability and community participation. ✓ Three community learning centers won the first prizes at the tambon level. They can develop the said technology to suit their local needs, resulting in higher income and sustainable development.

Solar home project at Ban Hua Ha, Amphoe Khun Yuam, Mae Hong Son

The company joined hands with the Thailand Environment Institute to organize this solar home project, enabling the community to access to electricity via installation of a solar-home system in 25 households for five years (2014–2018), with support in the usage and management.

2016 performance

- GHG emissions reduced by 6.64 tCO_2e per year.
- GHG emissions for three years (2014-2016) reduced by 19.92 tCO_2e.



- The company spent 33,200 baht on buying carbon credits from the project, certified by Thailand Voluntary Emission Reduction (TVER) of Thailand Greenhouse Gas Management Organization (Public Organization) (TGO). The community can manage carbon credit income for maintenance of the energy management system of their village, with regulations jointly formulated by the community. This helps add the sense of ownership in the community, as the villagers can join hands to maintain this system in a sustainable manner.

Strategy for Increasing GHG Trapping Storage

The company also values projects that increases trapped GHG storage.

Project/ Activity	GHG Storage (tCO_2e)	Target	Co-benefits
Reforestation project in watershed forests for enlarging carbon sinks	2,000	• Restore forest areas to create carbon sinks • Restore denuded forests in Nan	• This project helped maintain complete ecosystems with biodiversity • The project improved upstream areas and alleviated soil erosion
'Love the Forest and Community' Project	218,684	• Discover prototype community forests, which encourages other communities to learn from their success. • Find out community forest leaders and youths who can support sustainable forest development • Depend on communities' participations to take care of forest to create carbon sinks	• This project strengthened community forest leaders and youth networks • Those participating in information-sharing program can put knowledge into practices. • The community can generate income from their community forests' products. • This activity created unity within the community.

Reforestation project in watershed forests to create carbon sinks

In partnership with the Department of National Park, Wildlife and Plant Conservation, this project aims at planting trees in 1,000-rai denuded forests in Nan in order to enlarge carbon sinks. Tree survival and growth rates have been continuously monitored for three years (2014-2016).

The company's support	Objectives	2016 outcome
200,000 saplings were planted in a 1,000-rai area (200 saplings per rai)	A 95% tree survival rate was certified by the Development Project for Nan River Basin Security according to Royal Initiatives, organized by the Department of National Park, Wildlife and Plant Conservation	CO_2 absorption from the atmosphere stood at 2,000 tCO_2.

Love the forest and community project

The company has joined hands with the Royal Forest Department, Ministry of Natural Resources and Environment, to carry out "Love the Forest and Community" activities for nine consecutive years (since 2008).

Strategy to Apply Relevant Standards or Mechanisms and Promote Participation among Relevant Sectors

A project to expand the promotion of Carbon Footprint for Organization in the industrial sector (phase 5) at Ratchaburi and Tri Energy Power Plants

In 2016, Ratchaburi and Tri Energy Power Plants participated in the captioned project jointly managed by the Federation of Thai Industries and TGO. The objectives of this project included:

- To revise data of 2015 as the base GHG year for both power plants.
- To upgrade the power plants' GHG emission databases to meet an acceptable standard.
- To develop a GHG management plan for the power plants and RATCH Group, based on the revised information.

Outcome

Ratchaburi and Tri Energy Power Plants' GHG emissions under Scope 1 and 2 passed the verification process according to the criteria of Carbon Footprint for Organization Methodology initiated by TGO (2nd edition, April 2015), in the category of limited certification, with no significant mistake or error of over 5% found.

Validated GHG emissions

Power plant	2015 GHG emissions validated in 2016 (tCO_2e)	
	Scope 1	Scope 2
Ratchaburi	7,128,376.22	27,701.77
Tri Energy	1,456,665.41	2,182.68

Clean Development Mechanism (CDM) of Solarta's 16.78–MW (equity) solar farm

Under the CDM mechanism, countries that have ratified the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol must jointly reduce GHG emission. This mechanism allows industrialized countries to implement emission reduction projects in developing countries and receive credit, which they may count against their national reduction targets.

RATCH's feasibility study on CDM for Solarta's solar farms started in 2012 through studying GHG emission reduction in power generation processes at solar farms to offset the use of fossil fuels. This project was validated and registered with TGO. The forecasted reduction of GHG emissions during 2012-2019 is 233,203 tCO_2e.

To win the Gold Standard for adding value for its carbon credit, Solarta Co., Ltd., a solar-farm operator, carried out relevant activities as follows:

- Developing information on relevant project monitoring
- Preparing a draft report on CDM monitoring (according to Gold Standard)
- Organizing a hearing with all stakeholders of the project
- Preparing a monitoring report before submission to the United Nations Framework Convention on Climate Change (UNFCCC) and the Gold Standard Foundation.

Goal

✓ The forecasted carbon credit income equals 33,600 euro

(1 tCO_2e equals 0.40 euro as of August 2, 2016)

Plan for 2017

The project's carbon credit will be certified according to the CDM criteria together with the gold standard.

Carbon Disclosure Project (CDP)

CDP is a not-for-profit global organization that runs the global reporting and disclosure system to reveal standardized environmental information for organizations or cities worldwide. It uses marketing incentives to persuade the private sector to disclose environmental and natural resource impacts as well as measures to mitigate them, with an attempt to urge the operation to alleviate climate change via global financial and investment institutions.

The company first disclosed its 2014 GHG emission information via the CDP 2015 scheme. As the pilot project, information of GHG emission by Ratchaburi Power Plant as well as opportunities and challenges from climate change in 2014 was reported. As a result, the company realized its status and was ready to use such information for supporting its GHG emission management, risk assessment as well as ascertaining future possibility and challenges.

Global Climate Change Risk Management Strategy

To reduce GHG emissions and increase the trapped GHG storage, RATCH prepares to cope with climate change problems as one of its significant missions. Power generation normally consumes natural resources, particularly water. Any intensified disaster may interrupt its power generation and will possibly affect the country's power security.

Realizing the climate change issue, the company put it on the list of operational risk at corporate and project levels. For the corporate level, the probability and impacts of this risk are reviewed every three months. At the project level, risk issues of each project are developed for monitoring.

Risk management

Mitigation of natural disaster impacts caused by climate change

Flooding

- Assess flooding risk and impacts.
- Design and install drainage systems for all areas of new projects.
- Recheck and assess the strength of earth embankment around the plants and improve it to support the operation, which helps reduce the impacts of rainwater discharged to communities.
- Develop a manual and a contingency plan to cope with flooding as well as a training course equipping relevant persons with their responsibilities under the plan.
- Organize annual drills on the contingency plan.
- Install a meteorological measurement system in Ratchaburi Power Plant for monitoring information and notifying relevant persons.

There was no flood affecting power generation processes in 2016.

Drought

Power plants in Ratchaburi

- Monitor the portion of water usage from main rivers, such as the Mae Klong river in order to monthly assess and check impacts that may affect the generation processes.
- Improve the water quality in the cooling system to ensure that it could be used for five rounds before discharging (from 3–4 rounds in past years). This will help Ratchaburi Power Plant to reduce the use of Mae Klong river water by 4 million cubic meters per year.

Hongsa Thermal Power Plant, Lao PDR

- Assess the risk and impacts from water shortage that may affect the generation processes.
- Source additional water from Nam Kaen Dam aside from Nam Luek Dam, which helps secure resources for power generation and reduce conflicts with communities.

There was no drought affecting power generation processes in 2016.

Rise in Average temperature

Tri Energy Power Plant

- Study the impacts of temperature rise that may affect generation efficiency and fuel consumption rates.

Ratchaburi Power Plant

- Study the possibility to reduce the temperature to allow machinery to operate at its full capacity.
- Tri Energy Power Plant uses a spraying water system to reduce the temperature before the combustion process.
- Regularly monitor meteorological data.

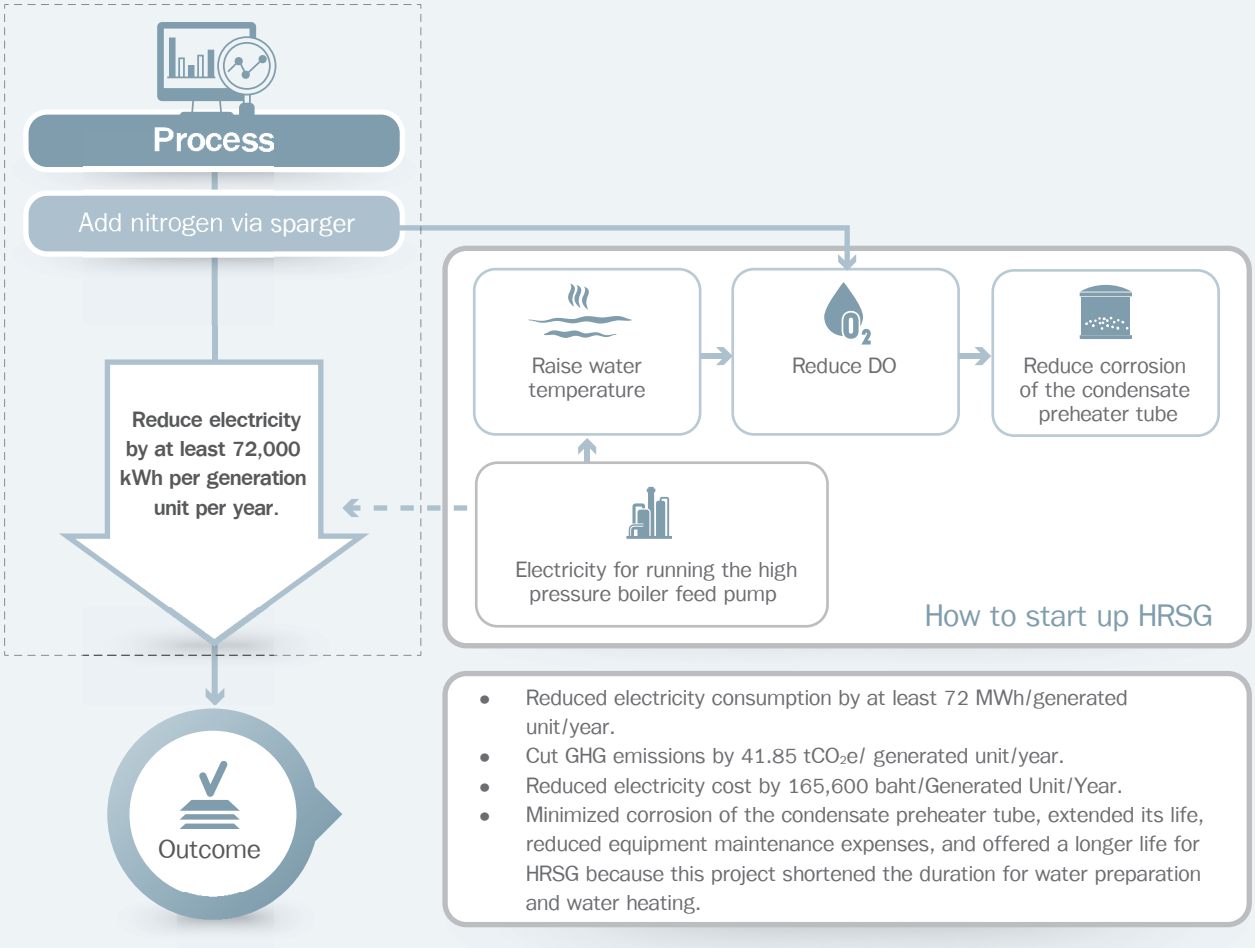
The company planned to offset power generation during low–temperature period in 2016.

Case Study: Generation Efficiency Improvement and Energy Consumption Reduction at Ratchaburi Power Plant

A project to improve the Line Nitrogen Sparger to reduce electricity cost for HRSG start-up

To start up the Heat Recovery Steam Generating (HRSG), water temperature must be raised to reduce DO (dissolved oxygen), which consequently helps limit the oxygen corrosion of the condensate preheater tube. The process usually requires high power consumption. Ratchaburi Power Plant then studied a new approach to prepare water by adding nitrogen via the porous-metal Sparger, which results in tiny nitrogen bubbles. This help get rid of DO and save energy for heating water.

Expectation/ Objective	Goal	Operation
To reduce electricity consumption for running the high-pressure boiler feed pump in preparing water to support the start-up of HRSG and to control dissolved oxygen (DO) at the specified limit	Reduce electricity consumption for running the high-pressure boiler feed pump by at least 72,000 kWh per generated unit per year	• Conducted a feasibility study and designed the nitrogen sparger • Developed an experimental program for the installation of in-line and in-tank nitrogen sparger at one unit of the combined-cycle power plant • Monitored and collected data to support DO reduction assessment. • Summarized the results and arranged a water preparation procedure for HRSG start-up in order to save as much time as possible.



Renewable Energy and Organic Agriculture Learning Center

Ban Khao Hua Khon, Moo 4, Tambon Nam Phu, Amphoe Muang, Ratchaburi

Background	This center is developed from the community energy project to support community participation in local energy and environmental management for maximum efficiency, foster sustainable energy consumption awareness, select renewable energy technology and promote energy conservation through community energy planning.
Expectation of project	• The community realizes the importance of energy and reduces household energy consumption. • Optimize their local resources for the use of energy in order to support future self-reliance.
Goal	• Use local resources to support renewable-energy generation • Reduce energy expenses • Establish a learning center for the community and encourage them to put into practice
Operation & progress	2014: Applied for community energy volunteers. Developed the community energy plan under the recommendations of the personnel of the Provincial Energy Office, Ratchaburi and the company. 2015: A bio-gas digester was installed at the villager head's house as a pilot project. The villager head participated in some training courses on energy management. 2016: Established a learning center, participated in the contest and won the tambon-level first prize award as it was able to integrate renewable energy technology and the sufficiency economy theory for the community's benefit, with energy expense reduction and household income increase.
Outcome	• The community reduced the purchase of liquefied petroleum gas (LPG) by 12 cylinders (15 kg./cylinder), for a total value of 4,300 baht, cutting GHG emissions by 0.56 tCO_2e per year. • Three communities nearby, namely neighbors, Ban Nam Phu School, and Wat Khao Nok Kajib participated in the study observation, allowing them to use local technology to reduce the purchase of cooking gas by 36 cylinders, equal to 12,900 baht, with GHG reduction of 1.08 tCO_2e per year.

Opinion of Mr. Sombat Tiangket, the village head and the chairperson of Renewable Energy and Organic Agriculture Learning Center, Ban Khao Hua Khon

"I first participated in the community energy project in 2014, with a chance to attend the training course on energy-saving. After the study visit on energy-efficient technology, I thought that energy-saving can start at home, and I can generate the energy for internal use. That's why I am interested in this project. In addition the company supported the pilot project of the bio-gas digester to lower the use of cooking gas, thus saving me 350-400 baht per month. I related this benefit to my interested fellow villagers, especially when I hosted the monthly meeting. There were some villagers from a family, Ban Nam Phu School and Wat Khao Nok Kajib interested in this project. I realized that this project should be further developed, as it can help reduce energy expenses and increase income. Then, I adopted integrated farming by following the "sufficiency economy" principle that partially promotes farming to support household consumption."

Social Performance

Human Resources Development and Management

Due to changes in RATCH's strategic plan that focuses more on foreign investment expansion and investment in businesses other than energy, the company had to adjust personnel plans and development of personnel capacities both in readiness and in number to effectively mobilize its growth objectives.

Looking after personnel development and management is a crucial tactic in RATCH's strategies. To implement the strategy this year, the company focused on five main topics:

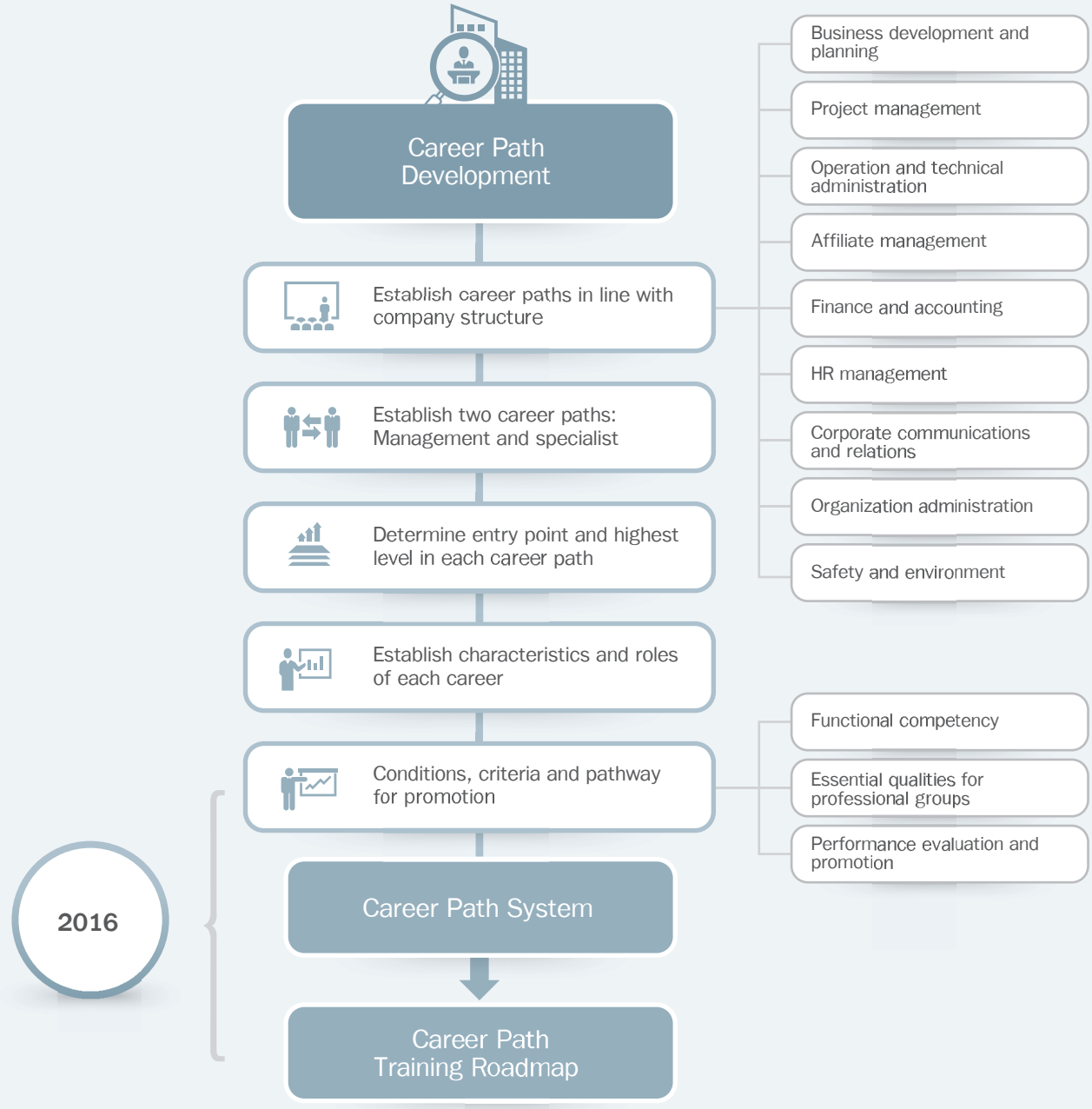
Career Management

Career Management concerns the management of personnel in preparation for the expansion of company business at home and internationally while strengthening employees' confidence for job security and motivation for talent retention. After career path plans for employees of the whole company group were completed in 2015, the company continued implementation of training road map across tho organization.

For employees' compensation, it was specified in line with requirements of labor law. Regardless of gender, the average compensation for all employees working in any country is higher than its local minimum wage and suit the standard of living of each country, with welfare spouting employees' sense of security and safety. Employees working overseas will also receive other special welfares, such as home leave, life assurance, health insurance, and emergency assistance and safe accommodation.

Entry Salary compared with minimum wages

	2016	2015	2014
Below bachelor's degree	1.6 times	1.6 times	1.5 times
Bachelor's degree	1.4 times	1.4 times	1.3 times



2016 work progress

- Revised its functional competency into five levels.
- Reviewed qualifications and characteristics required for each career family.
- Improved performance and functional competency evaluation system for career development in all nine job families.
- Prepared each career training roadmap for the whole company group. Results of annual performance and competency appraisal are used to consider knowledge and skills necessary for employees in 2016 that included training development both inside and outside the company, work study, and job transfers or rotation, and so on.
- In case of rotation for replacing a position with another, this must be mutual agreement between employees and the company. In case of rotation overseas, the notification will be made at least 30 days in advance.

Competency Development for Potential Successors

This plan continually prepares personnel with capability and competency to become successors to executives that will retire within 5-10 years.

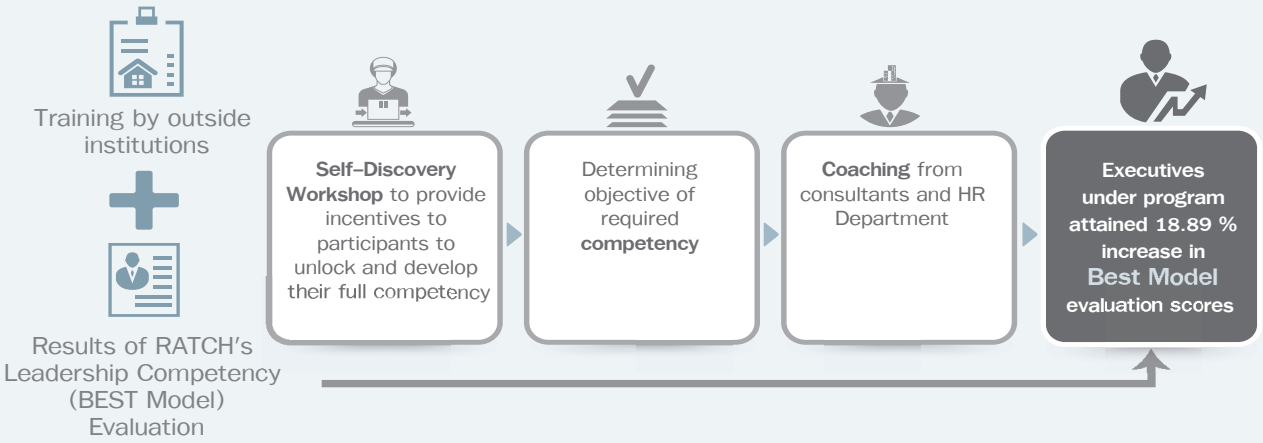
Number of management members to be retiring	5 years ahead (2021)		10 years ahead (2026)	
	Persons	%	Persons	%
	34	7.10	23	4.80

Work progress in 2016

- Enrolled middle management in leading outside institutes to increase knowledge and exchange experience with other participants through the year.
- Organized a Self-Discovery Workshop for middle managers to stimulate self-understanding and forge incentives to develop their own competencies. Results from RATCH's Leadership Competency using BEST Model evaluation are used to re-evaluate the participants and it was found that average scores increased by 18.89% from the baseline.

There are four BEST leadership characteristics:

1) **B**uild Network: Build a business network and use the network to forge synergy.
2) **E**mpower Team: Build a team with personnel that has strong competency and decentralize authority to lower echelon.
3) **S**eek Possibilities: Seek business opportunities and make careful, sensible decisions appropriate to the situation. Give everyone an overview and an understanding of the global market.
4) **T**hink Strategically**:** Thinking strategically helps steer the company toward action and significantly produce results from effective and efficient implementation of strategies and plans.

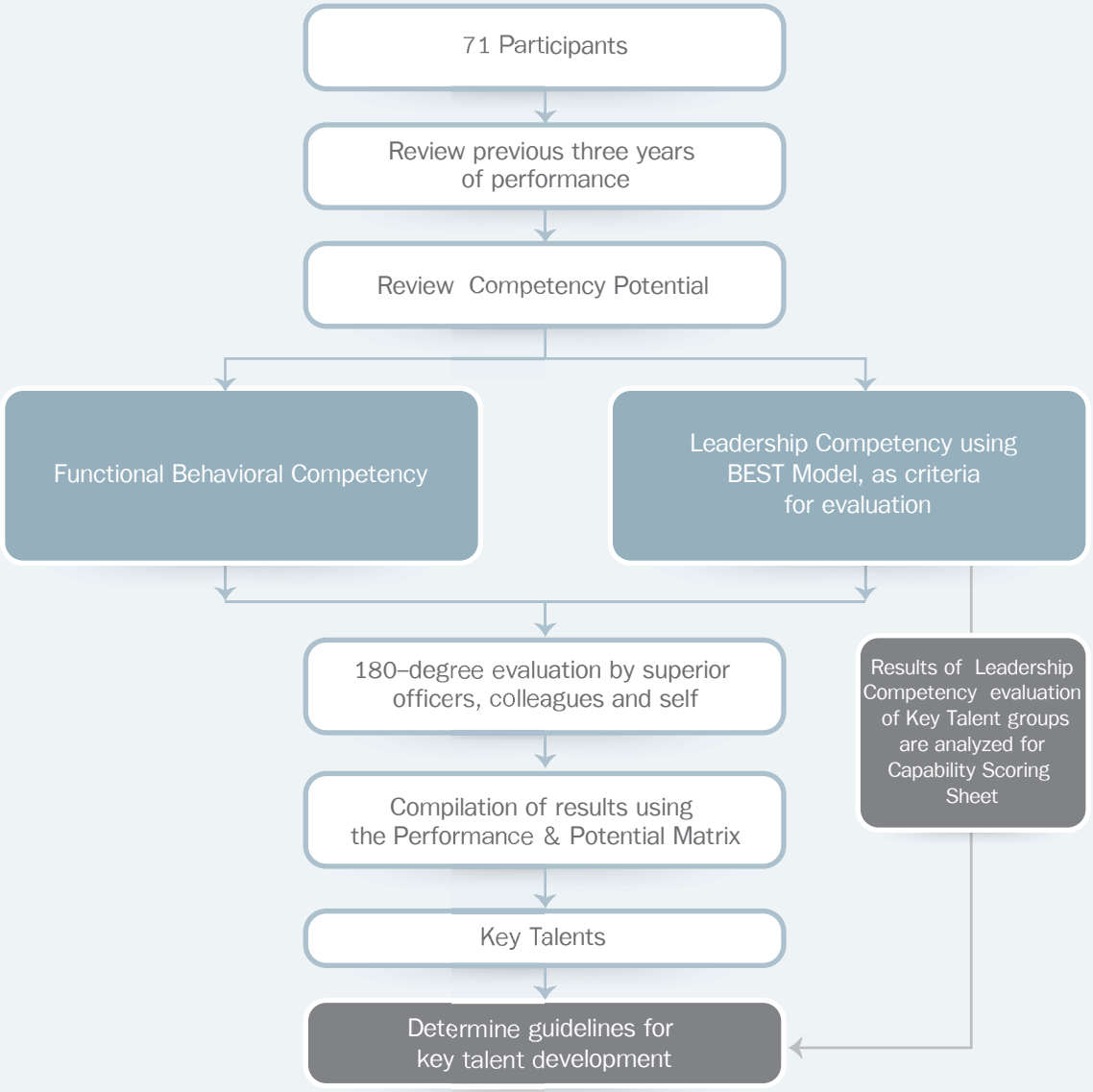


Competency Assessment

Talent Management concerns the grooming of personnel for company business expansion and executive succession Both are part of the career growth for employees and were a continuation of previous years' plan, with emphasis on competency assessment of first-line management.

Work progress in 2016

- Assessed the leadership of employees at the level of Department Manager of the group of companies using criteria specified in RATCH's Leadership Competency (BEST Model) to select "high flyers" (key talent) groups and develop career plans
- 71 employees participated in the program and 70% of participants were selected.

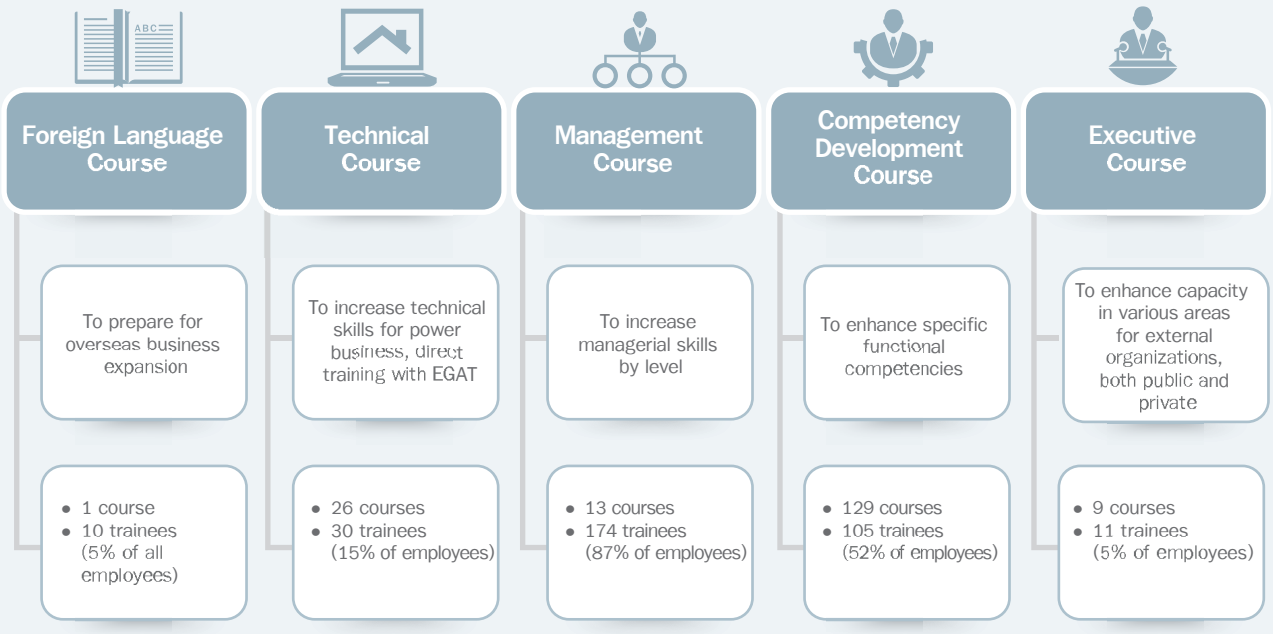


Personnel Development

The company focused on increasing essential knowledge and skills for employees in accordance with the level and type of work.

Work progress in 2016

- Development and training courses provided to employees in five areas: foreign language, specific technical courses, management courses, competency development courses and executive courses.
- Study visit of external organizations such as PTT Public Company Limited and Siam Cement Public Company Limited to increase experience and to exchange ideas, especially on organizational knowledge management.
- A total of 178 training courses were organized, with more than 93% of employees taking part.



Note: *RATCH's workforce stands at 201 (as of December 31, 2016)*

In 2016, the company focused on enhancing knowledge, skills and capability required for upgrading work potentiality of each position. The training goal is revised from length of training hour per person per year to percentage of trainees for each position. The outcome is higher than the established goal.

Position Level	Number of Employees (Person)	Number of Trainees (Person)	2016 Target (% of employees for each position)	2016 Outcome (% of employees for each position)	Training hours target (hours/person/year)
High-Level (Top) Executives	13	9	50	69.2	53.38
Middle Management	33	27	50	81.8	92.67
First-line Management	58	44	50	75.9	33.67
Rank and file	95	89	50	93.7	27.79

Note: Only training hours of RATCH's employee was reported.

Knowledge Management

Knowledge management in the organization, a major emphasis of the RATCH, is compiled from the knowledge and experience of personnel and is used to promote and strengthen organizational capacity. This project is on-going from last year and highlights business development and asset management as the pilot target group because they are both main units for steering the growth of company business. Due to the highly individualized nature of the operation, work experiences from experts will enhance learning and result in more efficient and swifter work.

In 2016, RATCH launched a knowledge management system to respond to the requirement of a body of knowledge for company business development. A knowledge base is needed for effective company operations as well as to provide a short cut for personnel training from lessons learned through experiences, opportunities and challenges that the company has accumulated for over 16 years.

Process of compiling and grouping knowledge management topics in the organization

Sets of organization knowledge that everyone can use to improve themselves and their work

Culture of learning values and exchange of knowledge within the organization in response to company strategies.

Knowledge Management

Work achieved in 2016

- Lessons learned from experts at the executive level were compiled into E-documents and distributed on five topics:
  - Knowledge on boiler maintenance and essential issues
  - Lessons from operation in Laos PDR
  - Corporate business development process
  - Project development process
  - Techniques for project contract.
- Dissemination of 20 topics of general knowledge in related business processes for work, especially do's and don'ts when working in Asia-Pacific, the company's next business expansion target area.
- Knowledge-sharing activities from the middle management on business development process and foreign business development process.
- Two Best Practice Sharing activities to pass on the knowledge of executives who are retiring

Next year's work plan

RATCH will fully continue with activities to fulfill the requirements of various target groups, especially new operators, in learning from experiences of experts such as how to conduct feasibility studies, principles and method of developing a project, financial management of power business and power plants, among others. Activities will be in the form of Best Practices Sharing and lesson-learned compiled into a body of knowledge that can be disseminated for use by all workers. Follow-ups of results from these knowledge management activities will be conducted to ensure continual development and add-ons for best interests of the business.

Topic: **"Experience of operation and maintenance of boilers in thermal power plant"**
by Chief Executive Officer
(Mr. Rum Herabat)

Target group: 28 engineers responsible for operation and maintenance of boilers and interested persons to gain knowledge and share work experience with a new generation of workers.

Topic: **"Lesson learned and key success on business development in Lao PDR"**
by Managing Director of RATCH–LAO Services Co. Ltd.
(Mr. Chinnakorn Chantra)

Target group: 25 personnel in business development and interested persons to gain knowledge and share experience and techniques about working in Laos PDR.

Community Relationship Management and Stewardship

Constantly and confidently, the company has valued community acceptance for earning the social license to operate from communities and all stakeholders, which is crucial for the power plant's operation sustainability. Aside from gaining trust, RATCH actively enhances the quality of life in the community around each power plant and business operation. Guidelines to take care of communities, society and the environment, regarded as the company's key stakeholders, were specified in the Code of Conduct, with details summarized as follows:

1. RATCH's commitment to operate business with community, social and environmental responsibility is incorporated in its mission for creating and maintaining a good corporate image, reputation and reliability. Community and society's acceptance and trust toward the company paves the way for business success, significant development and sustainable growth.
2. In partnership with business partners, the company organizes projects and activities for the benefit of communities and society. This aligns with the established strategy and the aim to meet stakeholders' expectations.
3. The company participates in activities organized to take care communities and society in order to upgrade the stakeholders' wellbeing.
4. The company offers appropriate support for society and communities at local and national levels.
5. The company respects local customs, culture and ways of life.
6. The company participates in activities of the communities where it has operations.
7. The company selects the best methods for natural resource consumption by selecting ones that offer least impacts on communities and society.

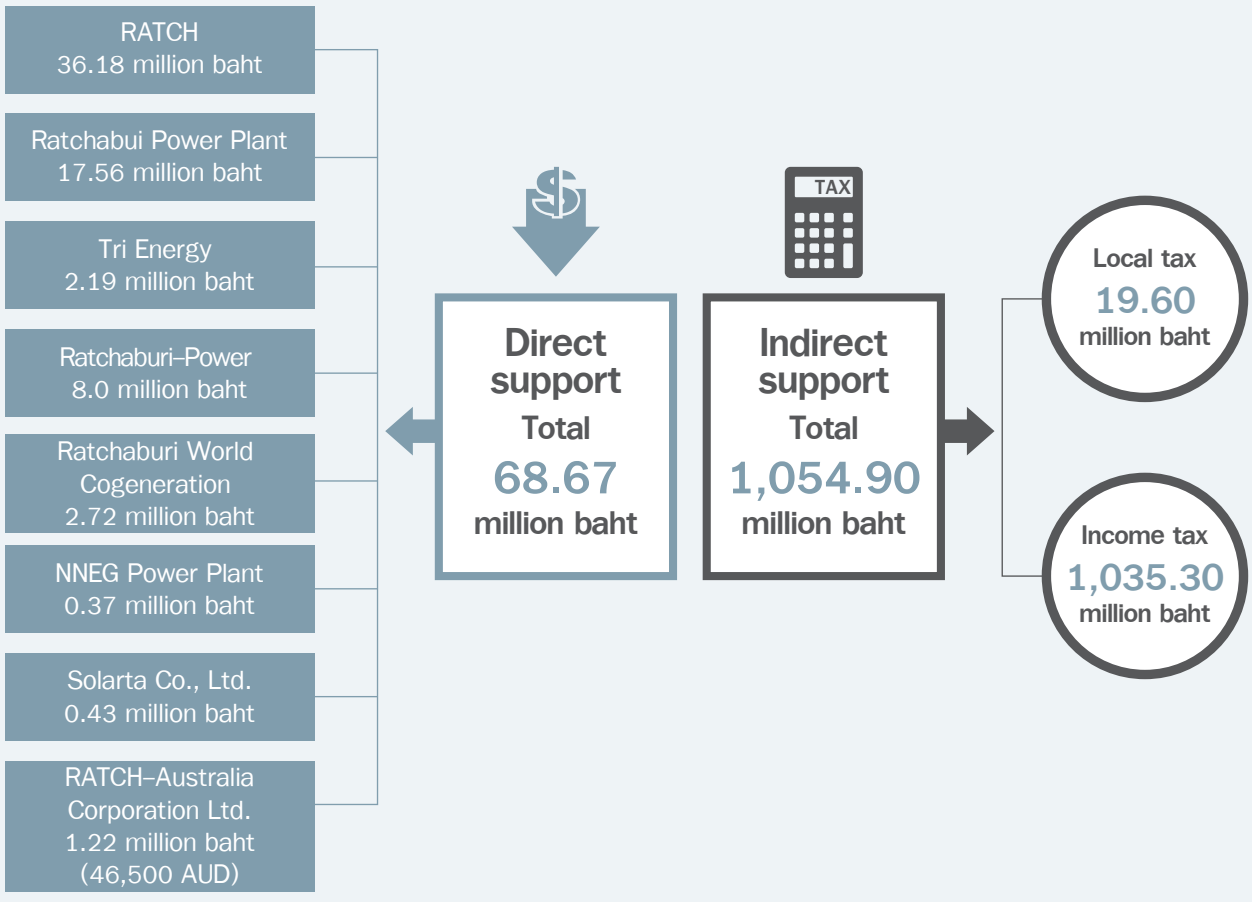
RATCH Group apply these guidelines to its operations to support communities and stakeholders from the beginning of project development and construction to the commercial operation period to forge better understanding, trust and acceptance toward power plant operation. Key activities implemented in 2016 can be divided into five parts:

- Communication and information-sharing to forge better understanding and trust
- Promotion of women's role and gender equality
- Raising awareness of natural resource conservation
- Quality of life development
- Supporting community and social development.

2016 performance highlights:

Financial Support for Community and Social Development

In 2016, RATCH Group offered financial support for community and social development at home and internationally. Direct support for various projects and indirect support in the form of taxes totaled 1,123.57 million baht. Activities to support social and community have been continuously carried by the company and its subsidiaries.



1 Australian dollar equals to 26.23 baht

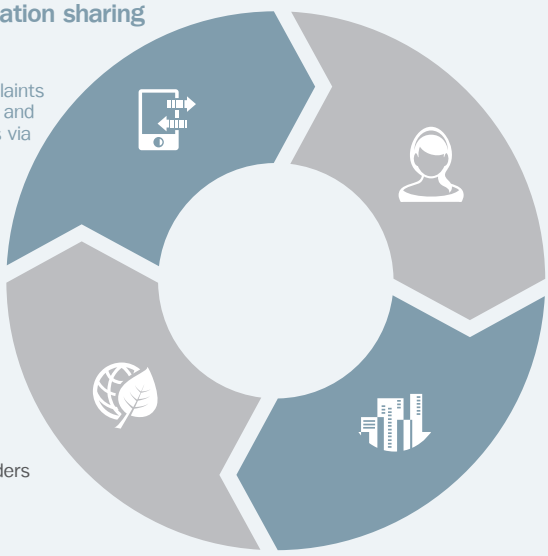
Activities to communicate and share information to forge better understanding and trust, promoting women's role and gender equality, raising awareness of natural resource conservation, and developing community's wellbeing in 2016 are as follows:

Communication and information sharing

- "Welcome to Our Home" (Chuan Phuen Yuen Ban) Project
- Listening to comments and complaints
- Updates on operation information and significant events of power plants via social media
- Ban Rao journal
- Enhanced the knowledge of environmental inspectors of Ratchaburi Power Plant

Promotion of women's role and gender equality

- Phumaree Project...Power of Women, Power to Conserve the Environment Project



Raising awareness of natural resource conservation

- Community forest contest
- Kla Yim Youth Camp
- Siminar of community forest leaders
- Community Energy Project

Quality of life development

- Mobile Medical Unit Project
- Education for Career Empowerment Project in Lao PDR
- Educational support for communities around RATCH-Australia Corporation's Power Plants.

Communication and Information Sharing

This project forges understanding of the electricity-generating business and raise community awareness of the importance and benefit of power plants. Information on the management of pollution caused by power generation processes and possibly affecting the environment or neighboring communities was disseminated to lessen anxiety. This effort will lead to communities' acceptance of and trust in RATCH's power plant. This information is communicated via these following activities and channels:

Project/ Activity	Expectation/Goal	Operation	Outcome
"Welcome to Our Home" (Chuan Phuen Yuen Ban) Project Ratchaburi Power Plant	• To forge understanding of power generation and environmental management processes among neighboring communities • 40% of the participants understand the power plant's operation • 60% of the participants have confidence in the power plant's process and environmental management processes.	• RATCH arranged six site visits at Ratchaburi Power Plant, allowing the communities in nine tambon around the power plant to observe its operation, including power generation and environmental management processes. • The participants filled in questionnaires to ensure their understanding.	• 600 persons from communities around the power plant visited the power plant. • 82.83% of the participants had better understanding of the power plant's operation. • 57.66% of the participants had confidence and 40.83% had moderate confidence in the power plant's environmental management processes.
"Welcome to Our Home" (Chuan Phuen Yuen Ban) Project Tri Energy Power Plant	Communities around the power plant understand and have confidence in the power plant's operation.	• RATCH arranged a site visit to Tri Energy Power Plant for communities in three tambon around the plant, including Tambon Hin Kong, Huay Rai and Don Rae, enabling them to observe its operation, including the power generation and environmental management processes.	• 70 participants had better understanding of the power plant's processes. (Previously, they had received updates from other sources of information.)

Project/ Activity	Expectation/Goal	Operation	Outcome
Baan Rao Journal	Updates on Ratchaburi Power Plant's operation are thoroughly and equally disseminated to communities for their understanding and acknowledgment.	• "Baan Rao" Journal was published quarterly. • Copies of this journal were given to all households in nine tambon around the power plant. • Copies of this journal were given to the mass media and government agencies in Ratchaburi as well as interested persons.	• All households around the power plant can access the power plant's updates. • Communities, the mass media and government agencies in Ratchaburi received the power plant's updates quarterly. • The target audiences in the communities sent feedbacks regarded as recommendations for improvement.
Updates on operation information and significant events of power plants via the social media	Communities receive the power plants' updates, including events, important or urgent activities such as an emergency plan drill and fuel switching.	• Information was disseminated to the communities around the power plant via SMS, LINE application or Facebook.	According to the interview, it was found that: • Updates helped ease the communities' anxiety. • Communities had confidence in the power plant's operation.
Real-time communication	Communities around the power plant and the public can receive daily updates on power generation and emissions from operation.	• Information was shown on the digital display board in front of the power plant around the clock.	According to the interview, it was found that: • Communities had confidence in the power plant's operation. • Communication helped ease the communities' anxiety.
Listening to comments and complaints from the communities around the power plant	Communities around the power plant reveal opinions and concerns about the power plant, while the power plant can devise solutions to promptly solve problems.	• Officers visited the communities and received feedback from the communities, 18-21 days per month. • The communities' opinions and concerns were considered and the power plant provided preventive and corrective measures.	• Officers visited the communities and received feedback from the communities as planned, without complaints filed.
Enhance knowledge of environmental inspectors of Ratchaburi Power Plant	Environmental inspectors command understanding; can investigate and monitor the power plant's environmental management; and give the communities correct information.	• The power plant arranged a site visit on environmental management for 25 inspectors at Hongsa Power Plant in Lao PDR. • The inspectors from all sectors jointly investigated and monitored the power plant's environmental quality.	• With good understanding, environmental inspectors became a third party to jointly investigate and monitor the power plant's environmental management and gave the communities correct information on the power plant's operation.

Promotion of Women's Role and Gender Equality

Phumaree Project...Power of Women, Power to Conserve the Environment Project

Expectation

This project can enhance roles and caliber of women in the communities through encouraging them to participate in natural resource and local environmental management to support gender equality.

Operation

- The performance of women involved in good environmental management was publicized.
- To enhance women's role and caliber, they were invited to participate in the management of local natural resources, such as forests, tourist attractions
- Amphoe Chiang Klang and Amphoe Thung Chang, Nan is an operating area.
- The Project run during 2014–2018.

Outcome

- "Heart of the Stream" (Hua Jai Sai Nam), a short film to promote women's roles in water shortage management in the Northeast of Thailand (made by the students of Mahasarakham University) won first prize under this program, with a chance to publicize their work.
- Regardless of age, women in the community participated in serving communities as well as expanding their capability for work for their families and communities nearby.
- Progress of each activities promoting participation of women:

Participation of women in each activity:	2016 performance	Long-term goal for 2018
	%	
Community forest management	24	40
Ecotourism	20	30

Quality of Life Development

This is part of the promotion and development of the quality of life in communities to support short-term and long-term growth and stability. Activities carried out under this project focus on: health, education and career support.

Health

Project	Expectation/Goal	Operation	Outcome
Mobile Medical Unit Project Ratchaburi Power Plant 	This project promotes people in 11 tambon around Ratchaburi Power Plant to take care their health by relying on Thai folk wisdom to reduce risk or losses caused by diseases.	• A medical mobile unit offered medical service in 11 tambon around the power plants every year • General medical checkups • Thai medical massage service • Hair-cut service • Cervical cancer screening service (Patients will be treated in hospital.)	• 614 people received medical checkup service. • 1,204 people used Thai medical massage service. • 705 people used the hair-cut service. • 1,541 people participated in cervical cancer screening program and 12 people had abnormal cervical cells: 3 people received medical treatment at Ratchaburi Hospital, 2 people in Photharam Hospital and 7 persons in Damnoen Saduak Hospital.

Education

Project	Expectation/Goal	Operation	Outcome
Scholarship Project Ratchaburi Power Plant	The scholarship project offers educational opportunities for needy students with good grades.	• The power plant annually offered scholarships for 27 schools around the plant.	• There were 505 scholarships under this program, with a total value of 1,040,000 baht. • Those who received scholarships gain more educational opportunities, while helping lessen educational expenses for their parents.
"CSR IN SCHOOL" Project Ratchaburi Power Plant 	This project promotes CSR implementation in the participating schools, based on CSR-DIW guidelines, which can be divided into four parts: energy; environment; safety and occupational health; and ethics and morality.	• The project arranged a "CSR in school" workshop for teachers, consisting of two levels: - Beginner (for new participants in this project) - Advanced (for those participating in this project in 2015) • The school developed relevant policies and implemented four dimensions of the project. • The schools' operation was assessed. • Awards were given to schools with excellent operation that met the criteria. • The safety issue in this CSR project was developed into a "Safety in School" Project, supported by Ratchaburi Power Plant.	• Operation of nine schools met the beginner-level standard. • Operations of eight schools met the advanced-level standard, and they also put this CSR project into practice in their communities. • Three schools won the contest in "Safety in School" projects and were selected as the role model of safety for other schools in Ratchaburi.

Project	Expectation/Goal	Operation	Outcome
"Education for Career Empowerment in Lao PDR" Project	The project broadens knowledge and develops the caliber of electricians, welders, and mechanics to support their career development. 	• This project was implemented in universities and six vocational institutions in Lao PDR for five consecutive years (2012-2016). • It offered scholarships for teachers of vocational schools and the undergraduate level. • It granted scholarships on skill training for graduating vocational students.	• 50 scholarships in five years were given annually to teachers of vocational schools and the undergraduate level. • 120 scholarships per year (600 scholarship in total) for enhancing those three skills were given annually to students. • All trainees could apply knowledge to their careers, such as self-employment, or working in RATCH joint venture companies in Lao PDR.
Educational support by RATCH-Australia Corporation Ltd.	This program enhances educational opportunities for students from kindergarten to undergraduate levels.	• This project supported undergraduate education. • The educational support focused on energy and the environment, mental health development and sports for primary and secondary students. • The development of pre-school children's readiness was also supported by this project.	• The communities around the power plant received the 30,500-Australian-dollar scholarships. • Students in the communities around the power plant have brighter educational opportunities with lower educational expenses.

Career and income

Project	Expectation/Goal	Operation	Outcome
Community Product and Enterprise Project Ratchaburi World Co-generation	The communities established a community enterprise to develop product quality and variety to generate sustainable income. 	• This project promoted people in Tambon Jed Samean in forming a career group and enhanced participation. • The training courses and study visits on OTOP products are organized. • This project gave necessary financial support and equipment at up to 40% of their community fund.	• A community enterprise consisting of 26 members was established. • Herb soaps, a community product certified by FDA Thailand, received good acceptance from customers, as seen from continuous production and distribution. • The profit margin of the community product stood at 30-40%, generating an average income of 1,615 baht /person.

Raising Awareness of Natural Resource and Environmental Conservation Environment

To reduce climate change impacts caused by GHG emissions, the company aims to enhance communities' and society's understanding and raise their awareness of natural and environmental conservation and management, with encouraging participation from all sectors, including people, educational institutions, government and private sectors and independent entities.

Project	Expectation/Goal	Operation	Outcome
Community forest contest	The contest encourages and praises communities that show systematic forest management to create carbon sinks and expand their management to other areas nearby as a role model for other communities. 	• The community forest contest honored the winners of the Community Forest Conservation Fund and awards for provincial, regional and national level (The award winner for the national level annually receives HRH Princess Maha Chakri Sirindhorn's Trophy.)	• In 2016, a total of 138 community forests won these awards, with a total area of 109,342 rai and a carbon sink capacity of 218,684 tons. • For the nine-year operation during 2008-2016), 1,253 community forests won these awards, with a total area of 1,118,254.46 rai and a carbon sink capacity of 2,236,508.92 tons
Kla Yim Youth Camp	• The camp hopes to create understanding and awareness for the youth from community forests nationwide in order to encourage them to maintain local forest, energy and natural resources. • The camp forges awareness and encourage participation in natural resource conservation for youths.	• Two Kla Yim youth camps for the Northeast and the South of Thailand were organized.	• There were 150 youths participating in this project in 2016. • For the nine-year operation during 2008-2016, there were 19 youth camps organized, with 1,553 youths participating in this project.
Seminar of community forest leaders	• Seminar enhances knowledge and expertise for forest management and energy conservation for community forest leaders. • This project aims to share opinions, methods and guidelines on solutions to forest management problems.	• Two seminars of community forest leaders for The North and the Central Region were organized.	• There were 169 youths participating in this project in 2016. • For the nine-year operation during 2008-2016, 16 seminars were organized, with 1,306 community forest leaders participating in this project.
Community Energy Project	• The communities realizes the value of energy and optimizes the use of their local resources to produce energy, thus lessening energy expenses and increasing household and community incomes. • This project is expanded to communities nearby.	• Under a three-year project term (2014-2016), there are three target provinces: Ratchaburi, Phetchaburi, and Kanchanaburi. • A community energy map was developed for each community in three provinces • A program to select community energy volunteers was organized, with training for community technicians. • A community energy center at the tambon level was established and expanded to other communities nearby and interested persons.	• 3 plans for reducing community energy consumption were devised. • There were 92 persons participating in the community energy volunteer program, and there were 59 technicians able to apply knowledge to earn a living. • 15 learning centers were established in three provinces and three centers from those three provinces won the awards. • The participating communities could share their knowledge with communities nearby and visitors.

Volunteer-Minded Employee Project

In 2016, the company supported CSR activities by focusing on employees' participation in various projects related to religion support, playground and instructional media improvement, environmental stewardship, disaster-affected assistance programs and activities for underprivileged people. Employee participation stood at 6,456 hours, or 807 man-day. Of this, 2,592 hours were organized on holidays and 3,864 hours on weekdays or 483 man-day. The man-hour value of volunteer-minded employees in 2016 stood at 1,492,470 baht for social contribution, as normal wages apply. Nevertheless, volunteer-mined employees must manage their time while participating in the weekday CSR program that requires appropriate and consistent involvement.

Community Attitude Survey

Ratchaburi Power Plant

Ratchaburi Power Plant's CSR activities aim to forge understanding and share information with all stakeholders to gain trust and relieve communities' anxiety. The plant conducted a survey on attitudes towards its image as well as its community and social operation in 2015-2016.

- Sampling group of 500 people from communities around the plant
- Study the sampling group's behavior in receiving updates on the plant's operation
- Questionaire survey on attitudes, confidence and trust toward the plant

- The communities' attitudes toward the image of Ratchaburi Power Plant was very good, at 95.12%
- The communities' confidence and trust in Ratchaburi Power Plant was very good, at 95.15%
- The communities' satisfaction with the plant's CSR activities and projects was very good, at 96.38%
- The communities' overall attitudes toward Ratchaburi Power Plant was very good, at 95.41%

- Enhance communication channels to disseminate updates on plant's operation, enabling the communities to access information in a timely manner.
- Organize the "Welcome to Our Home" Project by focusing on participation of farmers in four Amphoe around the plant.
- Develop projects and activities that create employment and generate income with more focus on aging and underprivileged people
- Add the communities' participation in each project.

NNEG power plant

The 139.13-MW NNEG Power Plant was operated in June 2016. The plant participated in many activities organized by communities nearby. A survey on attitudes and opinions toward the plant's operation was also conducted to ascertain understanding of people in 55 communities according to the EIA requirements. The survey found that:

54.66% of the respondents acknowledging the plant's operation and agreeing with its operation in supporting communities to strengthen relationship for growing together with the communities

34.46% of the respondents were confident in the plant's operation, since they viewed that the establishment of the power plant should benefit their quality of life, generate higher income and secure electricity supply for the communities.

Community enterprise of the Nontoxic Farming Group, Tambon Paengpuay, Ratchaburi

Operated by Ratchaburi Power Plant

Starting in 2008, this project aimed at lessening farmers' health problems due to the use of chemical substances in farming and enhancing income for farmers in Tambon Paengpuay, Damnoen Saduak, Ratchaburi, through promoting communities' participation.

Communities' problems

- Farmers had a dangerous level of pesticide residues in their blood.
- They highly depended on pesticides, thus resulting in high production costs.
- Their farm produce was unsaleable due to high levels of chemical residues.

Project progress

1978

The community formed a group for developing an experimental program on using herbs to keep insects away.

2004

Under Ratchaburi Power Plant's development program, the plant gave financial and equipment support to encourage farmers to form a group and increase participation.

2005

The group of farmers tried to produce bio-extracts and herb extracts for keeping insects away before distributing them to others.

2006

A community enterprise of "nontoxic farming group of Tambon Paengpuay" was established as a distribution channel for its bio-extracts and herb extracts nationwide.

Regulations for community enterprise management were established.

- The management committee's term was limited to two years
- Members were eligible to buy shares and receive annual dividends of not over 30% of the net profit.
- The meeting of community enterprise members is arranged monthly
- The community developed accounting for the project and a performance report was reviewed by Ratchaburi Cooperatives.

2016

The project was expanded to other activities and the number of members increased.

Community Enterprise Management Structure of the Nontoxic Farming Group, Tambon Paengpuay

Chairman

- Supervise the community enterprise's operation
- Disseminate knowledge on bio-extracts, with solutions for all farmers

Committee

Management Committee

- Attending meeting
- Arranging operation report
- Devising operating plan
- Marketing

Production Committee

Monitoring and controlling bio-extracts' quality and ensuring adequate volume to serve members' and customers' demand.

Community Enterprise Auditor

Auditing community enterprise's operation and accounting and developing the operation perfomance report

Members

Farmers in Tambon Paengpouay and communities nearby

- Attending all scheduled meetings.
- Having shares in community enterprise and receiving annual dividend
- Voting to elect committee
- Buying products at special prices

Ratchaburi Power Plant's support (under the Ratchaburi Power Plant's Development Project)

Jointly devise a community development plan » Give financial support » Give support on equipment, such as vegetable cutter machines, grinders and herb-extracts buckets » Organize training courses and study visits to enhance knowledge and develop the caliber of the community enterprise » Monitor the operation and give suggestions.

Impact of projects

Issues	First year of operation 2005	2016	Progress
Committee (Persons)	7-8	20	The elected committee served a two-year term and the number of committee increased due to higher members and operating growth.
Members (Persons)	32	181	The number of members increased by 4.65 times from the first year of operation
Capital Stock (Baht)	25,800	139,100	The shares increased by 4.39 times from the first year of operation.
Profit (Baht)	No profit recorded (production for internal use)	37,467.85	Herbs were distributed to farmers in the communities and other nearby provinces.
Dividend (Baht)	None	11,240.36	For the first year, there is no herb sales. Then the dividend has not been allocated to members.
Reduction of chemical substances	Decreasing by 25-50%	Decreasing by 50-75%	Farmers switched to herb extracts and organic fertilizers, thus lessening the use of chemical substances.
Illnesses due to chemicals	According to blood test, chemical volume reached dangerous level as chemical had been used for longtime	According to blood test, chemical volume was at safe level	The number of the sick members dropped.
Production cost	Decreasing by 25-50%	Decreasing by 50-75%	The chemical expenses decreased.

Project expansion

Promote farmers in the network to plant herbs as materials for herb extracts and bio–extracts. → **Expand the project to other nearby tambon in order to encourage them to form a group and plant herbs for higher income.** → **Drive the project to join other ASEAN and international programs.**

Mr. Chuchai Nakkniow
Chairman of Non–toxic Farming Group
Tambon Paengpuay

"Local wisdom and natural resources help upgrade people's wellbeing"

"The community has switched to herb extracts and bio–extracts, thus they become healthier, with lower chemical levels in blood. For example, Asparagus, a key farm produce in the community, has lower pesticide residues and records satisfactory sales. Most farmers prefer herbs and local wisdom in keeping insects away, which also benefit the environment, health, and quality of life. Also, herb knowledge can be shared with farmers in other areas.

Due to the reliance on natural resources and local wisdom in pursuit of sufficiency economy, farm produce is stronger, with developed immunity to diseases and insects, while people become healthier. Although we are living near the power plant, we can grow safe farm produce amid a good environment due to our reliance on natural resources and local wisdom."

Safety and Occupational Health

RATCH aims to be a leader in operational excellence, safety, and health for all personnel and stakeholders. Indeed, it is one of the company's key success indicators. To this end, RATCH targets zero accident both at the Headquarters and the power plants while establishing and functionalizing safety, occupational health, and the work environment as the company's Code of Conduct, described below.

1. Safety is an essential component of RATCH's business. At the minimum, compliance with safety, occupational health and environmental laws and regulations is mandatory. In addition, RATCH has developed and implemented safety, occupational health and environmental requirements and standards for the workforce to follow.
2. RATCH will control and prevent any losses from accidents, fires, injuries, occupational illnesses, property damage or losses. It is committed to providing safe work environment and appropriate protective gear to the workforce, including regular emergency exercises and drills. It is the management's and all employees' responsibility to report unsafe conditions and acts in accordance with the procedure.
3. RATCH will communicate and engage with employees, contractors and stakeholders to nurture their understanding of requirements, procedures and precautionary measures regarding safety, health and the environment. The expectation is for them to operate and perform their tasks safely and in an environmentally friendly way.
4. If unsafe conditions or potential violation of regulations or potential adverse effects regarding safety, health and environment are identified, all members of workforce are to stop working and report such conditions to their supervisors or relevant parties for remedial actions.

Safety, Occupational Health and Environmental Management Structure

The safety of power plant workforce is the vital component in RATCH's business because the power plant is large, with heavy machinery and high risk. Continual improvement of safety management is therefore critical to ensure workforce safety.

Risk Assessment

For RATCH, risk assessment is its top priority in managing safety. It is meant to identify factors to reduce risk, impacts, and losses to people, process, assets, business continuity, and the environment and communities. Further, RATCH implements a monitoring system to consistently track performance and review the effectiveness of control measures and plans to achieve zero accident.

Safety management

Risk assessment procedure

In 2016, all of RATCH's power plants consistently conducted risk assessment to cover all activities within the power plants, especially for less frequent activities which could initiate extensive impacts. For medium-risk and high-risk activities, RATCH established more stringent control and preventive measures.

Therefore, RATCH significantly reduced the number of accidents and losses, despite long-time operation of power plants.

Risk assessment (Ratchaburi Power Plant)

No.	Risk Assessment List	Items	
		2016	2015
1	Total activities under risk assessment	**1,157**	1,128
2	Risk severity		
	• High	**0**	0
	• Medium	**351**	334
	• Acceptable	**343**	346
	• Low	**463**	448
3	Number of measures or procedures	**694**	680

Ratchaburi Power Plant has been implementing risk assessment to define risk control measures since the beginning of operation in 2000. Today, such risk assessment covers 1,157 activities, which rose by 29 activities over the year. Moreover, there are 694 risk control measures.

With 16 years of operation, Ratchaburi Power Plant strives to identify more stringent control measures, especially for maintenance activities and fire prevention to ensure workforce safety and continuation of its operations to the next nine-year service.

Safety and Occupational Health Management

Ratchaburi Power Plant, RATCH's main asset, implements OHSAS 18001 Safety and Occupational Health Management system, utilizes computer software for maintenance, and LOTO (Log Out Tag Out) as control measures to ensure work safety for employees and contractors.

The control measures prevent incidents and losses during operation. If there are any unsafe incidents, supervisors or involved parties will immediately stop the operation, which is the safety practices clearly specified by the power plant.

Operational Control Principles

Personnel

1) Personnel qualifications
2) Safety training
3) Coaching and on-the-job training
4) Task observation
5) Compliance with specific safety rules

Equipment/Machinery

1) Pre-job or regular safety inspection
2) Safety inspection and testing in accordance with laws
3) Equipment/machinery maintenance

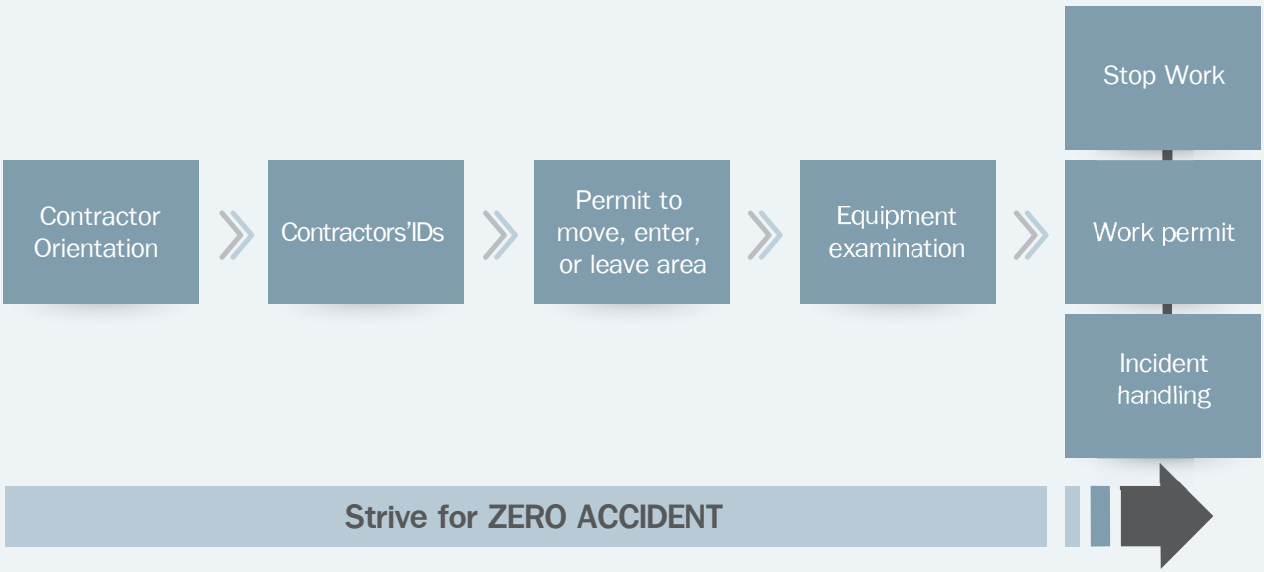
Work Environment

1) Work condition assessment before operation
2) Monitoring and analysis of work environment
3) Good workplace keeping after work

Stop Operation

1) Substandard actions
2) Substandard conditions
3) Change in scope of work or procedure
4) Emergency incident

Managing contractor safety



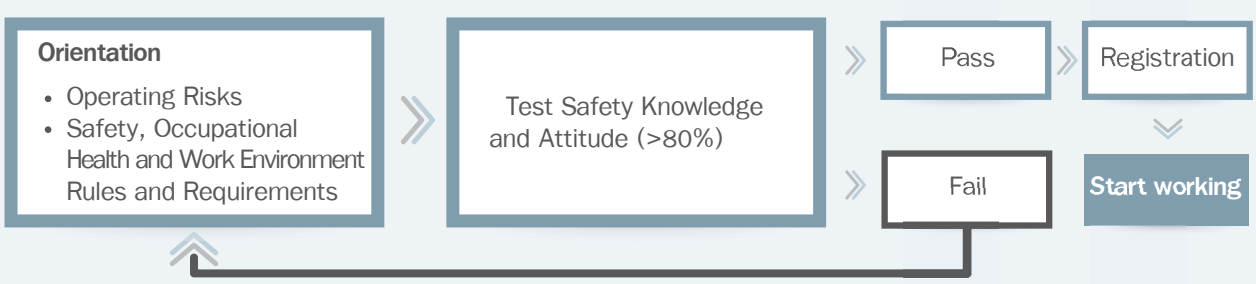
Contractor safety orientation

Contractor safety orientation is crucial, since it nurtures understanding and awareness of safe behavior and risk reduction during operation. Safe behavior is particularly more vital to high-risk activities described by laws such as working in confined space, crane operation, and diving. These activities require training, certification, medical examination, and a minimum of 80% passing of assessment of safety knowledge and attitude. Moreover, all contractors and sub-contractors must completely participate in the orientation program.

Health check-up List

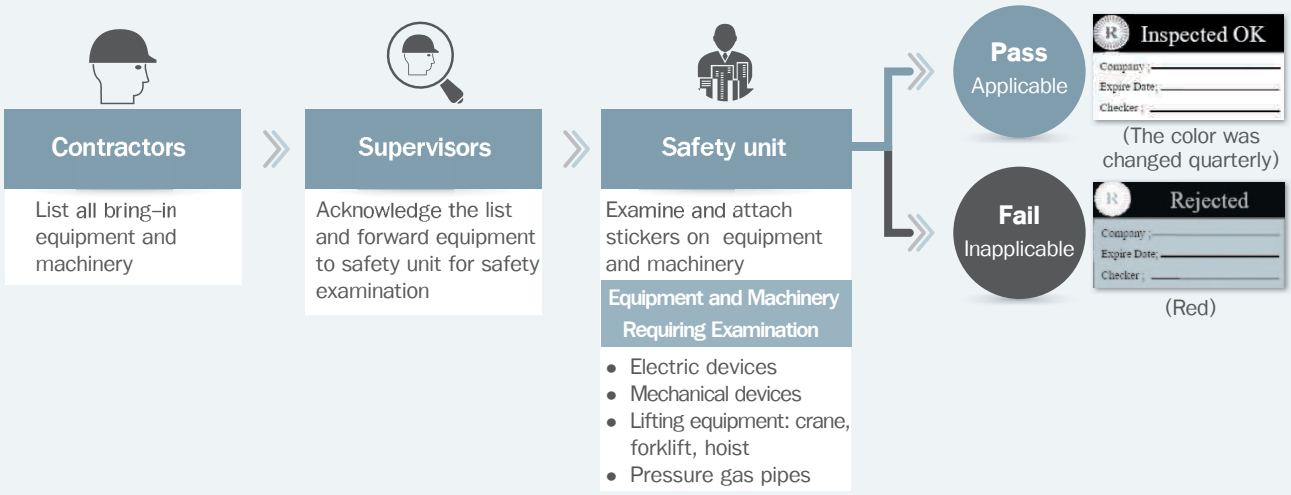
No.	Nature of job	General check-up	Chest X-ray	CBC	Cholesterol	Triglyceride	HDL	Glucose	SGOT	BUN	Urine Test for narcotics	EKG	Lung Function Test	Hearing Ability Test	Vision Test	Fit Test	Toxicology	Remark
1	Working in confined space	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
2	Hot work	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	Welder (lead and manganese)
3	Working with hazardous chemicals	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓				
4	Diving	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
5	Work at height	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
6	Working with radioactive materials	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
7	Crane operation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓				
8	Work with high-voltage electricity	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				

Contractor safety orientation procedure



Equipment examination procedure

Equipment generally plays a significance role in operation. Properly prepared equipment greatly reduces risks and accidents that could occur to the personnel during operation.

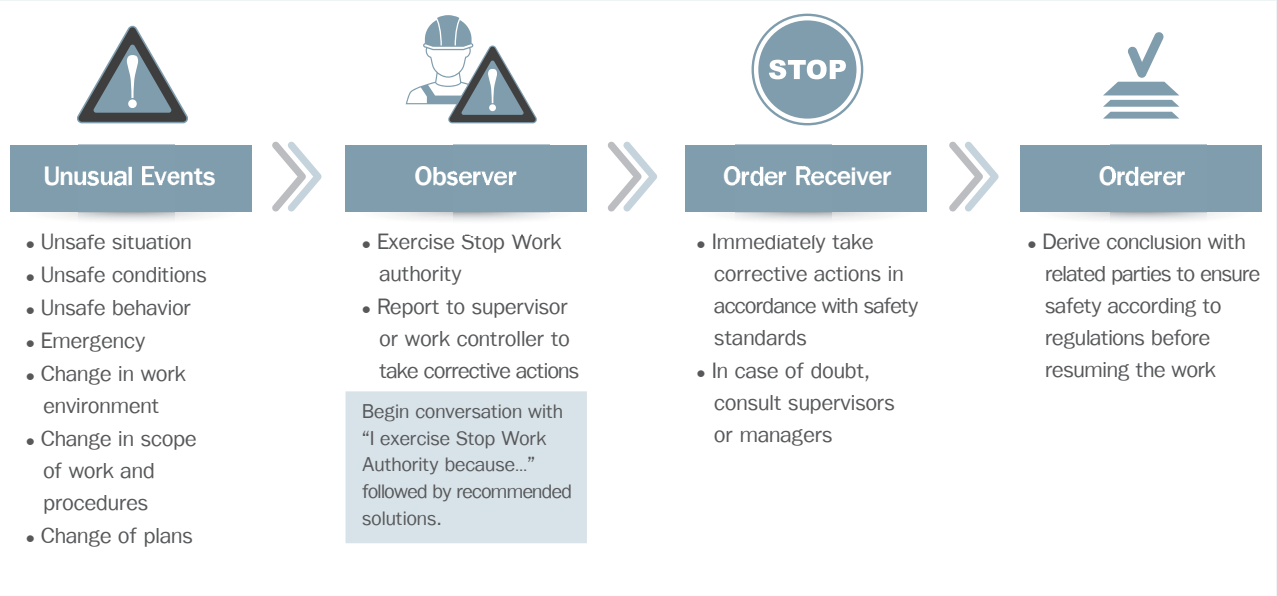


Work permit procedure

A work permit is a process designed to control and evaluate the readiness of personnel, equipment, tools, and personal protective equipment before starting work, effective from the beginning of work to closure. Before signing off a work permit, one must evaluate and ensure completeness of work. The work permit will be kept as evidence.

Stop work procedure

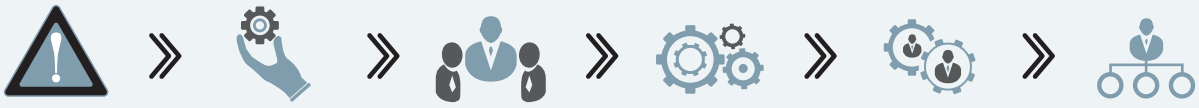
When any unsafe conditions or unsafe situation is noticed, the observer is to exercise stop work authority immediately. Task performers must stop working and correct the conditions or situation in accordance with safety standards. Once those corrective actions are fulfilled, the task owner can resume the work.



In 2016, there were a total of six 'Stop Work Authority' exercises. They effectively reduced potential accidents and losses due to unsafe or risky works. Of this, six times were caused by inappropriate use of equipment/machinery, without unsafe act by operators and or work conditions.

Incident investigation and reporting

In case of incidents, RATCH has in place a functional procedure to report, investigate and identify root causes to prevent recurrence, thus diminishing impacts on personnel, assets, processes, and the environment.



Incident
- Personnel
- Asset
- Processes
- Environment

Supervisor reports the incident to
- Superiors
- Area controller
- Safety Unit

Supervisor investigates root causes

Notify relevant departments to identify root causes and remedial actions to prevent recurrance.

Initiate remedial actions

Relevant Units to monitor progress

Report the completion of remedial actions and conclusion

Safety Activities

In addition to the control measures, RATCH has implemented safety and occupational health activities to raise awareness and discipline to prevent carelessness in both operation and daily life for all personnel. The ultimate goal is for safety behavior to become a safety culture at work and day-to-day life.

In 2016, Ratchaburi Power Plant and Ratchaburi-Power Power Plant initiated control measures and promotional activities to motivate all personnel to work safely. These activities are summarized below.

Power Plant	Safety Activities/System	Progress and Result
Ratchaburi Power Plant	1) **Lock Out Tag Out (LOTO)** ensures that dangerous equipment and machines are properly shut off by a designated person and cannot be started up again before the completion of his/her maintenance or servicing work.	• Using tag is not acceptable. Use a padlock instead. Key holders are the team leader, operator, supervisor, and contractor to ensure complete shut off while under maintenance • Adopt computer software to control the isolation of electricity to an equipment. However, a padlock still has final control of the isolation in case of software malfunction.
	2) **Online Work Order** system reduces document handling time when work requires a work permit by providing appropriate documents	• Allows quick approval of permit for day-to-day maintenance • Enable tracking of overall activities within the plant • Enable tracking of contractors' performance and random checking
	3) **Personnel-tracking** system to locate their whereabouts within the power plant in case of emergency	• Increase efficiency of employee tracking within the power plant in case of emergency
Ratchaburi Power	1) **Contractor Standard Improvement Program** Implement BS1139 British Standard regarding scaffolding for contractors with previous good performance to advance their capability to comply with laws and regulations.	• Raised awareness and performance of contractors to meet international standards • Reduced risks and improve operating safety within the power plant
	2) **Implementation of BAR-AAR Program (Before-Action Review and After-Action Review)** This program applies for high-risk activities by forging knowledge and learning for future operation. It requires operators to learn and prepare before working. Once they finish the work, operators review and provide critiques, especially potential hidden hazards.	• Raised quality of work instruction • Improved supervisor's skills and knowledge to provide safety orientation and presentation. • Operator must pass all orientation sessions before working.

Power Plant	Safety Activities/System	Progress and Result
Ratchaburi Power	**3) Safety Promotion** It was implemented on annual combustion inspection to promote compliance with laws and regulations, such as driving at 30-km/h speed limit within the plant, wearing helmets and safety belts. Management leads by example.	• Served as role models and promoted safety culture

Ratchaburi Power Plant Safety Statistics

Apart from categorizing accidents based on employees and contractors, Ratchaburi Power Plant includes impacts on service to further address the dimensions of impact from four to five: 1) Personnel 2) Assets 3) Production processes 4) Environment 5) Service.

Accidents Record	Personnel	Assets	Production processes	Environment	Service
	Number of times				
Company operator / EGAT operator (Number of people)					
Severity High	0	1	4	0	0
Severity Medium	2	0	11	0	0
Severity Low	0	6	5	0	1
Contractors / Subcontractor (Number of people)					
Severity High	1	0	0	0	0
Severity Medium	1	0	0	1	0
Severity Low	0	2	0	1	0

The accident records were in two groups:

1) RATCH's operators and EGAT's operators
2) Contractors and subcontractors. This is to analyze all potential risks relevant to their work, efficiently manage their work and tasks and finally reduce accidents at its root causes.

The recorded accident statistics were analyzed to find out the causes affected those two mentioned groups. After that, correction and prevention measures will be issued in order to prevent recurrence.

In 2016, the plant adopted the Disabling Index (DI) as a safety KPI. The target was zero. However, the actual record showed that DI was 0.006, meaning that the plant did not achieve its goal. This was due to two lost-workday cases. The plant has completed investigation. Root causes were identified and precautionary measures were implemented.

2016 Emergency Exercise

Aside from safety control measures, RATCH has in place functional emergency plans. The plans require designated personnel to be competent in responding to emergencies by training, exercises and drills. In addition, RATCH provides all necessary state-of-the art equipment so that emergency response will be efficient. Thus, adverse impacts of emergency will be alleviated.

Emergency	Ratchaburi	Tri Energy	Ratchaburi Power	Ratchaburi World Cogeneration	NNEG	Head Office
	Number of drills					
1st degree fire	27	1	13	1	-	1
2nd degree fire	1	-	2	1	1	-
3rd degree fire	1	-	-	-	-	-
Gas leak	4	1	-	-	-	-
Oil spill	1	1	-	1	-	-
Chemical spill	3	-	-	-	-	-
Radiation Leak	1	-	-	-	-	-
Natural disaster (storms/floods/earthquakes)	1 (Flood)	1 (Flood)	1 (Flood)	1 (Flood)	-	-
Snake bite	-	1	-	-	-	-
Elevator stuck	1	-	-	1	-	12
Community demonstration	-	-	Scheduled in 2017	-	-	-

Notes: NNEG cogeneration power plant began commercial operation on June 3, 2016

In 2016, Ratchaburi Power Plant conducted 40 emergency drills as follows:

Fires: 29 times

Chemical spills: 3 times

Gas leak: 4 times

Oil spill, radiation leak, elevator stuck, and floods: 1 of each

In addition, there were two major emergency exercises.

- 3rd degree fire simulation at Air Heater Side B of Ratchaburi Power Thermal Plant Unit 1 on September 23, 2016 (alternate practice every two years between Ratchaburi and Ratchaburi-Power Power Plant).
- 2nd degree fire simulation at the electrical equipment room of the chlorine building of the Ratchaburi Combine Cycle Plant Block 1 on June 28, 2016.

Lessons learned from the exercises were used for improvement as follows:

1) Fire-extinguishing training, such as usage of fire hoses
2) Better understanding of emergency exercise procedures.
3) Evaluation of firefighting and evacuation plans

Promotion of Occupational Health of Operators

RATCH values its operators' safety and occupational health, especially those facing high risk potential within power plants. RATCH has implemented three core components in occupational health care as follows:

1) Annual medical examination and special checkup program

Ratchaburi Power Plant, RATCH's principal plant, requires all personnel to undergo an annual medical examination and a special checkup program in accordance with respective job functions. This is to monitor and confirm no work-related health issues on operators and maintenance crews who work at the plant. In 2016, all workers of contractors responsible for operation and maintenance passed a health check-up program. The findings from the hearing test, visual test, and pulmonary function test were used to develop risk minimization measures as follows:

Hearing-loss prevention measures

1) Relocate high-risk personnel into lower-risk areas
2) Avoid loud noise exposure by using PPE
3) Develop hearing-loss conservation plan

Pulmonary prevention measures

1) Avoid areas with high dust, smoke, chemicals and wear PPE
2) Campaign to stop smoking

Visual impairment prevention measures

1) Appropriate use of glasses and annual eye examination
2) Use of PPE to reduce exposure to dust, chemicals, and welding fumes
3) Appropriate use of eyesight and regular eye relief

2) Fostering a better work environment

Ratchaburi Power Plant strives to provide a better work environment by implementing control measures of noise, lighting, heat, chemical exposure, and air condition. Monitoring data every six months show parameters are within established standards announced by the Ministry of Industry and the Department of Labor Protection and Welfare.

To further better the work environment and risk reduction, it adjusted all workplace factors, such as low lighting to comply with standards. All less-frequent activities were provided with additional equipment. This helps ensure appropriateness of work environment and reduce related risks.

3) Promotion of personnel health

- Stop smoking

Ratchaburi Facility

Implemented a project entitled "Foot reflexology to stop smoking": Ratchauburi power plant and the Health Promotion Hospital of Tambon Don Sai encouraged gradual withdrawal and smoking cessation.

Goal: More than 50% of project participants quit smoking.

Result :

- 7 attendees out of 12 successfully quit smoking, with 1 from company's operators and 6 from the operation and maintenance unit, accounting for 58.33%.
- All 12 attendees had lung carbon monoxide reduced from 14.41 to 6.58 ppm. This accounted for 54% decrease in carbon monoxide.

Ratchaburi-Power

Implemented a project entitled "Withdrawal and quit smoking for everyone's health". Ratchaburi Power and with Fa Sai Clinic of Ratchaburi Hospital raised awareness about the effects of smoking. Not only, this project monitored all attendees' lung CO, but also prevented potential fire outbreak.

Goal: More than 85% of project participants quit smoking.

Result:

- 4 attendees out of 8 successfully quit smoking, with 1 operator and maintenance, 2 gardeners, and 1 safety officer. This accounts for 50%.
- All 8 attendees had lung carbon monoxide reduced from 8–25 to 0.2 ppm.

Interviews of participating operator who successfully quit smoking

Mr. Pran Punyawansiri,

Officer of Engineering and Efficiency Control Department of Ratchaburi Power Plant

"I started smoking in my 3rd year in college (four years ago) because I thought smoking could lower my stress when doing projects and help me get along with friends. I began to smoke more two years ago. It was about half a packet a day (10 cigarettes). After that, I went for a health checkup, and the result showed an abnormal heart rate due to high carbon monoxide in my blood. My family wishes I would stop smoking. I tried to stop smoking by going cold turkey. When the company introduced reflexology, I was interested because I thought it would help relieve my craving for cigarettes. I joined the program, and the officers told me about the positive health effects even with some abnormality sign present. I became encouraged and attended every session until I realized that reflexology indeed helps with the craving. At present, I have stopped smoking. My resolution is to quit smoking forever as a way to dedicate the good deed to His Majesty the late King Bhumibol, which is an objective of the program."

- Drug Abuse Prevention Program

Ratchaburi Facility | **Ratchaburi-Power**

Goal

To be certified for its power plants that meet the Drug Abuse Prevention and Corrective Actions Standard in accordance with Department of Welfare and Labor Protection

Practices

- Maintain a policy regarding drug prevention and corrective actions.
- Communicate the policy and targets with employees for mutual understanding and implementation.
- Appoint a committee or responsible party to implement the plan.
- Keep records of all documents regarding the implementation of drug prevention and corrective actions system.
- Monitor and control employees and external parties to prevent drug abuse on business premises.
- Conduct campaigns at the sites.
- Random urine test for drug abuse. Regularly inspect high-risk areas for drug abuse.

Result

No drug abuse found in the random employees.

- Other health promotional activities

Operators' waistline reduction at Ratchaburi Power Plant

Goal

60% of operators with average waistlines (Female waistline below 80 cm / Male waistline below 90 cm)

Result

71.1% of operators have average waistline (goal achieved). 28.9% have beer gut.

Hearing-loss conservation at Ratchaburi Power Plant

Goal

Operators lost hearing of noise under 15 dB(A) on either side when compared with 2015

Result

Hearing loss of operators of noise under 5 dB(A) on either side when compared with 2015

Respect for Human Rights

RATCH is well aware that human rights are becoming globally recognized and increasingly critical for its sustainability. Through these years, RATCH has responsibly conducted business and respected stakeholders' human rights based on laws, standards, and acceptable social norms. Its implementation covers various aspects, namely employing neither child labor nor forced labor, complying with laws, adopting safety standards in workplaces, encouraging community engagement, and protecting the environment.

In 2016, RATCH determined its intention on human rights as one aspect of the code of conduct, which was enforced in February 2016 and posted on www. ratch.co.th to inform the stakeholders.

- RATCH must conduct its business and activities by strictly complying with the principles of basic human rights. It educates the employees about these principles so that they can incorporate them in their jobs and do not support any acts that violate the principles.
- RATCH respects and abides by enforced laws and regulations in the business to ensure that its operations are safe and responsible for all stakeholders.
- RATCH fairly and equally treats all stakeholders without any discrimination against races, religions, genders, skin colors, and social and financial status
- RATCH treats all employees with respect for their human dignity and promotes gender equality at the workplace.
- RATCH always takes part in improving the quality of life of people in surrounding communities.
- RATCH will convince its suppliers to treat their employees and communities based on the principles of basic human rights.

- Protect employees' personal information kept at the company without disclosing, handing over, or transferring it to anyone who is not involved. The information that requires protection includes personal profiles, medical records, work background, and other personal information.
- All employees must treat one another with respect and accept or respect different opinions.
- Should not express opinions about races, religions, genders, social and financial status, education, or other matters that will cause conflict.
- All employees are strictly prohibited from taking any actions that physically or mentally oppress others, using violence or force to hurt others, or doing anything unfair to others at the workplace.
- All employees have rights and freedom to exercise their political rights, such as supporting or being a member of political party, voting in election campaigns, or exercising other political rights.

- Classify personal information as confidential information. Access is limited to authorized parties who clearly need to use such information for business purposes only.
- Once authorized, fairly and honestly use the personal information for indicated purposes only.
- Store personal information as required, in compliance with laws, regulations, and appropriate business needs.
- Be aware of privacy laws in Thailand, especially when transferring data out of the home country. Discuss with the consultants of privacy rights or people who work on information protection to define and comply with legal requirements.
- Do not disclose any personal profiles or confidential documents of RATCH unless authorized by the CEO or person (s) assigned by the CEO.
- Store and destroy personal profiles or confidential documents of RATCH in a timely manner under the company's terms and conditions along with related regulations.

Enhancing Awareness of Human Rights

In 2016, RATCH hosted human rights training for 31 middle and top management under the following topics:

- Background and development of human rights principles
- Understanding of human rights, consisting of rights, freedom, equality, and fairness or human dignity
- Partnership of human rights treaties ratified by Thailand
- International Covenant on Economic, Social and Cultural Rights (ICESCR)
- Background on “business and human rights”
- Human rights impacts on business conduct
- Standards related to business and human rights.

From these training sessions, the management understood the significant meanings and corporate responsibility for human rights. The awareness would lead them to comprehensively ponder both positive and negative impacts on business operations and sustainability before making any decision.

Future moves:

- Hold training sessions to forge awareness and recognition of human rights among operating employees
- Provide fundamental data on politics, races, religions, traditions, cultures, and beliefs of several countries that are RATCH’s investment targets so that the operators can preliminarily master them.
- Study the principles and methods of human rights risk assessment that meet the standard or are globally accepted as guidelines for developing the process of human rights risk assessment.

Equal and Fair Labor Practice

RATCH realizes employee quality and diversity which commits us to ensure no unjustified discrimination in human resource management, ranging from employment to compensations. Aside from compliance with the labor requirements, the company formulated relevant criteria by taking into account the business appropriateness, ability to forge employee inspiration and to strengthen talent retention as well as business conditions overall. These guidelines were applied to all employees, regardless of genders based on fair and equal treatment. In 2016, capabilities, experiences and expertise of candidates were taken into consideration for hiring. Meanwhile, compensations and career growth of all employees were determined based mainly on their performance and competency.

To raise the employee participation, the company welcomes their feedbacks, recommendations and opinions via the following channels:

- Welfare Committee In 2016, there was no recommendation from the employee representative.
- Safety, Occupational Health, and Working Environment Committee This year, there was no recommendation from the employee representative
- Employee clubs that were established based on the employees’ interests, with the company financial supports There was no club established during 2016.

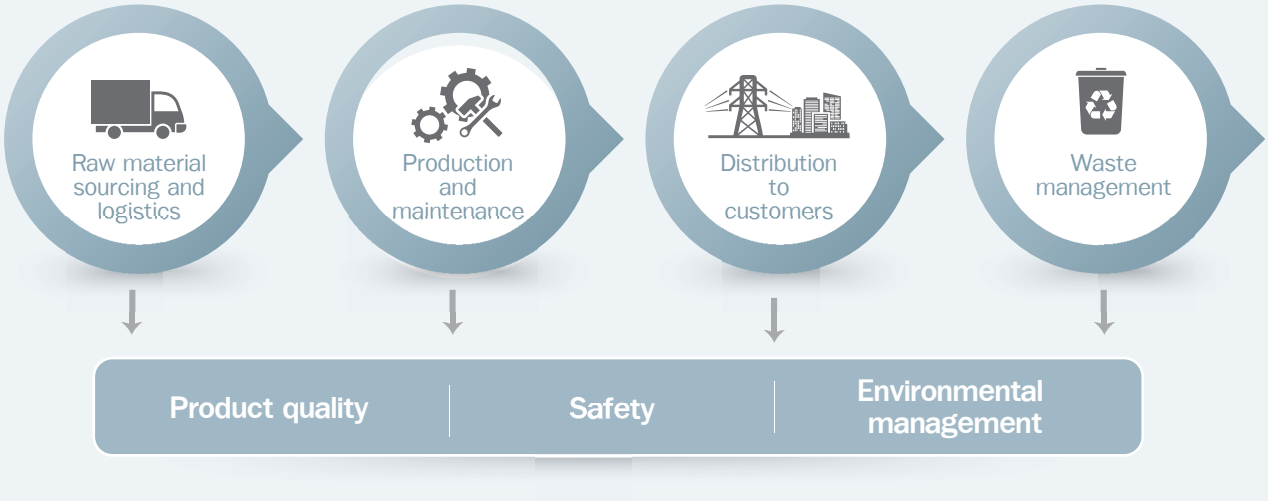
Product Responsibility

The main product of the power generation business is electrical energy-invisible and intangible-derived from using the heat from fuel combustion to drive generators. Our primary responsibility is to maintain the reliability of operations that secures the country's electricity system and capacity, which is the driver of national economic growth and the quality of life of the public.

Each unit of power generated requires resource input and emits outputs. The range of our responsibilities includes overseeing and controlling operations to be safe for the environment and communities while keeping up the quality and quantity of our customers' orders.

Power Product Life Cycle

Our responsibility to power products concerns life cycle assessment of all processes.



There are four key processes in the life cycle of power product: raw material sourcing, production and maintenance, distribution to customers, and waste management. The management and control of these processes need to consider three significant issues that ultimately reflect power plant responsibility for its products:

- Product quality, namely, electrical voltage and availability: This refers to the ability to generate electricity as agreed and stipulated in the power purchase agreement (PPA) and to maintain the reliability of the national power system. All power plants therefore bear the duty of both generating electricity at the required voltage and maintaining availability.
- Power plant operating safety: All power plants have clear safety measures and targets. More details can be found on page 110.
- Management of environmental impacts from power plant operations and resource consumption: It is part of our duties to abide by all related regulations and satisfy stakeholders' expectations about the environment. More details can be found on page 66.

Product Quality Control

The key indicator of product quality is power plant efficiency. Managing efficiency to ensure generating capacity at a required voltage has significant economic and social impacts for the country. As power cannot be stored, operations must be ready at the time of need at the voltage that is compatible within customers' power grids. Power plants must therefore manage their reliability and availability as committed to customers. This year, most of our power plants successfully maintained reliability targets and met customer demand.

2016							
Power plant	Installed capacity (MW)	Equivalent Availability Factor: EAF		Reliability Factor: RF		Dispatch Factor: DF	
		Target %	Actual %	Target %	Actual %	Target %	Actual %
Ratchaburi Thermal Power Plant Unit 1	735	85.01	**96.42**	95.47	**96.42**	25.00	**21.50**
Ratchaburi Thermal Power Plant Unit 2	735	85.01	**97.75**	95.47	**97.75**	25.00	**28.01**
Ratchaburi Combined-Cycle Power Plant Unit 1	725	87.68	**92.99**	92.96	**95.65**	70.00	**90.02**
Ratchaburi Combined-Cycle Power Plant Unit 2	725	87.68	**88.60**	87.68	**96.51**	70.00	**89.76**
Ratchaburi Combined-Cycle Power Plant Unit 3	725	85.20	**93.09**	92.83	**95.75**	70.00	**81.32**
Tri Energy Power Plant	700	93.31	**72.58**	98.63	**78.42**	80.00	**70.58**
Ratchaburi Power Combined-Cycle Power Plant Unit 1	700	93.00	**92.80**	98.00	**94.70**	60.00	**75.92**
Ratchaburi Power Combined-Cycle Power Plant Unit 2	700	88.90	**90.70**	98.00	**96.80**	60.00	**79.81**
Ratchaburi World Cogeneration Power Plant	234	100.00	**97.73**	100.00	**99.83**	80.00	**81.73**
NNEG Cogeneration Power Plant	139.13	97.50	**96.55**	-	**98.27**	-	**74.23**

* Started commercial operations on June 3, NNEG Cogeneration Power Plant is now in process of setting RF and DF goal.

Note: *1) Equivalent Availability Factor (EAF) refers to the percentage of time that a power plant can generate electricity as ordered by customers or as planned, including maintaining the level of electricity generation and availability to feed to the power grid.*

2) Reliability Factor (RF) refers to the percentage of time that a power plant can maintain the availability of operations without unplanned shutdowns.

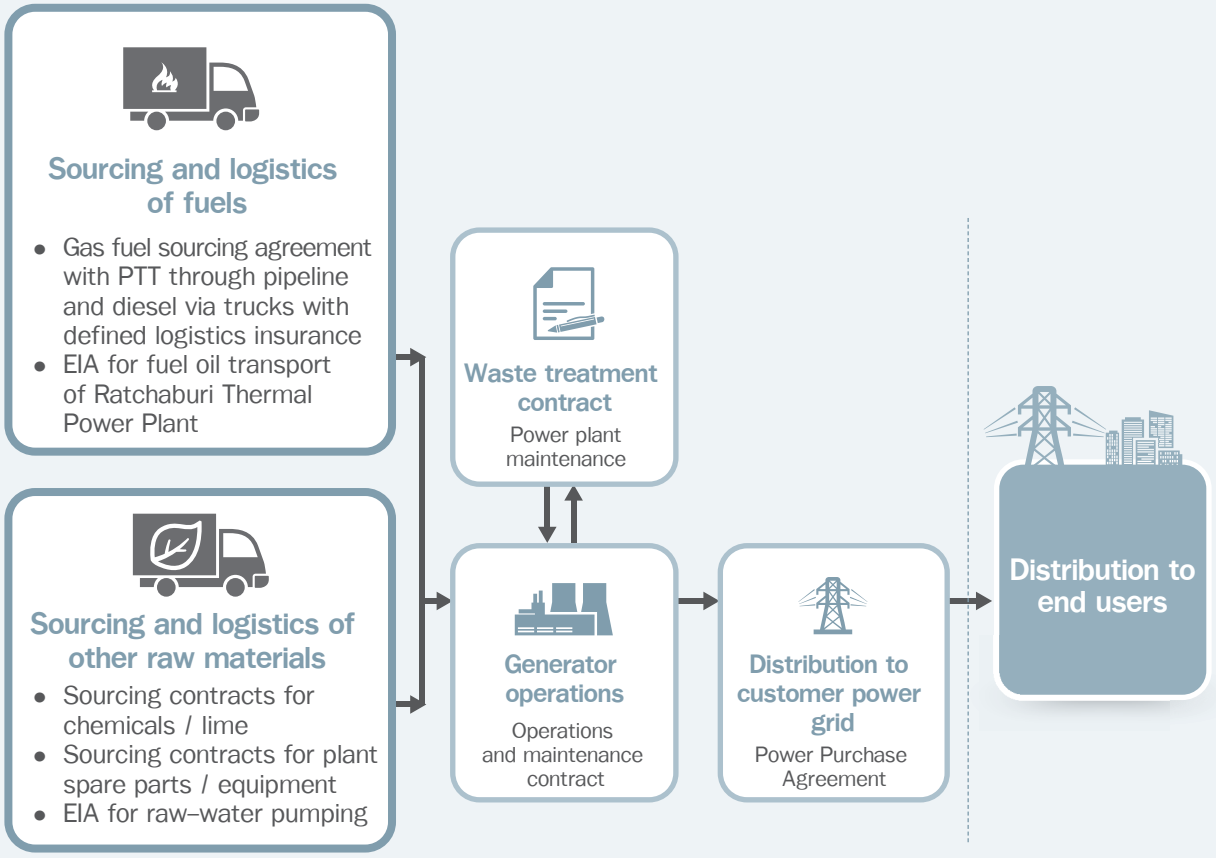
3) Dispatch Factor (DF) refers to the percentage of time that a power plant can generate electricity to the required level as ordered in that period

Ratchaburi Power Plant's Approach to Product Responsibility

Ratchaburi Power Plant, Thailand's main power plant, boasts a capacity of 3,645 MW (accounting for 52% of RATCH's total capacity). The plant also acts as a swing producer to maintain the power system security for the Central, Western and upper Southern regions of Thailand. Our management approach therefore focuses on environmentally friendly operations with a committed standard of product quality.

Note that, as a private operator with a generation concession from EGAT, RATCH does not interact directly with the end power consumers.

Ratchaburi Power Plant Operations in Brief



Sourcing key raw materials for power generation

- Fuel-Most fuels are controlled through long-term sales agreements executed since the start of commercial operations, such as natural gas, fuel oil, and diesel sales agreements with PTT Public Company Limited. These contracts cover transportation/transmission safety, leak monitoring, and logistics insurance with the delivery point at power plants. There are also EIA regulatory controls on fuel oil delivery to Ratchaburi Thermal Power Plant, on top of other regulations.

- Raw water-Permission to construct a water pumping station was granted by the Marine Department. The station is operated under EIA regulatory control, specifically for pumping raw water for operations.

- Power plant spare parts and equipment, chemicals and lime - Long - term contracts including complete insurance are made for these raw materials.

Power plant operations and maintenance

- **Operations:**
  Large power plants such as Ratchaburi Power Plant (capacity of 3,645 MW) rely on fuel and water sourcing via pipeline, laid underground into the plant. The pipes are equipped with monitoring sensors and leak stoppage systems. There are also periodic inspections and maintenance specified by regulatory standards to ensure prevention of contamination.

- **Planned maintenance:**
  Maintenance work is defined in three categories:

- Major overhaul-commissioned every six years
- Minor inspection-commissioned every two years
- Combustion inspection (for combined-cycle power plants)-commissioned every year

- Most maintenance work is outsourced to EGAT, recognized as a skilled operator for parts-replacement with clear work plans to ensure maintenance activities work as planned and plants' resumption of operations within planned periods.

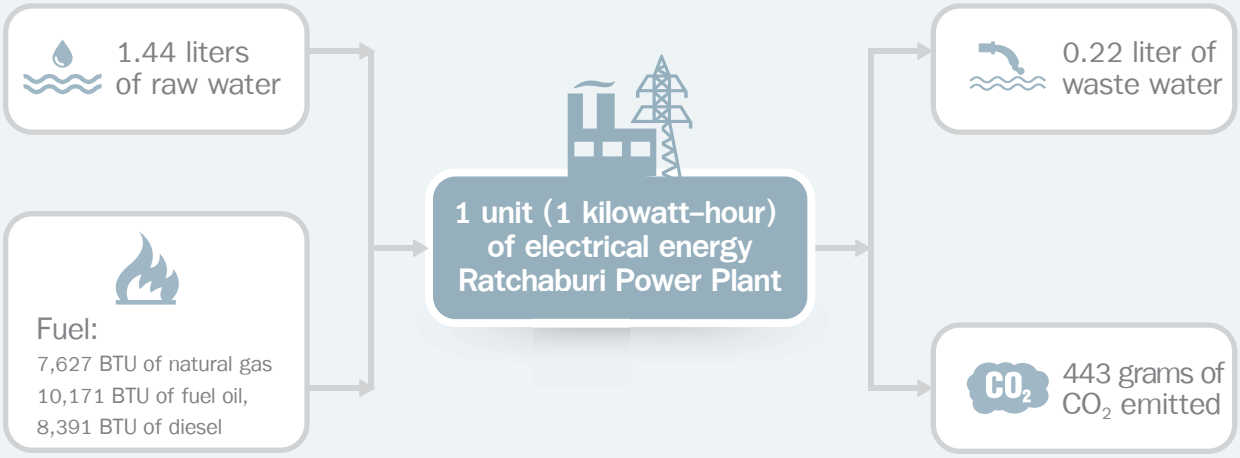
Waste management

- There are procedures to control and monitor emissions from the operations, including exhaust and waste water, via online systems at all times to ensure that emission levels are within the regulatory limits. The systems report results to control rooms and the Department of Industrial Works.

- The management of waste generated from maintenance activities at all plants is outsourced to companies permitted by the Department of Industrial Works to handle specific types of waste. RATCH's power plants also periodically conduct random audits on these companies to make sure that their operations are in full compliance with applicable environmental standards and report results to related government agencies.

Overall resource consumption and CO_2 emission per power unit

For every unit or every kilowatt-hour of power generated at Ratchaburi Power Plant, the rate of resource consumption is close to the rate of emission per unit. Occasionally, consumption is higher due to maintenance activities or plant start-ups.

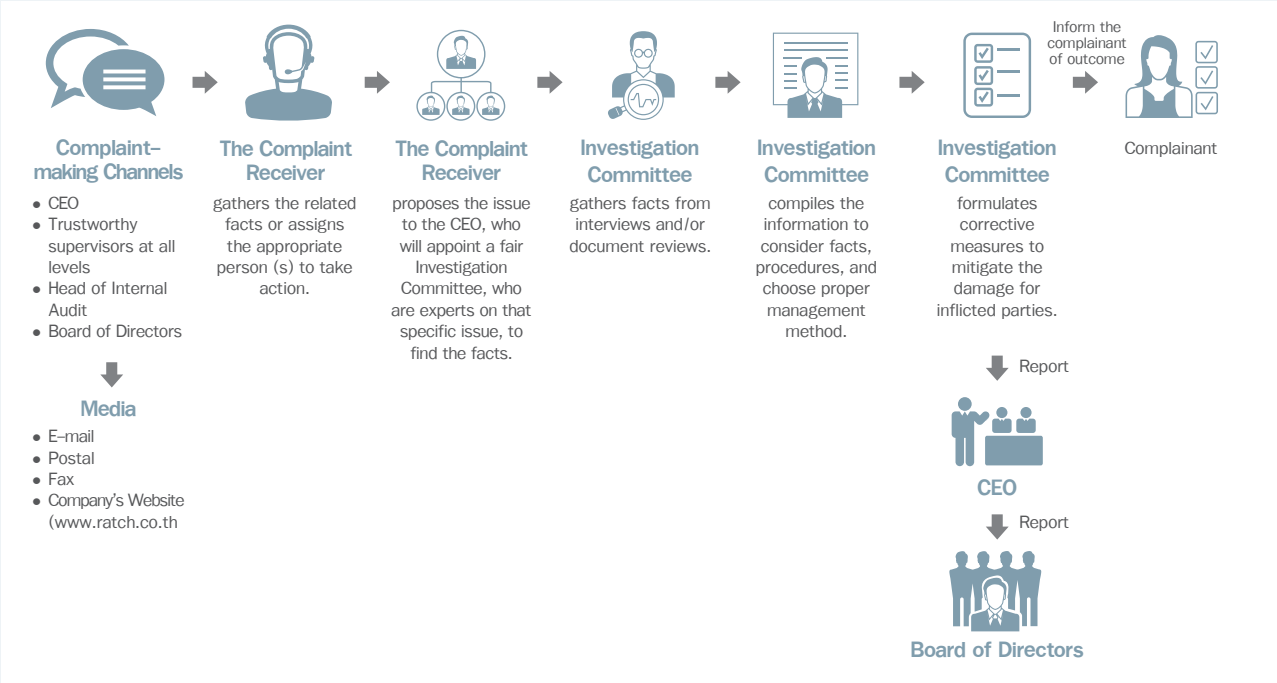


This year, Ratchaburi Power Plant tested upgrades of its coolant systems from an alkali-based to an acidic-based system, expecting water consumption per unit (1 kilowatt-hour) decreasing by 0.1 liter, that is, from 1.54 liters to 1.44 liters. This will lead to a reduction in water consumption by 4.05 million cubic meters per year and a decrease of greenhouse gas emissions by 845 tons per year.

For 16 years, RATCH has constantly made these efforts in its business to maintain its responsibility for the generation of power as required by end-users while ensuring the wellbeing of the environment, safety, community, and society.

Complaint-making Channels, Complaint Handling, and Protection Measures

The company provides channels for complaints, comments, or recommendations from stakeholders who are affected by the operations of RATCH, including the management and employees who breach the Code of Conduct or violate laws. RATCH also includes written processes of complaint-receiving and investigation in its Code of Conduct.



Measures to prevent retaliation and mitigate damage for whistleblowers or complainants

RATCH will fairly protect the whistleblowers, complainants, or cooperative people in the fact-finding process by using the following guidelines:

1. Whistleblowers, complainants, or cooperative people can opt to remain anonymous if they foresee the potential danger or damage. On the contrary, if they disclose their identities, RATCH can report to them the results or mitigate the damage more rapidly.
2. RATCH deems the related information confidential and will disclose it only to problem-solving parties in charge because of its concerns for the safety and damage of whistleblowers and related parties.
3. If the complainants are concerned about their safety or potential threats, they may request proper protection measures from RATCH. If foreseeing the possibility of threats or harm, RATCH may set protection measures on its own, without a request from complainants.
4. RATCH takes suitable, fair remedial process to help the complainants.

Although the above process and measures started in 2016, RATCH needs to follow up and evaluate the outcomes and continuously communicate with all employees and stakeholders.

Performance Data

Abbreviation

RATCH = Ratchaburi Electricity Generating Holding PCL.
RATCHGEN = Ratchaburi Power Plant
TECO = Tri Energy Power Plant
RPCL = Ratchaburi Power-Power Plant
RW COGEN = Ratchaburi World Cogeneration Power Plant
RAC = RATCH-Australia Corporation Limited
RL = RATCH-Lao Services Company Limited

Economic

Data	Unit	2016	2015	2014
Revenues	Million THB	**51,279.88**	59,326.30	54,969.75
Operating costs	Million THB	**41,623.27**	50,616.66	47,913.68
Employee wages and benefits	Million THB	**639.39**	624.26	628.49
Dividend to all shareholders	Million THB	**3,407.50**	3,291.50	3,291.50
Payments to government	Million THB	**1,054.91**	1,829.75	1,651.27
Community investments	Million THB	**68.67**	101.01	91.37
Spent on local suppliers				
Operations in Thailand[1]	Million THB	**78,875.27**	105,103.07	62,542.26
Operations in Australia	Million AUD	**24.27**	26.23	45.21
Spent on foreign suppliers				
Operations in Thailand[1]	Million THB	**1,170.54**	805.23	2,082.28
Operations in Australia	Million AUD	**0.07**	0.32	3.33

[1] Operations in Thailand include RATCH, RATCHGEN, TECO, RPCL and RW COGEN.

Health and Safety[2]

Data		Unit	2016	2015	2014
Total workforce represented in formal joint management–worker health and safety committees					
RATCH		persons (%)	**13 (5.00%)**	11 (4.37%)	11 (4.35%)
RATCHGEN		persons (%)	**15 (2.79%)**	15 (2.74%)	15 (2.72%)
TECO		persons (%)	**13 (22.41%)**	9 (16.07%)	9 (15.79%)
RPCL		persons (%)	**11 (6.63%)**	11 (6.67%)	11 (7.01%)
RW COGEN		persons (%)	**9 (27.27%)**	11 (37.93%)	9 (40.91%)
RAC		persons (%)	**6 (31.58%)**	6 (30.00%)	6 (30.00%)
Number of Fatalities by Gender					
Total workforce		persons (Male : Female)	**0 : 0**	0 : 0	0 : 0
Independent Contractors		persons (Male : Female)	**0 : 0**	0 : 0	0 : 0
Number of Fatalities by Region					
Thai		persons	**0**	0	0
Australian		persons	**0**	0	0
Number of Fatalities by Gender					
RATCH	Total workforce	persons (Male : Female)	**0 : 0**	0 : 0	0 : 0
	Independent Contractors	persons (Male : Female)	**0 : 0**	0 : 0	0 : 0

Health and Safety[2]

Data		Unit	2016	2015	2014
RATCHGEN	Total workforce	persons (Male : Female)	**3 : 0**	1 : 0	0 : 1
	Independent Contractors	persons (Male : Female)	**1 : 0**	3 : 0	6 : 0
TECO	Total workforce	persons (Male : Female)	**0 : 0**	0 : 0	0 : 0
	Independent Contractors	persons (Male : Female)	**1 : 0**	0 : 0	0 : 0
RPCL	Total workforce	persons (Male : Female)	**0 : 0**	0 : 0	1 : 0
	Independent Contractors	persons (Male : Female)	**0 : 0**	0 : 0	0 : 0
RW COGEN	Total workforce	persons (Male : Female)	**0 : 0**	0 : 0	0 : 0
	Independent Contractors	persons (Male : Female)	**1 : 0**	0 : 0	0 : 0
RAC	Total workforce	persons (Male : Female)	**0 : 0**	0 : 0	0 : 0
	Independent Contractors	persons (Male : Female)	**0 : 0**	0 : 0	0 : 0
Number of Injuries by Region					
Thai		persons	**6**	4	8
Australian		persons	**0**	0	0
Injury Rate (IR)					
RATCH	Total workforce	No/200,000 Hours worked	**0.00**	0.00	0.00
	Independent Contractors	No/200,000 Hours worked	**0.00**	0.00	0.00
RATCHGEN	Total workforce	No/200,000 Hours worked	**0.50**	0.16	0.16
	Independent Contractors	No/200,000 Hours worked	**0.49**	0.69	2.87
TECO	Total workforce	No/200,000 Hours worked	**0.00**	0.00	0.00
	Independent Contractors	No/200,000 Hours worked	**0.62**	0.00	0.00
RPCL	Total workforce	No/200,000 Hours worked	**0.00**	0.00	0.46
	Independent Contractors	No/200,000 Hours worked	**0.00**	0.00	0.00
RW COGEN	Total workforce	No/200,000 Hours worked	**0.00**	0.00	0.00
	Independent Contractors	No/200,000 Hours worked	**0.53**	0.00	0.00
RAC	Total workforce	No/200,000 Hours worked	**0.00**	0.00	0.00
	Independent Contractors	No/200,000 Hours worked	**0.00**	0.00	0.00
Total number of occupational diseases					
Total workforce		persons (Male : Female)	**0 : 0**	0 : 0	0 : 0
Independent Contractors		persons (Male : Female)	**0 : 0**	0 : 0	0 : 0
Occupational Diseases Rate (ODR)					
Total workforce		No/200,000 Hours worked	**0**	0	0
Independent Contractors		No/200,000 Hours worked	**0**	0	0
Total number of lost day					
RATCH	Total workforce	days (Male : Female)	**0 : 0**	0 : 0	0 : 0
	Independent Contractors	days (Male : Female)	**0 : 0**	0 : 0	0 : 0
RATCHGEN	Total workforce	days (Male : Female)	**13 : 0**	0 : 0	0 : 0
	Independent Contractors	days (Male : Female)	**0 : 0**	42 : 0	0 : 0

Health and Safety[2]

Data		Unit	2016	2015	2014
TECO	Total workforce	days (Male : Female)	**0 : 0**	0 : 0	0 : 0
	Independent Contractors	days (Male : Female)	**1 : 0**	0 : 0	0 : 0
RPCL	Total workforce	days (Male : Female)	**0 : 0**	0 : 0	0 : 0
	Independent Contractors	days (Male : Female)	**0 : 0**	0 : 0	0 : 0
RW COGEN	Total workforce	days (Male : Female)	**0 : 0**	0 : 0	0 : 0
	Independent Contractors	days (Male : Female)	**0 : 0**	0 : 0	0 : 0
RAC	Total workforce	days (Male : Female)	**0 : 0**	0 : 0	0 : 0
	Independent Contractors	days (Male : Female)	**0 : 0**	0 : 0	0 : 0
Lost Day Rate (LDR)					
RATCH	Total workforce	No/200,000 Hours worked	**0.00**	0.00	0.00
	Independent Contractors	No/200,000 Hours worked	**0.00**	0.00	0.00
RATCHGEN	Total workforce	No/200,000 Hours worked	**2.15**	0.00	0.00
	Independent Contractors	No/200,000 Hours worked	**0.00**	9.61	0.00
TECO	Total workforce	No/200,000 Hours worked	**0.00**	0.00	0.00
	Independent Contractors	No/200,000 Hours worked	**0.62**	0.00	0.00
RPCL	Total workforce	No/200,000 Hours worked	**0.00**	0.00	0.00
	Independent Contractors	No/200,000 Hours worked	**0.00**	0.00	0.00
RW COGEN	Total workforce	No/200,000 Hours worked	**0.00**	0.00	0.00
	Independent Contractors	No/200,000 Hours worked	**0.00**	0.00	0.00
RAC	Total workforce	No/200,000 Hours worked	**0.00**	0.00	0.00
	Independent Contractors	No/200,000 Hours worked	**0.00**	0.00	0.00
Absentee Days*					
RATCH	Total workforce	days (Male : Female)	**358 : 591**	299 : 509	230 : 427
RATCHGEN	Total workforce	days (Male : Female)	**2,275 : 1,217**	2,151.5 : 1,202	2,476 : 831.5
TECO	Total workforce	days (Male : Female)	**267 : 43**	237.5 : 45.5	248 : 41
RPCL	Total workforce	days (Male : Female)	**665.5 : 162**	473.5 : 188	541.5 : 178
RW COGEN	Total workforce	days (Male : Female)	**14 : 19**	12 : 17	9 : 13
RAC	Total workforce	days (Male : Female)	**27 : 3.5**	21 : 14	31 : 10
Absentee Rate (AR)*					
RATCH	Total workforce	% (Male : Female)	**1.01 : 1.87**	0.80 : 1.39	0.82 : 1.20
RATCHGEN	Total workforce	% (Male : Female)	**2.26 : 2.73**	2.09 : 2.68	2.38 : 1.87
TECO	Total workforce	% (Male : Female)	**2.72 : 2.54**	2.58 : 2.43	2.57 : 2.46
RPCL	Total workforce	% (Male : Female)	**2.20 : 1.93**	1.60 : 2.12	1.90 : 2.18
RW COGEN	Total workforce	% (Male : Female)	**0.72 : 1.28**	1.18 : 1.70	0.83 : 1.63
RAC	Total workforce	% (Male : Female)	**0.89 : 0.25**	0.56 : 1.50	0.83 : 1.07

[2] Presented information covers data of RATCH, RATCHGEN, TECO, RPCL, RW COGEN and RAC.
All employees of RATCH, RATCHGEN, TECO, RPCL, RW COGEN are Thai, and RAC's employees are Australian and Thai.
Total workforce includes employees and contractors' employees including operation and maintenance provider.
Independent contractor is a number of employees of sub-contractors.
*Absentee days and rate excludes information of independent contractors.

People[3]

Data	Unit	2016		2015		2014	
		Male	Female	Male	Female	Male	Female
Total Employee	Persons	**439**		479		366	
	Persons	**294**	**145**	322	157	229	137
Employee by employment contract							
Permanent	Persons	**290**	**145**	299	140	227	137
Temporary	Persons	**4**	**0**	23	17	2	0
Employee by age group							
<30 years	Persons	**154**	**21**	165	33	84	32
30-50 years	Persons	**96**	**111**	106	111	98	94
>50 years	Persons	**44**	**13**	51	13	47	11
Employee by category							
Top Management	Persons	**13**	**3**	15	3	11	3
	%	**2.96**	**0.68**	3.13	0.63	3.01	0.82
Middle Management	Persons	**38**	**12**	34	9	27	9
	%	**8.66**	**2.73**	7.10	1.88	7.38	2.46
Junior Management	Persons	**44**	**35**	39	35	43	35
	%	**10.02**	**7.97**	8.14	7.31	11.75	9.56
Officer	Persons	**197**	**95**	227	102	148	90
	%	**44.87**	**21.64**	47.39	21.29	40.44	24.59
Worker	Persons	**2**	**0**	7	8	-	-
	%	**0.46**	**0.00**	1.46	1.67	-	-
Employee by Nationality							
Thai	%	**61.73**		56.16		66.42	
Lao	%	**34.17**		40.29		28.57	
Australian	%	**4.10**		3.55		4.76	
Other	%	**0.00**		0.00		0.25	
New Hires by Age Group							
<30 years	Persons	**26**	**9**	94	13	59	12
	%	**5.9**	**2.1**	19.6	2.7	16.1	3.3
30-50 years	Persons	**6**	**5**	6	7	15	14
	%	**1.4**	**1.1**	1.3	1.5	4.1	3.8
>50 years	Persons	**2**	**0**	2	0	5	2
	%	**0.5**	**0.0**	0.4	0.0	1.4	0.5
Total	Persons	**34**	**14**	102	20	79	28
	%	**7.7**	**3.2**	21.3	4.2	21.6	7.7
Turnover by Age Group							
<30 years	Persons	**15**	**4**	3	3	8	5
	%	**3.4**	**0.9**	0.6	0.6	2.2	1.4

People[3]

Data	Unit	2016		2015		2014	
		Male	Female	Male	Female	Male	Female
30-50 years	Persons	**6**	**3**	8	2	5	7
	%	**1.4**	**0.7**	1.7	0.4	1.4	1.9
>50 years	Persons	**5**	**1**	5	1	2	0
	%	**1.1**	**0.2**	1.0	0.2	0.5	0.0
Total	Persons	**26**	**8**	16	6	15	12
	%	**5.9**	**1.8**	3.3	1.3	4.1	3.3
Maternity leave							
Maternity leave	Persons	**3**		4		2	
Returning from Maternity leave	Persons	**3**		4		1	
Training and Development							
Top Management	hour/person/year	**53.69**	**36.67**	21.87	182.00	72.36	324.00
Middle Management	hour/person/year	**72.95**	**70.25**	57.41	65.00	40.18	48.44
Junior Management	hour/person/year	**24.39**	**33.97**	32.36	48.51	39.37	27.57
Officer	hour/person/year	**9.37**	**24.09**	10.41	29.04	45.17	37.00
Worker	hour/person/year	**0.00**	**0.00**	9.43	10.50	-	-
Employee receiving career development review							
Top Management	%	**100.00**		100.00		100.00	
Middle Management	%	**100.00**		100.00		100.00	
Junior Management	%	**100.00**		100.00		100.00	
Officer	%	**100.00**		100.00		100.00	
Worker	%	**100.00**		100.00		100.00	
Employee receiving regular performance review							
Top Management	%	**100.00**		100.00		100.00	
Middle Management	%	**100.00**		100.00		100.00	
Junior Management	%	**100.00**		100.00		100.00	
Officer	%	**100.00**		100.00		100.00	
Worker	%	**100.00**		100.00		100.00	
Grievance							
Total number of grievance about labor practices through formal grievance process	Case	**0**	**0**	0	0	0	0
Total number of grievance addressed	Case	**0**	**0**	0	0	0	0
Total number of grievance resolved	Case	**0**	**0**	0	0	0	0
Total number of grievance about human rights through formal grievance process	Case	**0**	**0**	0	0	0	0
Total number of grievance addressed	Case	**0**	**0**	0	0	0	0
Total number of grievance resolved	Case	**0**	**0**	0	0	0	0

[3] Presented employee data are of RATCH, RATCHGEN, RAC and RL in 2014-2016.

Environment[4]

Data	Unit	2016	2015	2014
Energy[5]				
Total energy consumption	TJ	**172,594**	163,655	128,487
Total direct energy consumption	TJ	**283,900**	267,342	210,978
- Natural Gas	TJ	**279,487**	263,196	207,099
- Bunker Oil	TJ	**4,175**	3,635	3,203
- Diesel Oil	TJ	**238**	510	676
Total Indirect Energy Consumption	TJ	**234**	224	235
- Electricity purchased	TJ	**234**	224	235
- Heating purchased	TJ	**0**	0	0
- Steam purchased	TJ	**0**	0	0
Total energy sold	TJ	**111,539**	103,911	82,726
- Electricity sold	TJ	**111,471**	103,905	82,725
- Heating sold	TJ	**0**	0	0
- Steam sold	TJ	**68**	5	2
Net Generation	MWh	**30,964,255**	28,862,629	22,979,032
Total energy intensity (within organization)	GJ/MWh	**9.17**	9.26	9.18
Total Energy Reduction	GJ	**133,683**	59,798	66,358
- Fuel saving	GJ	**31,796**	6,188	0
- Electricity saving	GJ	**101,887**	53,611	66,358
- Steam saving	GJ	**0**	0	0
GHG Emission[6]				
Direct GHG emissions (Scope 1)	tCO_2e	**14,108,486**	13,338,777	10,767,401
Indirect GHG emissions (Scope 2)	tCO_2e	**39,118**	37,739	39,638
Total GHG emissions (Scope 1 + 2)	tCO_2e	**14,147,604**	13,376,517	10,807,039
GHG emission intensity (Scope 1 + 2)	tCO_2e/MWh	**0.457**	0.463	0.470
Total GHG emissions reductions	tCO_2e	**16,452**	8,657	10,715
Emission[7]				
NO_x emissions	Tons	**11,898**	11,165	9,348
	Tons/MWh	**0.00038**	0.00039	0.00041
SO_x emissions	Tons	**158.7**	129.3	65.8
	Tons/MWh	**0.000005**	0.000004	0.000003
Opacity	%	**1.9**	2.6	3.7
Water[8]				
Total water withdrawal	Million m^3	**37.56**	37.44	29.65
- Surface water	Million m^3	**35.39**	36.22	29.11
- Seawater	Million m^3	**0**	0	0
- Ground rater	Million m^3	**0**	0	0
- Rainwater	Million m^3	**0**	0	0
- Municipal water	Million m^3	**2.16**	1.22	0.54

Environment[4]

Data	Unit	2016	2015	2014
Recycled and reused water	m^3	**960,499**	3,377,604	1,395,319
	% of total water withdrawal	**2.56**	9.02	4.71
Water Discharge[8]				
Total water discharge to surface water	Million m^3	**6.61**	5.90	4.10
- COD loading	Tons	**298**	302	230
- BOD loading	Tons	**27**	29	21
Waste[9]				
Total waste disposal	Tons	**7,598**	10,737	10,654
Total hazardous waste disposal	Tons	**1,122**	330	395
- Reuse	Tons	**631**	83	60
- Recycling	Tons	**19**	24	1
- Recovery (including energy recovery)	Tons	**447**	136	236
- Secured Landfill	Tons	**25**	87	97
- Onsite storage	Tons	**0**	0	0
Total non-hazardous waste disposal	Tons	**6,477**	10,407	10,259
- Reuse	Tons	**0**	0	0
- Recycling	Tons	**5,770**	808	661
- Recovery (including energy recovery)	Tons	**616**	0	7
- Landfill	Tons	**91**	35	55
- Onsite storage	Tons	**0**	9,564	9,536
- Waste from non-routine operation	Tons	**0**	0	0

[4] Presented environmental data are of RATCHGEN, TECO, RPCL, RW COGEN and RAC.

[5] Energy consumption are calculated based on conversion factors for stationary combustion in the energy industries from Thai Energy Statistics 2010.

[6] GHG Emission of RATCHGEN and TECO are calculated based on the assessment Methodology of Carbon Footprint for Organization developed by TGO (2nd edition, April 2015)
GHG Emission of RPCL and RW COGEN are calculated based on CO_2 emission factors from IPCC Volume 2 Energy.
- For Natural Gas, CO_2 emission factor = 56,100 $kgCO_2/TJ$ on Net Calorific Basis.
- For Diesel oil, CO_2 emission factor = 74,100 $kgCO_2/TJ$ on Net Calorific Basis.

GHG Emission of RAC follow National Greenhouse and Energy Reporting Act.

[7] Emission of RATCHGEN and TECO are calculated base on conversion factor of EMEP/EEA emission inventory guidebook 2013 Table 3-11,3-12, 3-17, 3-18.
Emission of RPCL and RW COGEN are calculated from the Continuous Emission Monitoring Systems (CEMs)

[8] The data are measured from metering.

[9] The data are measured from Manifest System and weight scale.

GRI Content Index

Indicator	Description	Page		Omission	External Assurance
		Sustainability Report	Annual Report		
GENERAL STANDARD DISCLOSURES					
Strategy and Analysis					
G4-1	Statement from the most senior decision-maker of the organization	12-13	-	-	-
G4-2	Description of key impacts, risks, and opportunities	10-11, 24-27	-	-	-
Organizational Profile					
G4-3	Name of the organization	14	-	-	-
G4-4	Primary brands, products, and services	14	-	-	-
G4-5	Location of the organization's headquarters	14	-	-	-
G4-6	Number of countries where the organization operates, and names of countries where either the organization has significant operations or that are specifically relevant to the sustainability topics covered in the report.	15, 19, 22-23	-	-	-
G4-7	Nature of ownership and legal form	16	-	-	-
G4-8	Markets served	16, 19, 22-23	-	-	-
G4-9	Scale of the organization	16-21	-	-	-
G4-10	Total number of employees by type	Performance Data	-	-	-
G4-11	Percentage of total employees covered by collective bargaining agreements	3.5% of total employees represented in the Employee's Welfare Committee	-	-	-
G4-12	Organization's supply chain	57-59	-	-	-
G4-13	Significant changes during the reporting period regarding the organization's size, structure, ownership, or its supply chain	14-16, 48, 57-63	-	-	-
G4-14	Whether and how the precautionary approach or principle is addressed by the organization	28-37, 89-90	-	-	-
G4-15	Externally developed economic, environmental and social charters, principles, or other initiatives to which the organization subscribes or which it endorses	45-46, 65, 88-89	-	-	-
G4-16	Memberships of associations	64-65	-	-	-
EU1	Installed capacity, broken down by primary energy source and by regulatory regime	18-19	-	-	-

Indicator	Description	Page		Omission	External Assurance
		Sustainability Report	Annual Report		
EU2	Net energy output broken down by primary energy source and by regulatory regime	49, Performance Data	-	-	-
EU5	Allocation of CO_2e emissions allowances or equivalent, broken down by carbon trading framework	88-89	-	-	-
Identified Material Aspects and Boundaries					
G4-17	All entities included in the organization's consolidated financial statements or equivalent documents	5-6, 15, 20	-	-	-
G4-18	Process for defining the report content and the Aspect Boundaries	6-11	-	-	-
G4-19	Material Aspects identified in the process for defining report content	10-11	-	-	-
G4-20	For each material Aspect, report the Aspect Boundary within the organization	11	-	-	-
G4-21	For each material Aspect, report the Aspect Boundary outside the organization	11	-	-	-
G4-22	Effect of any restatements of information provided in previous reports, and the reasons for such restatements	5-6	-	-	-
G4-23	Significant changes from previous reporting periods in the Scope and Aspect Boundaries	5	-	-	-
Stakeholder Engagement					
G4-24	List of stakeholder groups engaged by the organization	7-9	-	-	-
G4-25	Basis for identification and selection of stakeholders with whom to engage	6	-	-	-
G4-26	Organization's approach to stakeholder engagement	7-9	-	-	-
G4-27	Key topics and concerns and how the organization has responded	7-9	-	-	-
Report Profile					
G4-28	Reporting period for information provided	5	-	-	-
G4-29	Date of most recent previous report	5	-	-	-
G4-30	Reporting cycle	5	-	-	-
G4-31	Contact point for questions regarding the report or its contents.	10 Feedback Form	-	-	-
G4-32	a. 'In accordance' option the organization has chosen b. GRI Content Index for the chosen option c. Reference to the External Assurance Report	5, GRI Content Index, Assurance Statement	-	-	-
G4-33	Organization's policy and current practice with regard to seeking external assurance for the report	10, Assurance Statement	-	-	-

Indicator	Description	Page		Omission	External Assurance
		Sustainability Report	Annual Report		
Governance					
G4-34	Governance structure of the organization	38	-	-	-
G4-35	Process for delegating authority for economic, environmental and social topics from the highest governance body to senior executives and other employees	38-39	-	-	-
G4-36	Whether the organization has appointed an executive-level position or positions with responsibility for economic, environmental and social topics, and whether post holders report directly to the highest governance body	39	-	-	-
G4-38	Composition of the highest governance body and its committees	38-39	-	-	-
G4-39	Whether the Chair of the highest governance body is also an executive officer	No, Chair is a represen-tative of shareholders	-	-	-
G4-40	Nomination and selection processes for the highest governance body and its committees, and the criteria used for nominating and selecting highest governance body members	38-39	-	-	-
G4-41	Processes for the highest governance body to ensure conflicts of interest are avoided and managed	38	-	-	-
G4-42	Highest governance body's and senior executives' roles in the development, approval, and updating of the organization's purpose, value or mission statements, strategies, policies, and goals related to economic, environmental and social impacts	40-41	-	-	-
G4-45	Highest governance body's role in the identification and management of economic, environmental and social impacts, risks, and opportunities	28, 39-41	-	-	-
G4-46	Highest governance body's role in reviewing the effectiveness of the organization's risk management processes for economic, environmental and social topics.	28, 39-41	-	-	-
G4-47	Frequency of the highest governance body's review of economic, environmental and social impacts, risks, and opportunities.	40			
G4-48	Highest committee or position that formally reviews and approves the organization's sustainability report and ensures that all material Aspects are covered.	5	-	-	-
G4-49	Process for communicating critical concerns to the highest governance body	36, 38, 128	-	-	-
G4-50	Nature and total number of critical concerns that were communicated to the highest governance body and the mechanism(s) used to address and resolve them	37, 128	-	-	-
G4-51	Remuneration policies for the highest governance body and senior executives	41-42	-	-	-

Indicator	Description	Page		Omission	External Assurance
		Sustainability Report	Annual Report		
G4-52	Process for determining remuneration	41-42	-	-	-
Ethics and Integrity					
G4-56	Organization's values, principles, standards and norms of behavior such as codes of conduct and codes of ethics	43-44	-	-	-
G4-57	Internal and external mechanisms for seeking advice on ethical and lawful behavior, and matters related to organizational integrity	35-37, 46, 128	-	-	-
G4-58	a. Internal and external mechanisms for reporting concerns about unethical or unlawful behavior, and matters related to organizational integrity, such as escalation through line management, whistleblowing mechanisms or hotlines	36, 128	-	-	-
SPECIFIC STANDARD DISCLOSURES					
Economic					
Economic Performance					
G4-DMA	Disclosures on Management Approach	26-27	-	-	-
G4-EC1	Direct economic value generated and distributed	48-51	-	-	-
Market Presence					
G4-DMA	Disclosures on Management Approach	16-17	-	-	-
G4-EC5	Ratios of standard entry level wage by gender compared to local minimum wage at significant locations of operation	93	-	-	-
Indirect Economic Impacts					
G4-DMA	Disclosures on Management Approach	48-51	-	-	-
G4-EC7	Development and impact of infrastructure investments and services supported	50-51	-	-	-
G4-EC8	Significant indirect economic impacts, including the extent of impacts	48-49, 58-61, 100, 108-109	-	-	-
Procurement Practices					
G4-DMA	Disclosures on Management Approach	57-59	-	-	-
G4-EC9	Proportion of spending on local suppliers at significant locations of operation	Performance Data	-	-	-
Availability and Reliability					
G4-DMA	Disclosures on Management Approach	53-54, 125	-	-	-
EU-10	Planned capacity against projected electricity demand over the longterm, broken down by energy source and regulatory regime	16, 22, 41			
Demand–Side Management					
G4-DMA	Disclosures on Management Approach	81-83, 86	-	-	-
Research and Development					
G4-DMA	Disclosures on Management Approach	27, 91	-	-	-

Indicator	Description	Page		Omission	External Assurance
		Sustainability Report	Annual Report		
System Efficiency					
EU11	Average generation efficiency of thermal plants by energy source and by regulatory regime	49, 125	-	-	-
Environmental					
Materials					
G4-DMA	Disclosures on Management Approach	66-68	-	-	-
G4-EN1	Materials used by weight or volume	77 Performance Data	-	-	-
G4-EN2	Percentage of materials used that are recycled input materials	76-77 Performance Data	-	-	-
Energy					
G4-DMA	Disclosures on Management Approach	81-82	-	-	-
G4-EN3	Energy consumption within the organization	Performance Data	-	-	-
G4-EN5	Energy intensity	Performance Data	-	-	-
G4-EN6	Reduction of energy consumption	83-85, Performance Data	-	-	-
Water					
G4-DMA	Disclosures on Management Approach	71	-	-	-
G4-EN8	Total water withdrawal by source	75, Performance Data	-	-	✓
G4-EN9	Water sources significantly affected by withdrawal of water	74-76	-	-	-
G4-EN10	Percentage and total volume of water recycled and reused	74, Performance Data	-	-	-
Emissions					
G4-DMA	Disclosures on Management Approach	69, 81-82	-	-	-
G4-EN15	Direct greenhouse gas (GHG) emissions (scope 1)	Performance Data	-	-	✓
G4-EN16	Energy indirect greenhouse gas (GHG) emissions (scope 2)	Performance Data	-	-	✓
G4-EN18	Greenhouse gas (GHG) emissions intensity	83, Performance Data	-	-	-
G4-EN19	Reduction of greenhouse gas (GHG) emissions	83-85, Performance Data	-	-	-

Indicator	Description	Page		Omission	External Assurance
		Sustainability Report	Annual Report		
G4-EN21	NO_x, SO_x, and other significant air emissions	70, Performance Data	-	-	✓
Effluents and Waste					
G4-DMA	Disclosures on Management Approach	76	-	-	-
G4-EN22	Total water discharge by quality and destination	75, Performance Data	-	-	-
G4-EN23	Total weight of waste by type and disposal method	77, Performance Data	-	-	-
G4-EN 26	Identity, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the organization's discharges of water and runoff	79-80			
Products and Services					
G4-DMA	Disclosures on Management Approach	124	-	-	-
G4-EN27	Extent of impact mitigation of environmental impacts of products and services	124-127	-	-	-
Compliance					
G4-DMA	Disclosures on Management Approach	66-67	-	-	-
G4-EN29	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations	67	-	-	-
Supplier Environmental Assessment					
G4-DMA	Disclosures on Management Approach	59	-	-	-
G4-EN32	Percentage of new suppliers that were screened using environmental criteria	60	-	-	-
G4-EN33	Significant actual and potential negative environmental impacts in the supply chain and actions taken	60, 63	-	-	-
Environmental Grievance Mechanisms					
G4-DMA	Disclosures on Management Approach	99	-	-	-
G4-EN34	Number of grievances about environmental impacts filed, addressed, and resolved through formal grievance mechanisms	101-102, 107	-	-	-
Social					
Social: Labor Practices and Decent Work					
Employment					
G4-DMA	Disclosures on Management Approach	93	-	-	-
G4-LA1	Total number and rates of new employee hires and employee turnover by age group, gender, and region	Performance Data	-	-	-

Indicator	Description	Page		Omission	External Assurance
		Sustainability Report	Annual Report		
EU15	Percentage of employees eligible to retire in the next 5 and 10 years broken down by job category and by region	95	-	-	-
EU18	Percentage of contractor and subcontractor employees that have undergone relevant health and safety training	113, 119	-	-	-
G4-LA3	Return to work and retention rates after parental leave, by gender	Performance Data	-	-	-
Labor/Management Relations					
G4-DMA	Disclosures on Management Approach	93	-	-	-
G4-LA4	Minimum notice periods regarding operational changes, including whether these are specified in collective agreements	94	-	-	-
Occupational Health and Safety					
G4-DMA	Disclosures on Management Approach	110	-	-	-
G4-LA5	Percentage of total workforce represented in formal joint management–worker health and safety committees that help monitor and advise on occupational health and safety programs	Performance Data	-	-	-
G4-LA6	Type of injury and rates of injury, occupational diseases, lost days, and absenteeism, and total number of work-related fatalities, by region and by gender	Performance Data	-	-	✓
G4-LA7	Workers with high incidence or high risk of diseases related to their occupation	119-121, Performance Data	-	-	-
Training and Education					
G4-DMA	Disclosures on Management Approach	93	-	-	-
G4-LA9	Average hours of training per year per employee by gender, and by employee category	97, Performance Data	-	-	-
G4-LA10	Programs for skills management and lifelong learning that support the continued employability of employees and assist them in managing career endings	96-98	-	-	-
G4-LA11	Percentage of employees receiving regular performance and career development reviews, by gender and by employee category	Performance Data	-	-	-
Diversity and Equal Opportunity					
G4-DMA	Disclosures on Management Approach	122	-	-	-
G4-LA12	Composition of governance bodies and breakdown of employees per employee category according to gender, age group, minority group membership, and other indicators of diversity	Performance Data	-	-	-
Equal Remuneration for Women and Men					
G4-DMA	Disclosures on Management Approach	123	-	-	-

Indicator	Description	Page		Omission	External Assurance
		Sustainability Report	Annual Report		
G4-LA13	Ratio of basic salary and remuneration of women to men by employee category, by significant locations of operation	123	-	-	-
Supplier Assessment for Labor Practices					
G4-DMA	Disclosures on Management Approach	29-60	-	-	-
G4-LA14	Percentage of new suppliers that were screened using labor practices criteria	60	-	-	-
G4-LA15	Significant actual and potential negative impacts for labor practices in the supply chain and actions taken	60	-	-	-
Labor Practices Grievance Mechanisms					
G4-DMA	Disclosures on Management Approach	128	-	-	-
G4-LA16	Number of grievances about labor practices filed, addressed, and resolved through formal grievance mechanisms	Performance Data	-	-	-
Social: Human Rights					
Investment					
G4-DMA	Disclosures on Management Approach	122	-	-	-
G4-HR2	Total hours of employee training on human rights policies or procedures concerning aspects of human rights that are relevant to operations, including the percentage of employees trained	123	-	-	-
Non–discrimination					
G4-DMA	Disclosures on Management Approach	123	-	-	-
G4-HR3	Total number of incidents of discrimination and corrective actions taken	123	-	-	-
Freedom of Association and Collective Bargaining					
G4-DMA	Disclosures on Management Approach	128	-	-	-
Child Labor					
G4-DMA	Disclosures on Management Approach	59, 122	-	-	-
G4-HR5	Operations and suppliers identified as having significant risk for incidents of child labor, and measures taken to contribute to the effective abolition of child labor	59-60	-	-	-
Forced or Compulsory Labor					
G4-DMA	Disclosures on Management Approach	122	-	-	-
G4-HR6	Operations and suppliers identified as having significant risk for incidents of forced or compulsory labor, and measures to contribute to the elimination of all forms of forced or compulsory labor	59-60	-	-	-
Indigenous Rights					
G4-DMA	Disclosures on Management Approach	122	-	-	-

Indicator	Description	Page		Omission	External Assurance
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Supplier Human Rights Assessment					
G4-DMA	Disclosures on Management Approach	60	-	-	-
Human Rights Grievance Mechanisms					
G4-DMA	Disclosures on Management Approach	128	-	-	-
G4-HR12	Number of grievances about human rights impacts filed, addressed, and resolved through formal grievance mechanisms	Performance Data	-	-	-
Social : Society					
Local Communities					
G4-DMA	Disclosures on Management Approach	100	-	-	-
G4-SO1	Percentage of operations with implemented local community engagement, impact assessments, and development programs	100-107	-	-	-
G4-SO2	Operations with significant actual and potential negative impacts on local communities	101-102, 107	-	-	-
EU22	Number of people physically or economically displaced and compensation, broken down by type of project	102	-	-	-
Disaster/ Emergency Planning and Response					
G4-DMA	Disclosures on Management Approach	27, 89-90	-	-	-
Anti–corruption					
G4-DMA	Disclosures on Management Approach	45-46	-	-	-
G4-SO4	Communication and training on anti-corruption policies and procedures	47	-	-	-
G4-SO5	Confirmed incidents of corruption and actions taken	37	-	-	-
Compliance					
G4-DMA	Disclosures on Management Approach	33, 45	-	-	-
Supplier Assessment for Impacts on Society					
G4-DMA	Disclosures on Management Approach	60	-	-	-
G4-SO9	Percentage of new suppliers that were screened using criteria for impacts on society	60	-	-	-
Grievance Mechanisms for Impacts on Society					
G4-DMA	Disclosures on Management Approach	101	-	-	-
G4-SO11	Number of grievances about impacts on society filed, addressed, and resolved through formal grievance mechanisms	101-102, 107	-	-	-

Indicator	Description	Page		Omission	External Assurance
		Sustainability Report	Annual Report		
Social : Product Responsibility					
Customer Health and Safety					
G4-DMA	Disclosures on Management Approach	53	-	-	-
G4-PR1	Percentage of significant product and service categories for which health and safety impacts are assessed for improvement	124-125			
G4-PR2	Total number of incidents of non-compliance with regulations and voluntary codes concerning the health and safety impacts of products and services during their life cycle, by type of outcomes	124			
Product and Service Labeling					
G4-PR3	Type of product and service information required by the organization's procedures for product and service information and labeling, and percentage of significant product and service categories subject to such information requirements	49, 124-127	-	-	-
G4-PR5	Results of surveys measuring customer satisfaction	9, 56	-	-	-
Customer Privacy					
G4-DMA	Disclosures on Management Approach	56	-	-	-
Compliance					
G4-DMA	Disclosures on Management Approach	56	-	-	-
G4-PR9	Monetary value of significant fines for non-compliance with laws and regulations concerning the provision and use of products and services	55	-	-	-
Access					
EU30	Average plant availability factor by energy source and by regulatory regime	53, 125	-	-	-

LRQA Assurance Statement

Relating to Ratchaburi Electricity Generating Holding Plc's Corporate Sustainability Report for the calendar year 2016

This Assurance Statement has been prepared for Ratchaburi Electricity Generating Holding Plc. in accordance with our contract but is intended for the readers of this Report.

Terms of engagement

Lloyd's Register Quality Assurance Ltd. (LRQA) was commissioned by Ratchaburi Electricity Generating Holding Plc. (RATCH) to provide independent assurance on its 2016 Sustainability Report ("the report") against the assurance criteria below to a limited level of assurance and at the materiality of the professional judgement of the verifier using LRQA's verification approach. LRQA's verification approach is based on current best practise and uses the principles of AA1000AS (2008) - inclusivity, materiality, responsiveness and reliability of performance data and processes defined in ISAE3000.

Our assurance engagement covered RATCH's subsidiaries in Thailand and Australia under its direct operational control, and specifically the following requirements:

- Confirming that the report is in accordance with:
  - GRI G4's Reporting Guidelines and core option
  - GRI G4's Electricity & Utilities sector disclosures
- Evaluating the reliability of data and information for only five-selected specific standard disclosures listed below:
  - total water withdrawal by source (G4-EN8)
  - direct and indirect GHG emissions (G4-EN15 & 16)
  - SOx, NOx and other significant air emission (G4-EN21)
  - type of injury and rates of injury, occupational diseases, lost days and absenteeism, and total number of work-related fatalities (G4-LA6)

Our assurance engagement excluded the data and information of RATCH's subsidiaries where it has no operational control and all of its operations and activities outside of Thailand and Australia. Our assurance engagement also excluded the data and information of its suppliers and any third-parties mentioned in the report.

LRQA's responsibility is only to RATCH. LRQA disclaims any liability or responsibility to others as explained in the end footnote. RATCH's responsibility is for collecting, aggregating, analysing and presenting all the data and information within the report and for maintaining effective internal controls over the systems from which the report is derived. Ultimately, the Report has been approved by, and remains the responsibility of RATCH.

LRQA's opinion

Based on LRQA's approach nothing has come to our attention that would cause us to believe that RATCH has not:

- Met the requirements above
- Disclosed reliable data and information as no errors or omissions were detected within the five-selected Environmental and Occupational & Health specific standard disclosures
- Covered all the issues that are important to the stakeholders and readers of this report.

The opinion expressed is formed on the basis of a limited level of assurance and at the materiality of the professional judgement of the verifier.

Note: The extent of evidence-gathering for a limited assurance engagement is less than for a reasonable assurance engagement. Limited assurance engagements focus on aggregated data rather than physically checking source data at sites.

LRQA's approach

LRQA's assurance engagements are carried out in accordance with our verification approach. The following tasks though were undertaken as part of the evidence gathering process for this assurance engagement:

- Assessing RATCH's approach to stakeholder engagement to confirm that issues raised by stakeholders were captured correctly. We did this by interviewing RATCH's Management who engage directly with stakeholder groups as well as reviewing documents and associated records.
- Reviewing RATCH's process for identifying and determining material issues to confirm that the right issues were included in their Report. We did this by benchmarking reports written by RATCH and its peers to ensure that sector specific issues were included for comparability. We also tested the filters used in determining

material issues to evaluate whether RATCH makes informed business decisions that may create opportunities which contribute towards sustainable development.

- Auditing RATCH's data management systems to confirm that there were no significant errors, omissions or mis-statements in the Report. We did this by reviewing the effectiveness of data handling process, and systems, including those for internal verification. We also spoke with key people in various departments responsible for compiling the data and drafting the report.
- Visiting RATCH's major electricity generating unit (Ratchburi Power Plant) to sample performance data and information for the five-selected specific standard disclosures to confirm its reliability.

Observations

Further observations and findings, made during the assurance engagement, are:

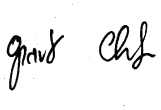
- Stakeholder inclusivity:
  We are not aware of any key stakeholder groups that have been excluded from RATCH's stakeholder engagement process. RATCH maintains regular, open dialogue with all of its stakeholders to understand their growing expectations.
- Materiality:
  We are not aware of any material issues concerning RATCH's sustainability performance that have been excluded from the Report. We believe that future reports should discuss in detail RATCH's progress in the installation of renewal energy e.g. Solar and Wind farms.
- Responsiveness:
  RATCH has addressed the concerns of stakeholders in Thailand and Australia in relation to GHG and water resource consumption. However, we believe that future reports should disclose more information about:
  - RATCH's GHG reduction and carbon trading framework
  - Investment and development in Bangkok's mass transit system as RATCH has diversified its operations.
- Reliability:
  Data management systems are defined but the implementation of these systems varies amongst RATCH's operational facilities and subsidiaries. RATCH should consider a single reporting system together with interim verification to further improve the reliability and timeliness of its disclosed data and information.

LRQA's competence and independence

LRQA ensures the selection of appropriately qualified individuals based on their qualifications, training and experience. The outcome of all verification and certification assessments is then internally reviewed by senior management to ensure that the approach applied is rigorous and transparent.

This verification is the only work undertaken by LRQA for RATCH and as such does not compromise our independence or impartiality.

Dated: 24 February 2017



Opart Charuratana
LRQA Lead Verifier

On behalf of Lloyd's Register Quality Assurance Ltd.
Lloyd's Register International (Thailand) Limited
14th Floor, Sirinrat Building, 3388/46 Rama IV Road
Klongton, Klongtoey, Bangkok 10110 THAILAND

LRQA reference: BGK6046255

RATCH

RATCHABURI
ELECTRICITY GENERATING
HOLDING PCL.

Feedback Form
2016 Sustainability Report
Ratchaburi Electricity Generating Holding PCL.

1. Reader Profile

Gender ○ Female ○ Male

Age ○ Below 30 years old ○ 30 – 50 years old ○ More than 50 years old

2. Please identity your stakeholder type

○ Shareholder ○ Investor ○ Alliance and Trade Partner

○ Community ○ Employee ○ Scholar/ Independent Organization

○ Customer ○ Mass Media ○ Other (Please specify.....)

3. Where do you receive this sustainability report?

○ AGM ○ Company's website ○ Company's employee

○ Other (Please specify.....)

4. For support investment decision on RATCH's securities

○ For support investment decision on RATCH's securities

○ For learning more about RATCH's business

○ Research and educational purposes

○ Other (Please specify.....)

5. Satisfactory level towards the sustainability report

Information adequacy	○ High	○ Medium	○ Low
Attractive topics	○ High	○ Medium	○ Low
Readability	○ High	○ Medium	○ Low
Design	○ High	○ Medium	○ Low
Overall satisfaction	○ High	○ Medium	○ Low

6. In your opinion, are you confident that RATCH potentially achieves the sustainable growth?

○ Yes, because.....

○ No, because.....

○ No idea because.....

7. In your opinion, which is the most significant aspect toward the company's sustainable growth?

○ Economy (Please specify.....)

○ Environment (Please specify.....)

○ Society (Please specify.....)

8. In your opinion, what should the report be improved?

○ Design ○ Readability

○ More content ○ Other (Please specify.....)

Thank you for your information and valuable opinion
which advantages us for improvement of next issue of the report.

RATCH

RATCHABURI
ELECTRICITY GENERATING
HOLDING PCL.

Sustainability Development Department
Ratchaburi Electricity Generating Holding PCL.
8/8 Moo 2, Ngam Wong Wan Road,
Bangkhen, Muang, Nonthaburi,
11000 Thailand

Channels to return the feedback form:

1. E-mail — Send the photo of the completed feedback form to sustainability@ratch.co.th

2. Fax — 0 2794 9888 ext. 9951-9955

3. Postal — Send the completed feedback form to the specified address above

4. Mobile — Send the photo of the completed feedback form to 08 1899 6908

5. Website — Download the feedback from at www.ratch.co.th and send back via email at sustainability@ratch.co.th

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RATCHABURI ELECTRICITY GENERATING HOLDING PCL.

Ratchaburi Electricity Generating Holding Public Company Limited
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11000 Thailand
Tell : +66 2794 9999
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For more information about this report, please contact:
Sustainability Development Department
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