Shifting towards Sustainability

RATCH GROUP

Sustainability Report 2021

RATCH GROUP PCL.

Vision

To become a leading value-oriented energy and infrastructure company in Asia Pacific.

Mission

M1 To ensure shareholders' value creation through financial return sustainably generated by accountability for environment, society and good governance

M2 To achieve operational excellence and enhance competitiveness.

M3 To adhere fair business conduct and strict compliance to relevant laws and regulations.

M4 To raise employees' awareness and motivation of self-development for readiness in competition and business changing.

M5 To support security of national power grid and infrastructure system.

M6 To explore potential opportunities and new alternatives in energy-related and other non-power businesses to generate growth and business expansion for shareholders.

Corporate Value

BE ENTREPRENEURIAL & COMMIT TO INTEGRITY.

POWER OF PROFESSIONAL

POWER OF INNOVATION

BOOST AGILITY & ENCOURAGE INNOVATION.

POWER OF TEAMWORK

EXCEL SYNERGY, COLLABORATION & STRENGTHEN PARTNERSHIP.

Contents

Message from Chairman and Chief Executive Officer

Dear all shareholders and stakeholders,

The containment of COVID-19 infections among RATCH employees was our necessary and essential mission in 2021, like what we had done in 2020. During the past year, RATCH worked closely with partners, customers and suppliers in Thailand and abroad in the value chain for dealing with the situation, by estimating the impacts related to the Company's operations and business outlook along with applying suitable measures to keep operations properly. RATCH, partners, suppliers and customers collaborated in establishing the commercially operating power plants the COVID-19 free zones, to avoid undisrupted production and delivery and satisfy customers and power users. Besides, we supported the public health effort against COVID-19 as well as communities. RATCH performed satisfactorily in the past year. We achieved not only in control of the infections at office buildings and power plants, but also in maintaining the economic values and creating shared values for stakeholders, community, society and the environment.

Strengthening risk management efficiency in support of ESG principles

The COVID-19 outbreaks in the past 2 years brought about rapid changes to the way of life and the way of business doing. Stakeholders' concerns about the environment, society and governance have been rising. These prompted the Company to rethink and the environmental, social and governance issues were included in the enterprise risk management process. Project risk management was monitored more closely, to ensure sufficient and effective preventive measures and mitigation of impacts.

In this context, the improvement of the risk management process continued. In 2022, RATCH plans to carry out its analysis on climate change risks based on the Recommendations of the Task Forces on Climate-related Financial Disclosures (TCFD). As climate change is considered a significant issue to the power generation industry, RATCH needs to know climate impacts that may derail the corporate targets on economic values and long-term growth as well as business opportunities that will bring about value-added in the long term.

RATCH has established the Environmental, Social and Governance Working Group, that integrates all business functions in the assessment and improvement of environmental, social and governance aspects that are essential to the Company and stakeholders. In 2022, RATCH plans to revisit the Corporate Sustainability Development Policy and target setting; formulate the greenhouse gas emission management strategy and target; develop the policy and due diligence process for human rights risks; and develop the Supplier Code of Conduct as guidelines for enhancing sustainable cooperation which will serve as best practices for the industry.

Greenhouse gas emission reduction in focus

RATCH is committed to greenhouse gas emission reduction. In 2021, all companies in the scope of this report reduce greenhouse gas emissions by 21,573 tons of carbon dioxide equivalent thanks to the optimized utilization of energy and resources in the production process. The power output from renewable sources accounted for 17 per cent of net annualized generation, which further reduced greenhouse gas emissions by 4,268,513 tons of carbon dioxide equivalent.

RATCH has also developed GHG inventory. The organization carbon footprint assessment is extended to Scope 3: other indirect emissions and the results will be used in the drafting of greenhouse gas emission reduction roadmap and targets. Our subsidiaries are being pushed to adopt similar actions.

Commitment towards GHG reduction

Due to the intensifying climate change, RATCH is committed to reducing greenhouse gas emissions while growing economic values. We target to reduce our investment in fossil fuel power plants and increase investment in renewable projects, to bring the investment ratio to 60:40 in 2035. Our expectation is the additional 4,000 MW capacity from renewable sources will reduce greenhouse gas emissions by 10 million tons of carbon dioxide equivalent. Meanwhile, our power plants will strive to further improve and maximize energy efficiency and we will diversify into low-carbon businesses that contribute to GHG reduction.

RATCH also plans to grow trees as well as rehabilitate and conserve forests during 2022-2025, to create natural carbon sinks, and adopt the forestry and green space methodology for voluntary emission reduction developed by Thailand Greenhouse Gas Management Organization (Public Organization) (TGO) for gaining registration and issuance of Thailand Voluntary Emission Reduction Program (T-VER) from TGO. It expected greenhouse gas emissions will reduce for another 670,000 tons of carbon dioxide equivalent along the project duration from 2022 to 2034. Under the plan, activities will be launched to strengthen community capacity in safeguarding and utilizing forests as well as to assess forests' carbon storage capacity and biodiversity, in support of Sustainable Development Goal 13: Climate Action.

The Sustainability Report 2021 presents our achievements and performance in governance, economic, environmental and social aspects in the past year. We would like to thank shareholders and stakeholders for their valuable recommendations and supports throughout the past 21 years in creating growth and shared values for all parties. We will continuously dedicate our capabilities to developing stable and sustainable progress as well as generating and contributing values for stakeholders, society and the environment.

Sincerely yours,

(Mr. Boonyanit Wongrukmit)
Chairman

Sincerely yours,

(Miss Choosri Kietkajornkul)
Chief Executive Officer

About This Report

RATCH Group Public Company Limited annually publishes Sustainability Report, to disclose sustainability strategies, goals and operational procedures in economic (incorporating governance), social and environmental dimensions crucial to electricity generation which is the Company's main business and stakeholders as well as sustainability performance in the reporting year. In Sustainability Report 2021, the Company disclosed the sustainability-related information of actions accomplished and showing progress during the year.

Reporting approach

This report was prepared accordingly to Global Reporting Initiative (GRI) Standards: Core option and additional indicators for the Electric Utilities Sector. The information covered the performance of the Company Group in Thailand, Australia and Lao PDR, conducted through subsidiaries and joint ventures in which the Company asserts operational control, from 1 January 2021 to 31 December 2021. The information of all subsidiaries and joint ventures are available on Form 56-1 One Report and website: www.ratch.co.th.

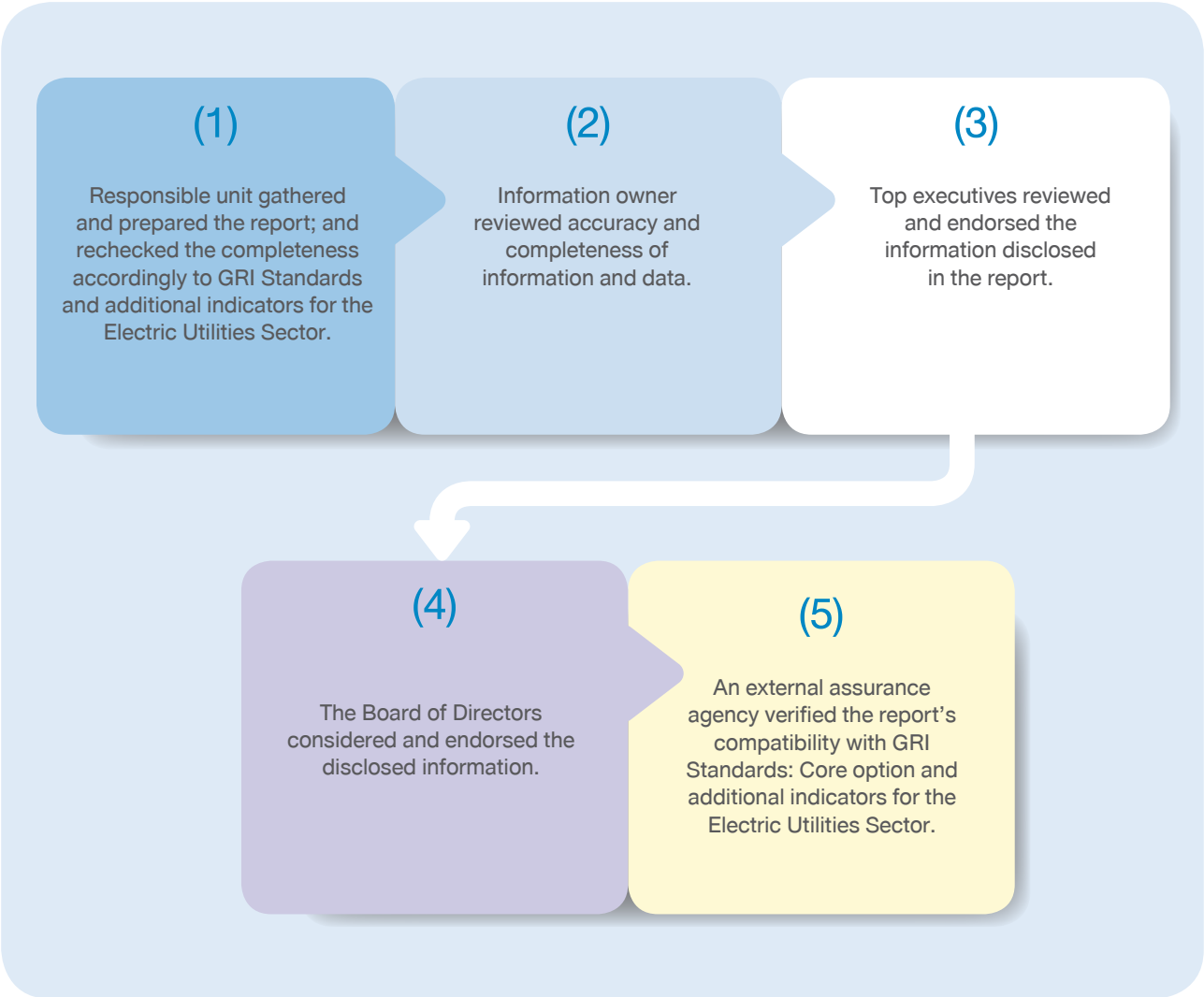
Scope of the report

The information contained in this report covered subsidiaries and joint ventures in which the Company has operational control.

Business/ Company	Material issues									
	Economic	Environmental						Social		
	Production	Air	Water	Waste	Biodiversity	Energy Consumption	GHG	Safety	Employee	Community
RATCH Group PCL	-	-	-	-	-	✓	✓	✓	✓	✓
Electricity Generation										
Ratchaburi Electricity Generating Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RATCH-Australia Corporation Pty Ltd	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RATCH Cogeneration Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nava Nakorn Electricity Generation Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Berkprai Cogeneration Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solarta Co., Ltd.	✓	-	-	-	-	-	-	-	-	-
Other businesses										
RATCH-Lao Services Co., Ltd.	✓	-	-	-	-	-	-	✓	✓	✓

Reporting Reliability

RATCH formulated the reporting process and procedure in accordance with GRI Standards and ensured a review for accuracy and completeness to assure stakeholders of the reliability. The process is as follows:



The external assurance agency tasked to verify the information and assured the information and Sustainability Report's compliance with GRI Standards is independent and not related to the Company. The selection of the assurance agency strictly followed the process identified in the Company's procurement regulations and the agency passed the suppliers' governance, environmental and social assessment. The assurance statement appeared on Page 166-167.

Report Assurance

The assurance to this Sustainability Report concerned the accuracy of economic data, or the accounting data disclosed in Form 56-1 One Report which was audited and verified by a certified auditor. The environmental and social information was verified by an external assurance agency for the accuracy and completeness in accordance with GRI Standards reporting principles. RATCH also sought assurance for 16 environmental and social indicators which were significant to the Company and stakeholders in 2021, compared to 10 indicators in 2020, as follows:

Indicator	GRI Standards	Topic-specific Standards
1. Materials used (by weight or volume)	GRI 301: Materials 2016	GRI 301-1 Materials Used by Weight or Volume
2. Internal energy consumption	GRI 302: Energy 2016	GRI 302-1 Energy Consumption within the Organization
3. Energy Intensity		GRI 302-3 Energy Intensity
4. Reduced energy volume		GRI 302-4 Reduction of Energy Consumption
5. Water withdrawal	GRI 303: Water and Effluents 2018	GRI 303-3 Water Withdrawal
6. Water discharge		GRI 303-4 Water Discharge
7. Water consumption		GRI 303-5 Water Consumption
8. Direct GHG emissions (Scope 1)	GRI 305: Emissions 2016	GRI 305-1 Direct (Scope 1) GHG Emissions
9. Energy indirect GHG emissions (Scope 2)		GRI 305-2 Energy Indirect (Scope 2) GHG Emissions
10. Other indirect GHG emissions (Scope 3)		GRI 305-3 Other Indirect (Scope 3) GHG Emissions
11. GHG Emissions Intensity		GRI 305-4 GHG Emissions Intensity
12. Reduced GHG emissions volume		GRI 305-5 Reduction of GHG Emissions
13. NO_x, SO_x, and other significant air emissions		GRI 305-7 Nitrogen Oxides (NO_x), Sulfur Oxides (SO_x), and Other Significant Air Emissions
14. New employee hires and employee turnover	GRI 401: Employment 2016	GRI 401-1 New Employee Hires and Employee Turnover
15. Work-related injury	GRI 403: Occupational Health and Safety 2018	GRI 403-9 Work-related Injuries
16. Work-related illness		GRI 403-10 Work-related Ill Health

Channels for information inquiry and recommendations

Report responsible unit: Corporate Relations Division

Tel : 0 2794 9940, 0 2794 9951
Email : charusudab@ratch.co.th, pornpent@ratch.co.th

RATCH Profile

RATCH Group Public Company Limited is listed on the Stock Exchange of Thailand under the stock symbol of "RATCH". RATCH was established on 7th March 2000 with a registered capital of 14.5 billion baht. The Company's Head Office is located at 72 Ngam Wong Wan Rd, Bangkhen, Muang Nonthaburi, Nonthaburi Province.

Nature of Business

RATCH operates as a holding company with interests in a number of entities involving mainly electricity generation, infrastructure, and other value-added businesses in Thailand and abroad. The Company directly and indirectly holds shares in a total of 62 subsidiaries and joint ventures.

More details appear in

Business Structure

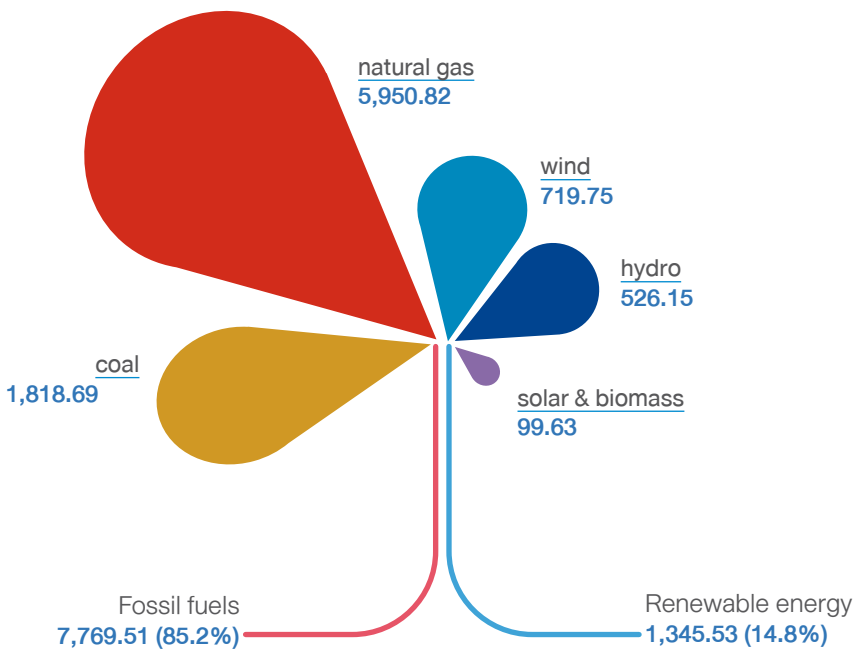
RATCH's investment is classified into two main areas:

1. Electricity generation business

Electricity generation business is the Company's crucial revenue contributor. Its power plants, located in Thailand and overseas, generate electricity from fossil fuels and renewable energy. As of 31 December 2021, the equity installed capacity totals 9,115.04 megawatts (MW).

Capacity sorted by fuel

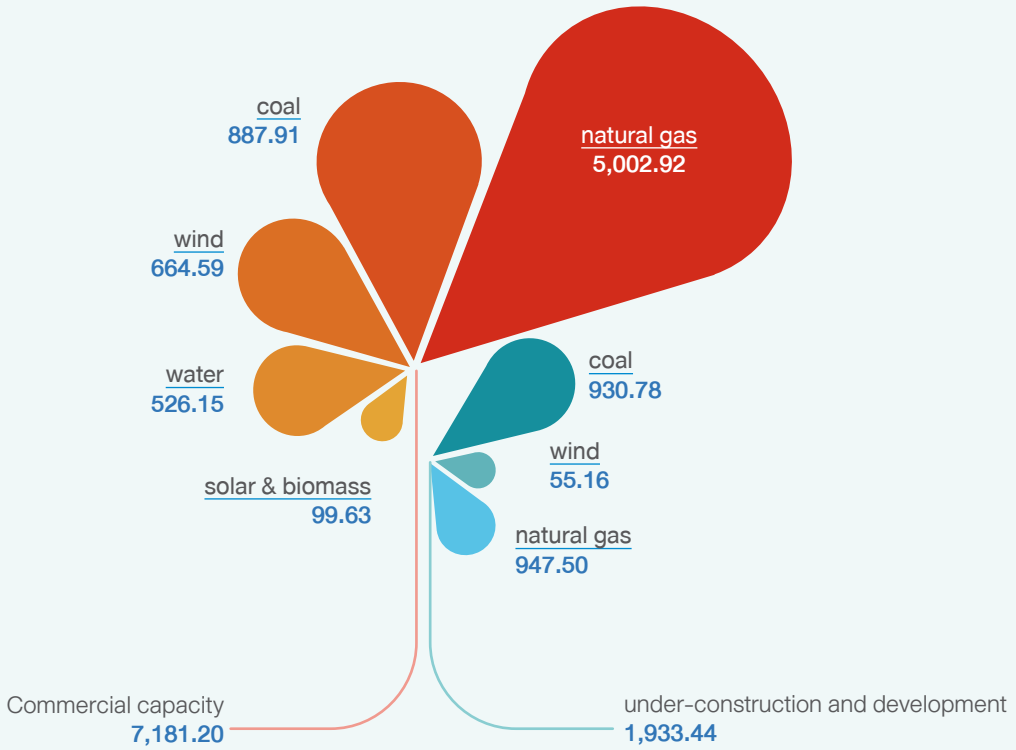
Unit: Megawatt (MW)



Commercial and under-construction capacity

In 2021, RATCH's commercial power plants shared a combined capacity of 7,181.20 MW or 78.8% of the total equity installed capacity. Power plants which are being developed and built have production capacity of 1,933.44 MW or 21.2% of the total equity installed capacity.

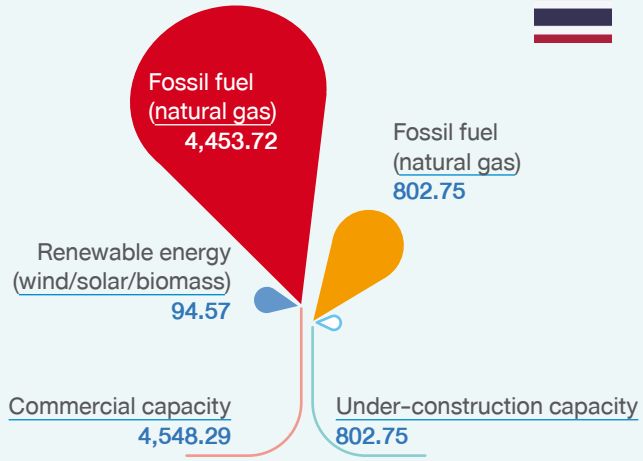
Commercial and under-construction and in-development capacity sorted by fuel Unit : Megawatt (MW)



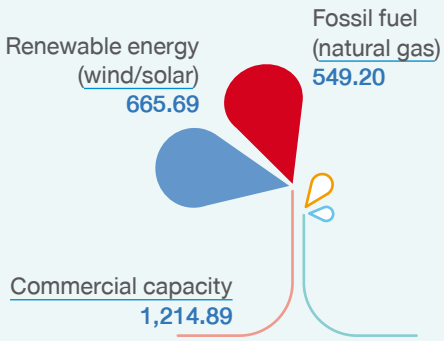
Electricity generation locations

The equity installed capacity in Thailand was 5,351.04 MW or 59% of the total and 3,764 MW or 41% in aboard.

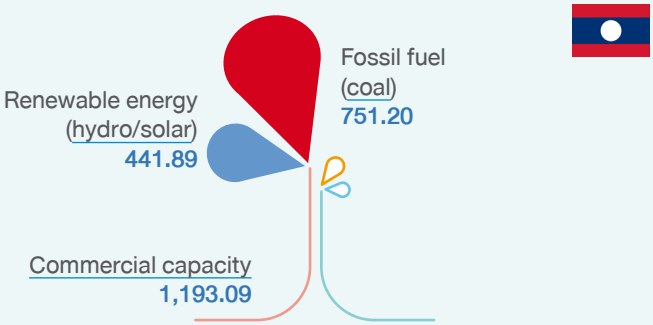
Unit : Megawatt (MW)



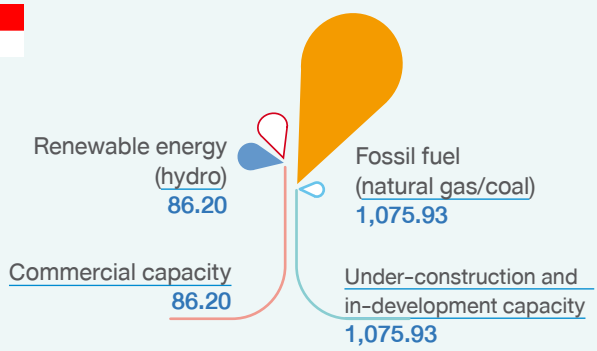
Thailand | Total capacity 5,351.04
Fossil fuel 5,256.47 | Renewable energy 94.57



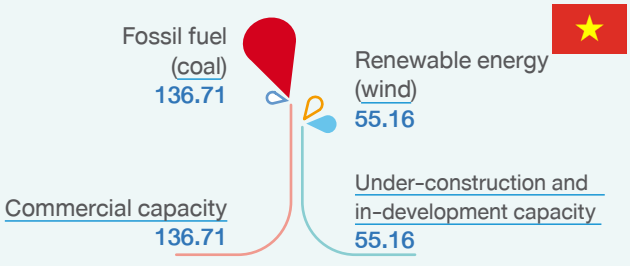
Australia | Total capacity 1,214.89
Fossil fuel 549.20 | Renewable energy 665.69



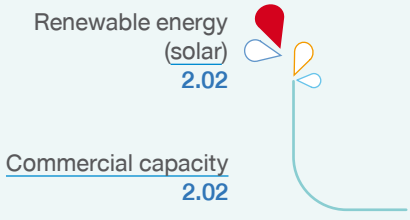
Lao PDR | Total capacity 1,193.09
Fossil fuel 751.20 | Renewable energy 441.89



Indonesia* | Total capacity 1,162.13
Fossil fuel 1,075.93 | Renewable energy 86.20



Vietnam | Total capacity 191.87
Fossil fuel 136.71 | Renewable energy 55.16



Japan | Total capacity 2.02
Renewable energy 2.02

** The extraordinary General Meeting of the Company's shareholders No. 1/2021, dated October 21, 2021, approved RH International (Singapore) Corporation Limited (RHIS), an indirect subsidiary, make a transaction of purchasing ordinary shares of Paiton Energy Group from Mitsui & Co., Ltd., including the acquisition of 45.515% of ordinary shares in PT Paiton Energy (PE) which operates thermal power plants. Two sub-bituminous coal-fired sites (3 production units) in Indonesia have a total capacity of 2,045 megawatts and the transaction is expected to complete in 2023.*

Read more in

2. Infrastructure and other businesses

RATCH has diversified into infrastructure and other businesses to generate additional revenue, which will add enterprise value and support organizational growth and stability in the long term. The Company intends to allocate at least 20% of total investment for these businesses in 2025. The current investments in the two categories in Thailand and Lao PDR, directly and indirectly, are as follows:

More details appear in

2.1 Infrastructure

Location	Subsidiary/ Joint venture	Shareholding (%)/ Controlling power	Investment by shareholding (Million Baht)	Nature of Business	Customers/Users
Thailand	Eastern Bangkok Monorail Co.,Ltd.	10/No	1,440	Implementing the Public Private Partnership Scheme involved in the provision of engineering design, machinery and electrical systems, operation and maintenance services for MRT Monorail Yellow Line Project (Lat Phrao-Samrong).	General public -scheduled for operations in 2022
Thailand	Northern Bangkok Monorail Co.,Ltd.	10/No	1,440	Implementing the Public Private Partnership Scheme involved in the provision of engineering design, machinery and electrical systems, operation and maintenance services for MRT Monorail Pink Line Project (Khae Rai-Min Buri).	General public -scheduled for operations in 2022
Thailand	Smart Infranet Co.,Ltd.	51/No	280.50	Provide rental fiber optic communications networks on major customer CBD roads and Bangkok's ring-roads, as well as on telegraph poles and railroads nationwide	Corporate customers
Thailand	Things on Net Co.,Ltd.	35/No	180.02	Provide integrated internet of things (IoT) solution services from consulting to strategic planning and IoT data analytics as well as distributing sensor sets, IT platform and IoT solutions such as asset tracking management, waste management, safety and environment, smart farming and smart city solutions	Corporate and retail customers
Thailand	BGSR 6 Co.,Ltd.	10/No	100	Implementing the Public Private Partnership Scheme involved with the design, construction and maintenance of civil works and the fee-collecting system of Bang Pa-in - Nakhon Ratchasima Highway (M6)	General public / Department of Highways -Slated for operations in 2024

Location	Subsidiary/ Joint venture	Shareholding (%)/ Controlling power	Investment by shareholding (Million Baht)	Nature of Business	Customers/Users
Thailand	BGSR 81 Co.,Ltd.	10/No	85	Implementing the Public Private Partnership Scheme involved with the design, construction and maintenance of civil works and the fee-collecting system of Bang Yai - Kanchanaburi Highway (M81)	General public / Department of Highways -Slated for operations in 2024
Lao PDR	Asia Water Co.,Ltd.	40/Yes	179.11	Produce and distribute tap water with a capacity of 24,000 cubic meters per day in Phase 1 since December 2018, scheduled for capacity increase to 48,000 cubic meters per day in 2041	Nakhonluang Water Supply Enterprise of Lao, Vientiane Capital, under 50-year concession

2.2 Other businesses

The Company has explored investment opportunities in businesses related to electricity generation and energy, as well as raise the potential of businesses responding to new-normal lifestyles', for add enterprise value. At present, the Company has invested in the following businesses:

Electricity and energy-related businesses

Location	Subsidiary/ Joint venture	Shareholding (%)/ Controlling power	Investment by shareholding (Million Baht)	Nature of business/product/service	Customers/User
Thailand	Chubu Ratchaburi Electric Service Co.,Ltd.	50/Yes	10	Provide operation and maintenance services for 1,420 MW Ratchaburi-Power Power Plant in Ratchaburi Province	Ratchaburi Power Co.,Ltd.
Thailand	Songkhla Biofuel Co.,Ltd.	40/No	0.4	Provide biomass fuel to Songkhla Biomass Power Plant	Songkhla Biomass Co.,Ltd.
Thailand	Innopower Co.,Ltd.	30/No	45	• Develop innovations relating to renewable power generating, power trading, energy, smart grid and electric vehicles • Develop EV kits, smart transmission line monitoring system, garbage and hyacinth-collecting boats, insulator-cleaning robots, energy storage systems, location analysis/ display program, and invest in Regional Energy Trading company	Corporate customers

Location	Subsidiary/ Joint venture	Shareholding (%)/ Controlling power	Investment by shareholding (Million Baht)	Nature of business/product/service	Customers/User
Thailand	EGAT Diamond Service Co.,Ltd.	10/No	62.3	Provide refurbishment service for power plants' gas turbine	Corporate customers
Thailand	Bangkok Aviation Fuel Services Public Co.,Ltd.	15.53/ No	2,712.14	Provide integrated aviation fuel services at Bangkok International Airport, Don Mueang International Airport, and the airports in Samui, Sukhothai and Trat, and invest in foreign and domestic renewable energy businesses.	Corporate customers
Lao PDR	RATCH-Lao Services Co.,Ltd.	99.99/ Yes	336.86	Investment in energy and electricity-related business, infrastructure projects, and value-added businesses.	Corporate customers
Lao PDR	Phufai Mining Co.,Ltd.	37.5/ No	630	Obtain lignite mining concessions and sales.	Hongsa Power Co.,Ltd.
Lao PDR	SIPHANDONE RATCH-LAO Co.,Ltd.	25/ No	25	Manufacture wood pellets and cultivate fast-growing trees in a 30,000-rai concession plot in Champasak, and start commercial operations in 2022	Kyuden Mirai Energy Co.,Ltd. has signed a 15-year contract to buy 100,000 tons of wood pellets per year
Lao PDR	EDL-Generation Public Company	10.11/ No	3,312.88	Hold shares in EDL-GEN which is listed on Lao Securities Exchange via subsidiaries, RATCH-Lao Services Co.,Ltd. (5.65%) and RH International (Singapore) Corporation Pte. Ltd. (4.46%)	EDL-GEN generates electricity from hydropower and solar power for distribution in Lao PDR and neighboring countries.

Health service businesses

Location	Subsidiary/ Joint venture	Shareholding (%)/ Controlling power	Investment by shareholding (Million Baht)	Nature of business/product/service	Customers/User
Thailand	Principle Capital PCL	10/No	1,557.71	Operate a private hospital, private hospital management services and wellness business with 11 hospitals and 13 primary clinics in its network	General public
Lao PDR	Bangkok Chain International (Lao) Co.,Ltd.	9.91/ No	190	Operate the 254-bed and 43-examination room Kasemrat International Hospital in Vientiane Capital	General public -110 beds serving in the initial stage

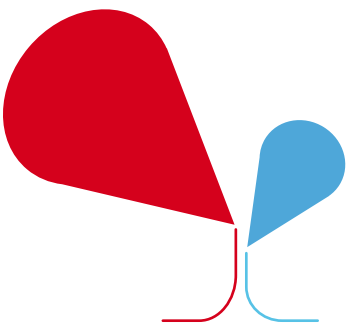
Shareholding structure

Electricity Generating Authority of Thailand (EGAT) is RATCH's major shareholder, holding 45 percent of 1,450 million shares. EGAT, a state enterprise, generates, sources and distributes bulk electric energy to Metropolitan Electricity Authority (MEA), Provincial Electricity Authority (PEA) and other users in Thailand and neighboring countries. It also operates other energy-related business under the EGAT Act.

Top 10 Shareholders as of 8 September 2021

	Shareholders	No. of shares	%
1	Electricity Generating Authority of Thailand	652,500,000	45.00
2	Thai NVDR Company Limited	77,276,896	5.33
3	Social Security Office	67,913,700	4.68
4	Electricity Generating Authority of Thailand Saving and Credit Cooperative Limited	56,792,500	3.92
5	South East Asia UK (Type C) Nominees Limited	37,855,165	2.61
6	Mr. Min Tienworn	20,076,200	1.38
7	State Street Europe Limited	12,880,959	0.89
8	Mr. Prateep Tangmatitham	11,888,600	0.82
9	Supalai Property Management Company Limited	8,036,300	0.55
10	Vayupak Fund 1 under MFC Asset Management Public Company Limited	7,068,750	0.49
11	Vayupak Fund 1 under Krungthai Asset Management Public Company Limited	7,068,750	0.49
	Total	959,357,820	66.16
	Other shareholders	490,642,180	33.84
	Grand total	1,450,000,000	100.00

Shareholders by nationality



Thai nationality
51,114 shareholders
1,371,494,425 shares | 94.59 %

Foreign nationality
144 shareholders
78,505,575 shares | 5.41 %

Total 51,258 shareholders | 1,450,000,000 shares

RATCH Group Public Company Limited's regulations prohibits foreign shareholders from holding more than 25% of total issued shares.

More details appear in

Number of employees

RATCH employs 474 workers for its operations in Thailand and overseas (excluding outsource company's operators), a 1.3% increase from 2020. In total, male employees number 315 or 66.5%, while female employees number 159 or 33.5%.

Base	Thai nationality (Person)	Lao nationality (Person)	Australian nationality (Person)	Others (Person)	Total (Person)
Thailand	Male = 129 Female = 131	Male = 0 Female = 0	Male = 0 Female = 0	Male = 0 Female = 0	Male = 129 Female = 131
Lao PDR	Male = 6 Female = 1	Male = 158 Female = 19	Male = 0 Female = 0	Male = 0 Female = 0	Male = 164 Female = 20
Australia	Male = 2 Female = 0	Male = 0 Female = 0	Male = 13 Female = 7	Male = 0 Female = 0	Male = 15 Female = 7
Indonesia	Male = 3 Female = 0	Male = 0 Female = 0	Male = 0 Female = 0	Male = 0 Female = 0	Male = 3 Female = 0
Vietnam	Male = 4 Female = 0	Male =0 Female = 0	Male = 0 Female = 0	Male = 0 Female = 0	Male = 4 Female = 0
Singapore	Male = 0 Female = 1	Male = 0 Female = 0	Male = 0 Female = 0	Male = 0 Female = 0	Male = 0 Female = 1
Total	277	177	20	0	474

More information in Performance Data Page 155

Revenue Structure

RATCH's revenue is classified into four main categories:

1. Revenue from electricity sales and services and revenue from lease contracts the majority of the Company's revenue generated by the electricity generation business. It covers revenues determined accordingly to the power purchase agreements for each power plant and the energy pricing structure in each country that encompasses Availability Payment, Energy Payment, Capacity Payment, Fuel Saving, and the price of energy and steam distributed to industrial users.
2. Profit sharing from associated and joint venture companies.
3. Dividends from subsidiaries and the Company's investment.
4. Other revenues covering interest income, service revenues and others.

Read more in

Sustainability Performance Highlight in 2021

Environmental Dimension

GHG emission reduction
4,290,085 tCO_2e

Volume of saved energy:
23,717 MWh

Certified carbon credit:
3,034 tCO_2e

Hazardous wastes not deposited in landfills:
79 tons

Water consumption reduction:
8%

Water recycling rate:
10%

Renewable energy consumption:
1,513 MWh

Complaints and fines for legal noncompliance: **None**

Economic Dimension

Net renewable energy generation:
7,247,621 MWh

Ratio of renewable energy revenue to total revenue:
19.2%

Investment on renewable energy in 2021:
THB 2,503.60 million
20.1% of total investment

Investment on innovation in 2021:
THB 45 million
0.4% of total investment

Social Dimension

Environmental expenses and investment:
THB 17.6 million

Occupational illness incidence rate: Employees/Suppliers
= 0 /200,000 Hours worked

Lost-Time Injury Frequency Rate:
= 0.13 /200,000 Hours worked

Community Investment :
THB 179.99 million

No. of communities winning Model Community Forest Award: **146 Communities**

Prize value: **THB 3,155,000**

Combined forest areas: **123,979 rai**

Carbon sequestration capacity: **781,068 tCO_2**

Fuels saved by the Community Energy Project's solar-powered water pumps: **17,280 liters**

GHG emission reduction: **37.84 tCO_2e**

No. of households benefiting from solar- powered pumps: **100 households**

No. of vocational students receiving training on electrical controls, metal welding mechanical and general maintenance, and renewable energy under the Education for Career Empowerment Project in Lao PDR 2011-2021: **1,154 persons**

Ratio of participating students employed and continue education: **90%**

No. of vocational teachers awarded scholarships and extra training: **100 persons**

No. of vocational Institutions in Lao PDR awarded supports for electrical controls, machinery, welding and renewable energy workshops:
8 workshops in 7 vocational schools

Project funding during 2011-2021:
THB 37,106,500

Infringement to labor, community and environmental:
None

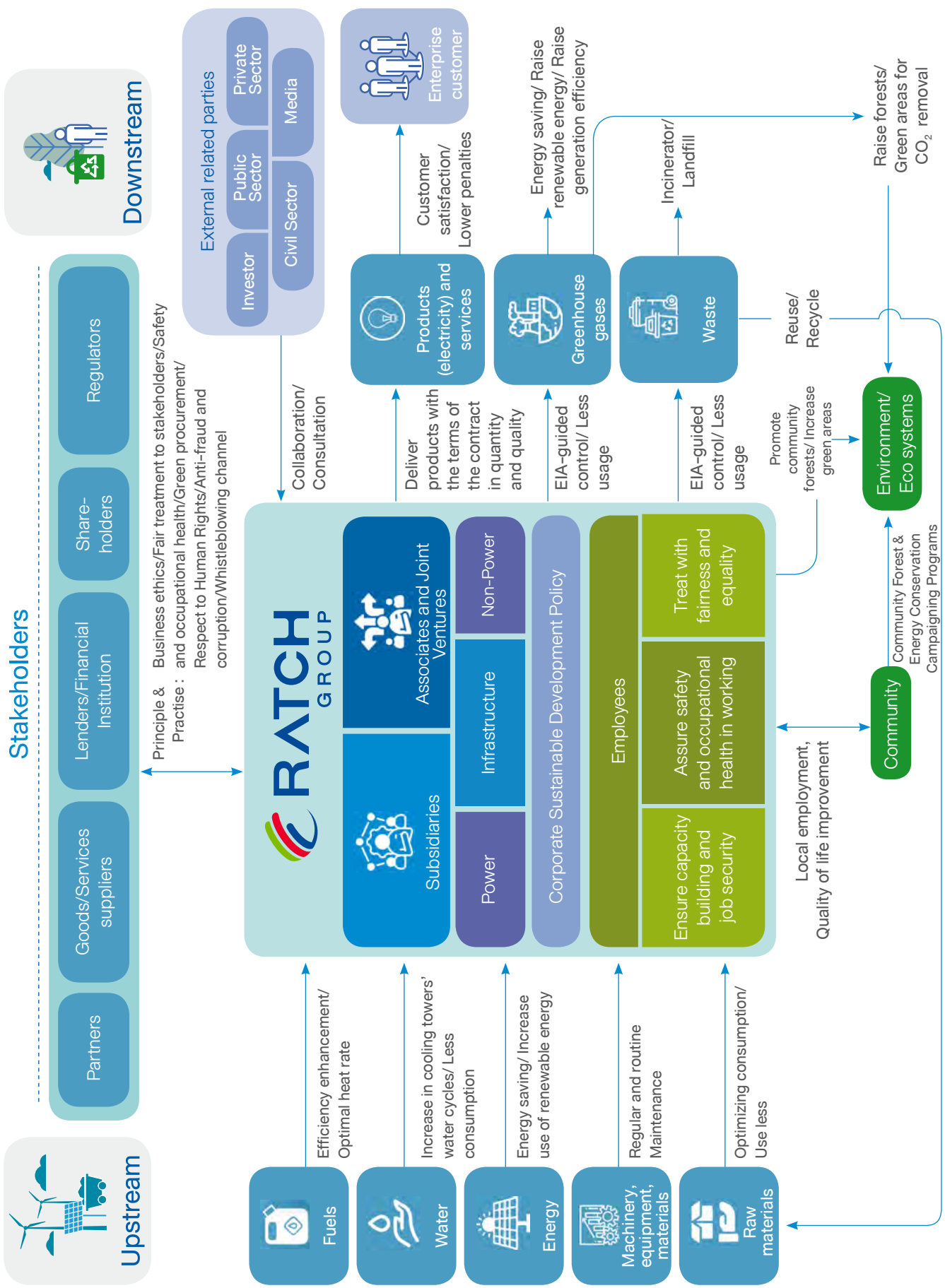
Awards and Recognition from External Organizations

RATCH Group Public Company Limited
• Deal of the Year Award and Environmental, Social and Governance Bond (ESG Bond) Private Sector Award for the THB 8,000 million Environmental Conservation Bond or Green Bond by Thai Bond Market Association
• Best Local Currency Green Bond Award - Renewable Energy / Transition Energy Category at The Asset Triple A Sustainable Capital Markets Country and Regional Awards 2020 by The Asset Magazine
• Outstanding Company Award 2021 - Resources Sector at Money & Banking Awards 2021 by Money & Banking Magazine
• Average score of 96% from Corporate Governance Report of Thai Listed Companies 2021 Project by Thai Institute of Directors Association with support from the Stock Exchange of Thailand
• 100 / full score from Annual General Meeting Assessment 2021 by Thai Institute of Directors Association
• Highly Commended in Sustainability Award in Sustainability Excellence category of SET Awards 2021 by the Stock Exchange of Thailand
• Inclusion in Thailand Sustainability Investment 2021 (THSI 2021) by the Stock Exchange of Thailand for the seventh consecutive year
• Sustainability Disclosure Award 2021 by Thaipat Institute for the third consecutive year
• 2021 award as a benefactor by the Royal Forest Department
• Green Office Award - Gold Level in 2021 by the Department of Environmental Quality Promotion
Ratchaburi Electricity Generating Company Limited
• Silver plaque and certificate from the Zero Accident Campaign 2021 of Thailand Institute of Occupational Safety and Health (Public Organization) (for enterprises that reported zero lost-time injury for accumulated hours worked from 3,000,000-9,999,999 hours) for the second consecutive year
• Sustainability Disclosure Acknowledgement Certificate 2021 by Thaipat Institute
• CSR-DIW Continuous Award 2020 from the Department of Industrial Works' Eco Industrial Development Division, Ministry of Industry for the tenth consecutive year
Nava Nakorn Electricity Generating Company Limited
• Environmental Governance Award by the Ministry of Industry
• Primary-level certificate from the Zero Accident Campaign 2021 of Thailand Institute of Occupational Safety and Health (Public Organization) (for enterprises that reported zero lost-time injury for accumulated hours worked below 1,000,000 hours)

Certification

Standard	Awardee
Carbon Footprint for Organization by Thailand Greenhouse Gas Management Organization (Public Organization)	• RATCH Group Public Company Limited • Ratchaburi Power Plant • RATCH Cogeneration Power Plant
Thailand Voluntary Emission Reduction Program by Thailand Greenhouse Gas Management Organization (Public Organization) Energy efficiency category	Energy Efficiency Project through LED Lighting Replacement by Ratchaburi Electricity Generating Company Limited • Ratchaburi Electricity Generating Company Limited (Project owner/developer) • RATCH Group Public Company Limited (Co-developer)
Thailand Voluntary Emission Reduction Program by Thailand Greenhouse Gas Management Organization (Public Organization) Renewable energy category	Solar Floating Project at Ratchaburi Electricity Generating Company Limited • Ratchaburi Electricity Generating Company Limited (Project owner/developer) • RATCH Group Public Company Limited (Co-developer)
Thailand Voluntary Emission Reduction Program by Thailand Greenhouse Gas Management Organization (Public Organization) Forests category	Sustainable Forestation Project of Ratchaburi Power Plant by Ratchaburi Electricity Generating Company Limited • Ratchaburi Electricity Generating Company Limited (Project owner/developer) • RATCH Group Public Company Limited (Co-developer)
Environmental Management System under ISO 14001 standard	• Ratchaburi Power Plant (ISO 14001:2015) • Nava Nakorn Power Plant (ISO 14001:2015)
Occupational Health and Safety Management System under ISO 45001 standard	• Ratchaburi Power Plant (ISO 45001:2018)
Green Industry Award - Level 3 (Green System) by the Department of Industrial Works, the Ministry of Industry	• Nava Nakorn Power Plant
Green Industry Award - Level 2 (Green System) by the Department of Industrial Works, the Ministry of Industry	• Berkprai Cogeneration Power Plant
Quality Management Systems under ISO 9001 standard	• Nava Nakorn Power Plant (ISO 9001:2015) • Berkprai Cogeneration Power Plant (ISO 9001:2015)

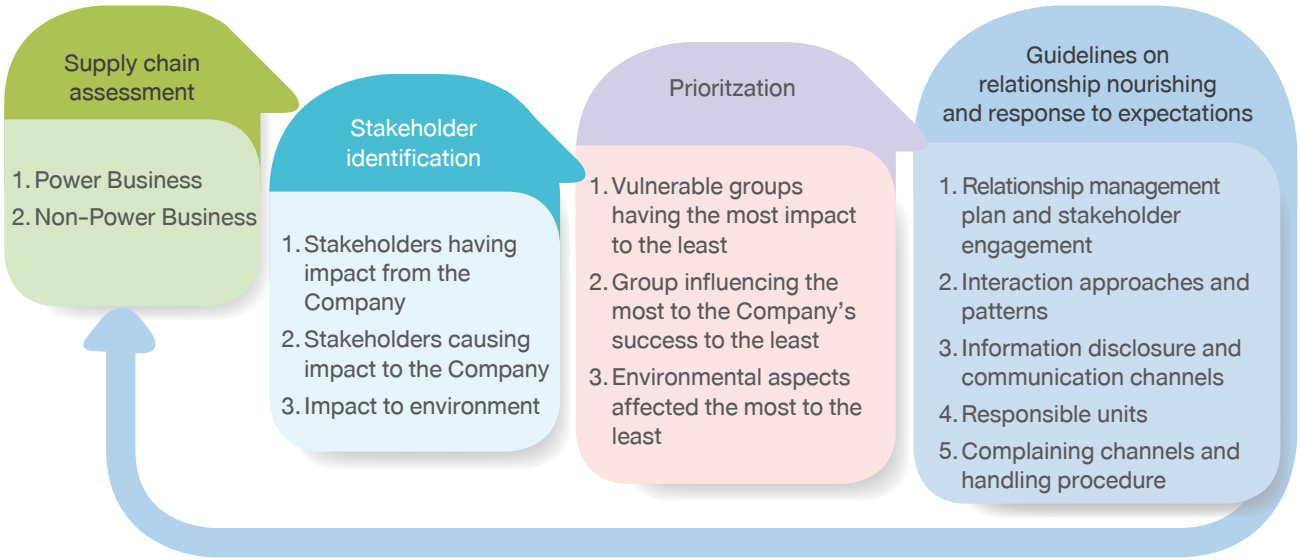
Value Chain of RATCH's business



Stakeholders' Engagement and Cooperation

RATCH's mission to achieve business goals involves stakeholders who hold the key to corporate success and sustainability.

Main stakeholders in the value chain of RATCH



Main stakeholders in the value chain of RATCH, who have significant influence on the Company's future growth, are classified into 4 groups as follows:

All business units of the Group are required to nurture the relationship with all relevant stakeholders, and strengthen long-term collaboration through the guidelines specified in the Code of Conduct.

Read more in *Form 56-1 One Report*

Each year, interaction approaches and patterns are modified along with in communications channels, in line with changing circumstances. In 2021, when the COVID-19 outbreak intensified, online channels were the tools to communicate with stakeholders. The channels supported meetings, gathering of recommendations and brainstorming for solutions in an appropriate and timely manner.

RATCH has outlined the guidelines to engage stakeholders, satisfy their expectations and support long-term relationship as follows:

Shareholders	
Expectations	• Corporate sustainability and appropriate returns • Capability in managing environmental, social and governance risks in the short and long term • Competitiveness and business goals • Corporate governance and transparency
Response guidelines	• Review and improve business plans, strategies and targets with concerns about economic, environmental and social dimensions that matter for shareholders. • Analyse and monitor risk issues; assess impacts; and prepare measures for the management of enterprise and project risks as well as the risks and impacts from climate change and new risks that may emerge in the next 3-5 years. • Cooperate with business partners in expanding business and raising competitiveness, while caring for society and the environment. • Disclose accurate, complete, sufficient, comprehensive and timely information, on the basis of transparency and equitability under national and international requirements and practices. • Give shareholders an opportunity to directly submit their opinions, nominate directors and complaints to the Company. • Designate the Office of Company Secretary and Investor Relations Department to communicate with shareholders.
Engagement channels	• Annual General Meeting and Extraordinary General Meeting • Company visit • Information disclosure through SET's system • Annual Report and Sustainability Report • Questionnaire on sustainability • Complaint Channel (https://www.ratch.co.th/en/cg/whistleblower) ◊ Chairman or directors: directors@ratch.co.th ◊ Independent directors: id@ratch.co.th ◊ Audit Committee: ac@ratch.co.th ◊ Chief Executive Officer: ceo@ratch.co.th ◊ Head of Internal Audit Division: internalaudit@ratch.co.th • Office of Company Secretary: https://www.ratch.co.th/en/cg/secretary Tel. 02 794 9510, email: cs@ratch.co.th • Investor Relations Department: https://investor.ratch.co.th/ir_contact.html Tel. 02 794 9841, email: ir@ratch.co.th
Expected results for shareholders	• Constant returns and confidence in corporate growth • Access to the Company's important information for timely decision making • Treatment according to their rights, which is being lifted to meet national and international requirements and practices. • Safeguarding and protection of shareholders' interests

Employees	
Expectations	• Job security and career advancement • Safe and favorable work environment • Fair and equitable treatment
Response guidelines	• Review remuneration and welfare against peer companies • Set work safety measures, monitor compliance with safety measures and ensure safe work environment that underlines occupational health • Provide constant capability enhancement and evaluate employee performance accordingly to indicators that support the organization's goals • Support and promote employee engagement in the Company's activities and activities that benefit society • Establish channels - email, opinion box and direct contact with executives - that employees can submit their opinions, complaints and appeals
Engagement channels	• Communications via email and Intranet • Biannual "CEO Meet Employees" events • Annual engagement survey • Function's activities that promote employee engagement and corporate CSR activities • Complaint Channel via corporate website
Expected results for employees	• Employees are confident and proud of the organization. • Employees at all levels receive average 23.5 hours of training. • Employees safely carry out their tasks without accident or work-related injury.
Business partners (Partners, Suppliers, Creditors and Customers)	
Expectations	• Fair, transparent and rightful operations • Credibility, stability and ability to compete in national and international stages • Full compliance with contracts, with quality products and punctual delivery • Maintenance and extension of business collaboration in the long term
Response guidelines	• Adhere to governance principles in administration and business operations and seek continuous recertification of Thai Private Sector Collective Action Against Corruption (CAC)'s membership • Develop the Code of Conduct for suppliers as guidelines for collaboration with suppliers in the supply chain • Task a unit to manage contracts, to ensure complete compliance with conditions as planned • Maintain power plants' production efficiency to satisfy customer demand and keep environmental quality within regulatory requirements and international standards • Apply industry best practices and international standards in enhancing operational efficiency and build stakeholders' confidence
Engagement channels	• Regular meetings with partners, suppliers and customers • Meeting with joint venture partners via monthly Board of Directors/the Management meetings • Annual survey of industrial customer satisfaction • Compliant Channel: https://www.ratch.co.th/en/cg/whistleblower • Cross-organization collaboration • Contact channel on the Company's website: https://www.ratch.co.th/en/contact
Expected results	• Confidence and trust for business collaboration • Stakeholders are delivered products and services as well as payments/debt repayments in full and on time. • Transparent collaboration based on fair profit sharing and ability to continue cooperation

Community, society and environment (community, the public sector, investors, analysts, media and the environment)	
Expectations	• Impacts from operations on community, society and the environment • Transparent, sufficient, equitable and timely information disclosure • Operations that underline corporate governance and business ethics • Compliance with laws and regulations as well as engagement and collaboration with various parties
Response channel	• Assess risks and outline preventive and corrective measures for impacts from the Company's operations and business on community, society and the environment • Disclose operational data on a constant, sufficient and timely basis as well as establish channel for stakeholders' opinions and complaints • Define the unit to take responsibility for direct communications and collaboration with stakeholders • Define the procedure in monitoring compliance with the Code of Conduct, laws, regulations and measures specified in EIA; and penalties in the case of breaches or violations. • Monitor stakeholders' views as publicized by media and other communication channels including social media and improve the operations accordingly • Organize a plant visit so that community and other parties in the vicinity can take part in the inspection of the power plants' operations
Engagement channels	• Monthly community visit by the community relations unit • 4 press conferences per year • 4 Analyst Meetings per year • Collaborative social activities organized jointly with government offices and community • Annual community satisfaction survey • Tri-partite committee and Environmental Inspectors Committee • Power plants' complaint channel and the Company's website • The Company's website: www.ratch.co.th/en/contact • Engagement and support to the activities of community, government offices and media outlets
Expected results for stakeholders	• Trust and confidence in the Company's operations • Employment of local workers and development of local economy • Volume of pollutants maintained within standard limits for the quality of community environment and society • Zero violations of environmental laws and full compliance with measures in EIA • Closer relationships that lead to collaboration in various fronts

Engagement and collaboration

RATCH has collaborated with external organizations, being the public sector, private organizations and non-profit organizations in undertaking activities that promote sustainable development in economic, social and environmental aspects.

Organization	Country	Approach	Starting year	Project/Activity
Thai Institute of Directors Association (IOD)	Thailand	Voluntary	2015	Thai Private Sector Collective Action Against Corruption (CAC)
Stock Exchange of Thailand			2015	Listed companies' sustainability assessment
Thailand Greenhouse Gas Management Organization (Public Organization)			2016	Carbon Footprint Assessment for Ratchaburi Power Plant
			2017	Low Emission Support Scheme (LESS)

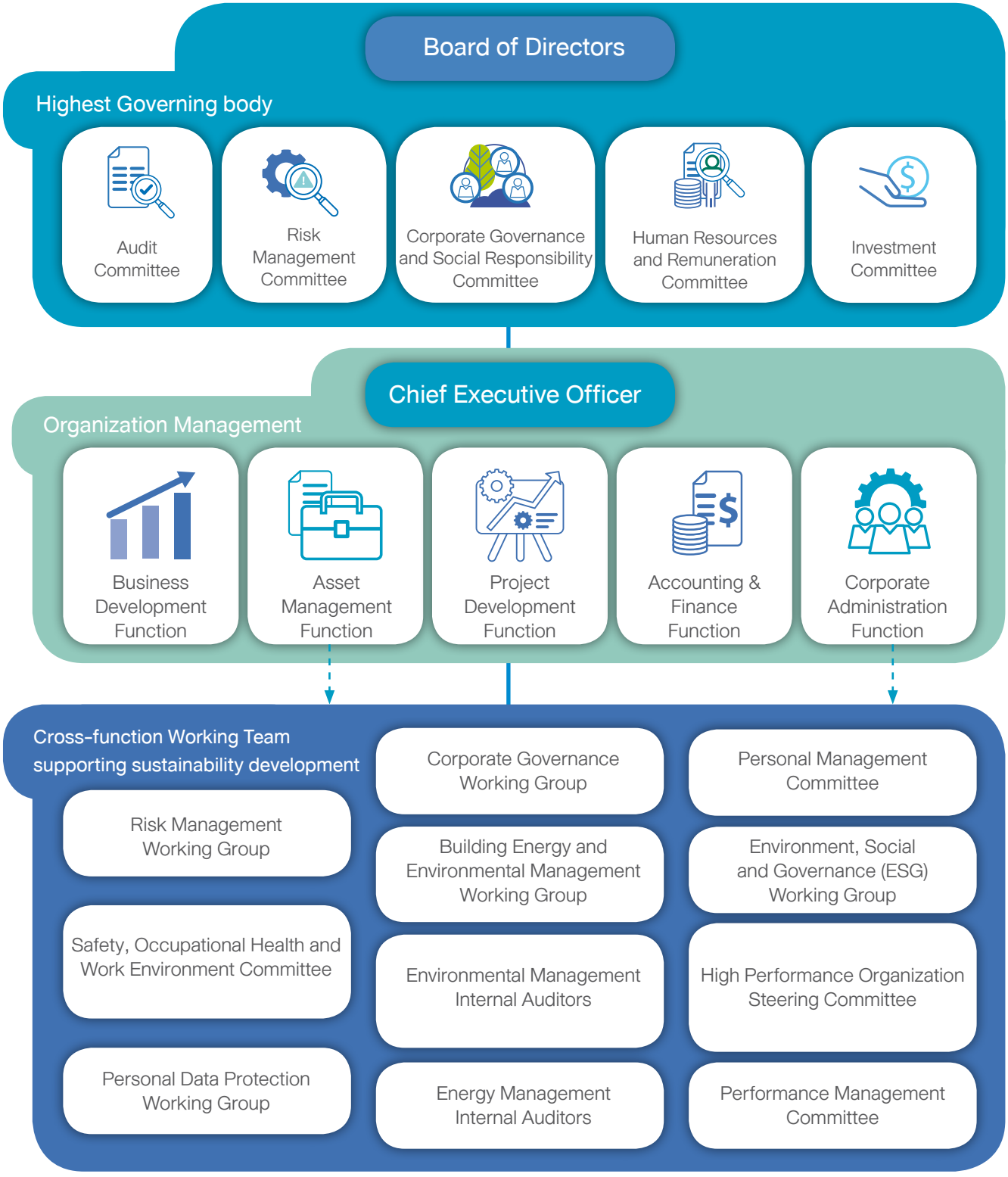
Organization	Country	Approach	Starting year	Project/Activity
Thailand Greenhouse Gas Management Organization (Public Organization)	Thailand	Voluntary	2018	Thailand Voluntary Emission Reduction Program (T-VER)
			2018	CFO for Head Office
			2018	CFO for RATCH Cogeneration Power Plant
Department of Industrial Works			2012	Corporate Social Responsibility, Department of Industrial Works (CSR-DIW) Awards
Community Forest Management Office, Royal Forest Department			2008	Love the Forest and the Community Project
Plant Genetic Conservation Project Under the Royal Initiative of HRH Princess Maha Chakri Sirindhorn			2017	Supporting the initiative through special activities: training on school botanical gardens and local natural resources
Ratchaburi Provincial Energy Office			2020	Community Energy Project
Ministry of Education and Sports	Lao PDR	Voluntary	2011	Education for Career Empowerment Project
• Sirindhorn International Environmental Park Foundation Under HRH Princess Maha Chakri Sirindhorn's patronage/ • Electricity Generating Authority of Thailand/ • Electricity Generating Public Company Limited	Thailand	Voluntary	2015	United force to return nature to the environment in honor of HRH Princess Maha Chakri Sirindhorn
Electricity Generating Authority of Thailand (EGAT)			2016	"Kla Dee" to promote environmental conservation in Nan Province through collaborative efforts of EGAT, government offices and private organizations in the province

Membership

Organization	Status	Sustainability dimension	RATCH's role
Thailand Management Association (TMA)	Member	Economic	• Attending meetings, seminars on business administration, networking activities
Thai Institute of Directors Association (IOD)	Member	Governance	• Attending training and seminars on corporate governance for directors, executives and employees • Supporting academy activities

Organization	Status	Sustainability dimension	RATCH's role
Thailand Listed Companies Association	Member	Governance	• Attending meetings and seminars on business management • Joining sustainability awards
Thai Private Sector Collective Action Against Corruption	Member	Governance	• Endorsing its manifesto, and being a certified member
Association of the Electricity Supply Industry of East Asia and Western Pacific (AESIEAP)	Member	Economic	• Exchanging information on regional industry • Attending meetings, seminars and study trips on technology in the region
ICC Thailand National Committee Board of Trade	Member	Economic	• Attending meetings, seminars, training and other activities • Supporting activities
Electricity Supply Industry Association of Thailand	Executive Director	Economic	• Promoting electricity-related technology and exchanging knowledge and experience on all fields of engineering technology • Joining capacity enhancement activities for professional engineers
Thailand Business Council for Sustainable Development and Thailand Environmental Institute	Member	Governance Environmental Social	• Being a Council member and Associate member • Being a partner of its environmental activities and climate change
Thailand Environment Institute Association of Electrical and Electronic Engineers (IEEE)	Supporter	Economic	• Supporting academic activities
Thailand Productivity Institute	Member	Social	• Joining seminars and study trips

Corporate Governing Structure



Corporate Administration and Asset Management Functions play critical role in running all cross-function working teams supporting corporate sustainability development

Corporate Governance

The Board of Directors serves as RATCH's highest governing body. The criteria and role of the Board of Director are shaped accordingly to its mission, targets and business context as well as the Securities and Exchange Commission's governance best practices for listed companies and internationally-recognized standards. The Board of Directors' criteria and role are written in the Regulations of the Board of Directors B.E. 2562 and posted on the Company's website: https://www.ratch.co.th/Uploads/Web/Attachment/6d4eca61-ad49-44e0-9f3a-1a8eb2341025.pdf

Read more in

The Board of Directors plays an important role in leading the organization towards success. The Board of Directors must be visionary in formulating business strategies as well as oversee and ensure the Company Group's operations and compliance with applicable laws, business objectives, shareholders' resolutions, rules, regulations and corporate governance practices.

Components of the Board of Directors in 2021

Element	Year 2021
Number of directors	The 12 directors are: 1. Mr. Boonyanit Wongrukmit 2. Mr. Chartchai Rojanaratanangkule 3. Mr. Apichart Chinwanno 4. Mr. Ratanachai Namwong 5. Mr. Boonsong Kerdklang 6. Mr. Kriengkrai Rukkulchon 7. Mr. Somboon Nhookeaw 8. Miss Nantika Thangsuphanich 9. Mr. Suthon Boonprasong 10. Miss Niramarn Laisathit 11. Mr. Prasertsak Cherngchawano 12. Miss Choosri Kietkajornkul *The Company's regulations specify the number of directors of at least 7 and no more than 15. All are appointed at the Annual General Meeting.* *Read more in*
Chairman	One Chairman: Mr. Boonyanit Wongrukmit *The Company's regulation specifies the Chairman shall not be an executive director or Chief Executive Officer and shall not have any relationship with the Management. The Chairman shall not serve as Chief Executive Officer to ensure the right balance of power and prevent the unlimited power of either of them. They work with different sets of duties and responsibilities. The regulation also requires the Board of Directors to appoint one of their own, who is not neither executive director nor and who is not Chief Executive Officer, as the chairman.*
Number of independent directors	Six independent directors are: 1. Mr. Chartchai Rojanaratanangkule 2. Mr. Apichart Chinwanno 3. Mr. Ratanachai Namwong 4. Mr. Boonsong Kerdklang 5. Mr. Kriengkrai Rukkulchon 6. Mr. Somboon Nhookeaw *The Company's regulation demands a minimum of one third shall be made up of independent directors, and at least three independent directors.*

Element	Year 2021
Sub-committees	Five sub-committees: 1. Audit Committee, with 3 members and Head of Internal Audit Division serving as the Committee's secretary. Read more in 2. Risk Management Committee with 3 members and Head of Corporate Planning and Systems Development Division serving as the Committee's secretary. Read more in 3. Investment Committee with 4 members and Chief Business Development Officer serving as the Committee's secretary. Read more in 4. Human Resources and Remuneration Committee with 3 members and Executive Vice President-Corporate Administration serving as the Committee's secretary. Read more in 5. Corporate Governance and Social Responsibility Committee with 2 members and Executive Vice President-Corporate Administration serving as the Committee's secretary. Read more in
Number of executive-director	One: Miss Choosri Kietkajornkul, as Chief Executive Officer *The Company's regulation specifies the number of executive directors must not exceed one third of all directors.*
Number of directors representing major shareholders	Six directors representing 50% of the total 1. Mr. Boonyanit Wongrukmit 2. Miss Nantika Thangsuphanich 3. Mr. Suthon Boonprasong 4. Miss Niramarn Laisathit 5. Mr. Prasertsak Cherngchawano 6. Miss Choosri Kietkajornkul
Number of female directors	Three female directors representing 25% of the total 1. Miss Nantika Thangsuphanich 2. Miss Niramarn Laisathit 3. Miss Choosri Kietkajornkul
Average serving period	2.1 years *The Company's regulation sets a 3-year term and prohibit directors from holding the position for more than 6 consecutive years.*
Average director age	61.8 years *The Company's regulation concerning directors' qualifications specifies directors must not be aged over 72 years.*
Directors who hold positions in other listed companies	Four directors: 1. Mr. Apichart Chinwanno 1 company 2. Mr. Kriengkrai Rukkulchon 1 company 3. Miss Niramarn Laisathit 2 companies 4. Miss Choosri Kietkajornkul 2 companies *The Company's Regulation prohibits directors from holding positions in more than 3 listed companies.*

Read more in

Independent Director's Qualifications

The Regulation of the Board of Directors outlines the 7 qualifications of independent directors as summarized below:

1. Holding no more than 0.5% of all voting shares of the Company, subsidiaries, affiliates, joint ventures or any juristic person who may have conflicts of interest, including the shares held by their related persons.
2. Neither being nor having been an Executive Director, employee, staff or advisor who receives salary, or a controlling person of the Company, its subsidiary or affiliate unless the foregoing status has ended at least two years prior to the date of appointment as the Independent Director.
3. Not being a person related by blood or registration under laws, such as father, mother, spouse, sibling, and child of executives, major shareholders, controlling persons, or persons to be nominated as executive or controlling persons of the Company or its subsidiary.
4. Not having a business relationship with the Company, its subsidiary, affiliate, joint venture, or juristic person who may have conflicts of interest, in manner may interfere with his independent judgement, and neither being nor having been a major shareholder, Non-Independent Director or executive having business relationship with the Company and any entity in the Group.
5. Neither being nor having been an auditor of the Company or any entity in the Group and not being a major shareholder, Non-Independent Director, executive or partner of an audit firm which employs auditors of the Company and any entity in the Group.
6. Not being or having been a professional service provider including legal consultant, financial advisor who received over THB 200,000 service free annually from Company, subsidiaries and entity in the Group.
7. Not being a director appointed to represent the Company's directors, major shareholders or shareholders related to major shareholders.

Governance Efficiency in 2021

Meeting

1. No. of Board of Directors meetings: 13 meetings
2. No. of Sub-committee meetings:
   - Audit Committee: 8 meetings
   - Risk Management Committee: 5 meetings
   - Investment Committee: 12 meetings
   - Human Resources and Remuneration Committee: 9 meetings
   - Corporate Governance and Social Responsibility Committee: 4 meetings
   - Co-Meeting of Audit Committee and Risk Management Committee: 3 meetings
3. No. of meetings by non-executive directors: 2 meetings

The Company's regulations require the Board of Directors convene at least once a month and the meeting of directors without the Management's presence be held at least once a year. At least half of the directors must attend the meeting to form a quorum.

Average meeting attendance

The Board of Directors: 100%

Sub-committees:

- Audit Committee: 100%
- Risk Management Committee: 100%
- Investment Committee: 100%
- Human Resources and Remuneration Committee: 100 %
- Corporate Governance and Social Responsibility Committee: 100%

Directors appointed in 2021	• No. of new directors appointed in 2021: six persons • No. of directors reappointed in 2021: three persons
Directors' experience and expertise	• Power generation and energy business: 9 directors • Infrastructure: 1 director • Public sector and state enterprise: 12 directors • Other businesses/industries: 6 directors
Board of Directors' annual self-assessment	Board of Directors: 96.83 out of 100 full scores Sub-committees: • Audit Committee: 78.33 out of 80 full scores • Risk Management Committee: 79.33 out of 80 full scores • Investment Committee: 78.33 out of 80 full scores • Human Resources and Remuneration Committee: 79.33 out of 80 full scores • Corporate Governance and Social Responsibility Committee: 78.50 out of 80 full scores *The Company's regulation requires the Board of Directors and sub-committees conduct annual self-assessments, with the criteria, method and indicators set in line with the Company's targets; and disclose their performance.*
Directors' remuneration	Board of Directors: THB 15,657,513.83 million (only for 11 non-executive directors) *Sub-committees:* • Audit Committee: THB 858,000 million (3 directors) • Risk Management Committee: THB 642,000 million (4 directors) • Investment Committee: THB 1,272,000 million (7 directors) • Human Resources and Remuneration Committee: THB 702,000 million (3 directors) • Corporate Governance and Social Responsibility Committee: THB 216,000 million (2 directors)

Read more in

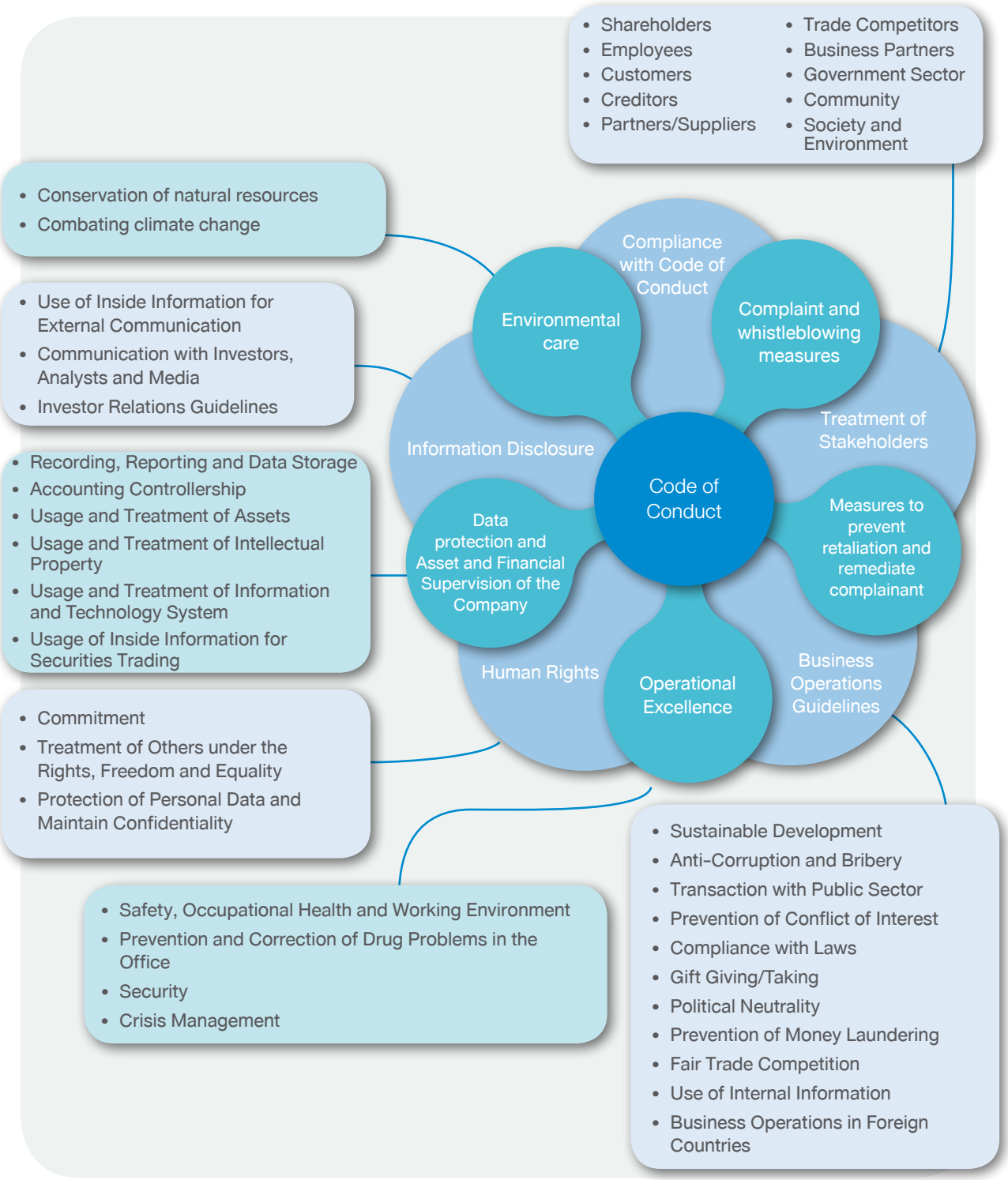
Managing Transparency of Board of Directors

- Set a clear and transparent process to manage connected transactions, having the Audit Committee examine the transactions and submit regular reports to the Board of Directors.
- Allow at least two directors to call for a Board of Directors meeting with the Chairman shall convening the meeting within fourteen days receiving the request.
- Set an appropriate ratio or number of independent directors in the Board of Directors to assert proper balance of power between the Board of Directors and the Management and/or major shareholders.
- Prohibit directors with vested interest in an agenda from voting on the agenda.
- Independent directors may be assigned by the Board of Directors to make a decision with regard to the business operations of the Company, its subsidiary, affiliate, subsidiary of the same level or juristic person that may have conflict of interest. Such decision shall be a collective decision.
- Assign the Audit Committee, the Risk Management Committee and the Corporate Governance and Social Responsibility Committee to coordinately monitor and manage risks, conflicts of interest, fraud and corruption risks in particular, and submit reports to the Board of Directors.
- Monitor the efficiency of communications and disclosure of financial and non-financial information to stakeholders and the general, public, business units' communication process and channel in complete, through and timely manners, and full compliance with relevant laws and regulations.

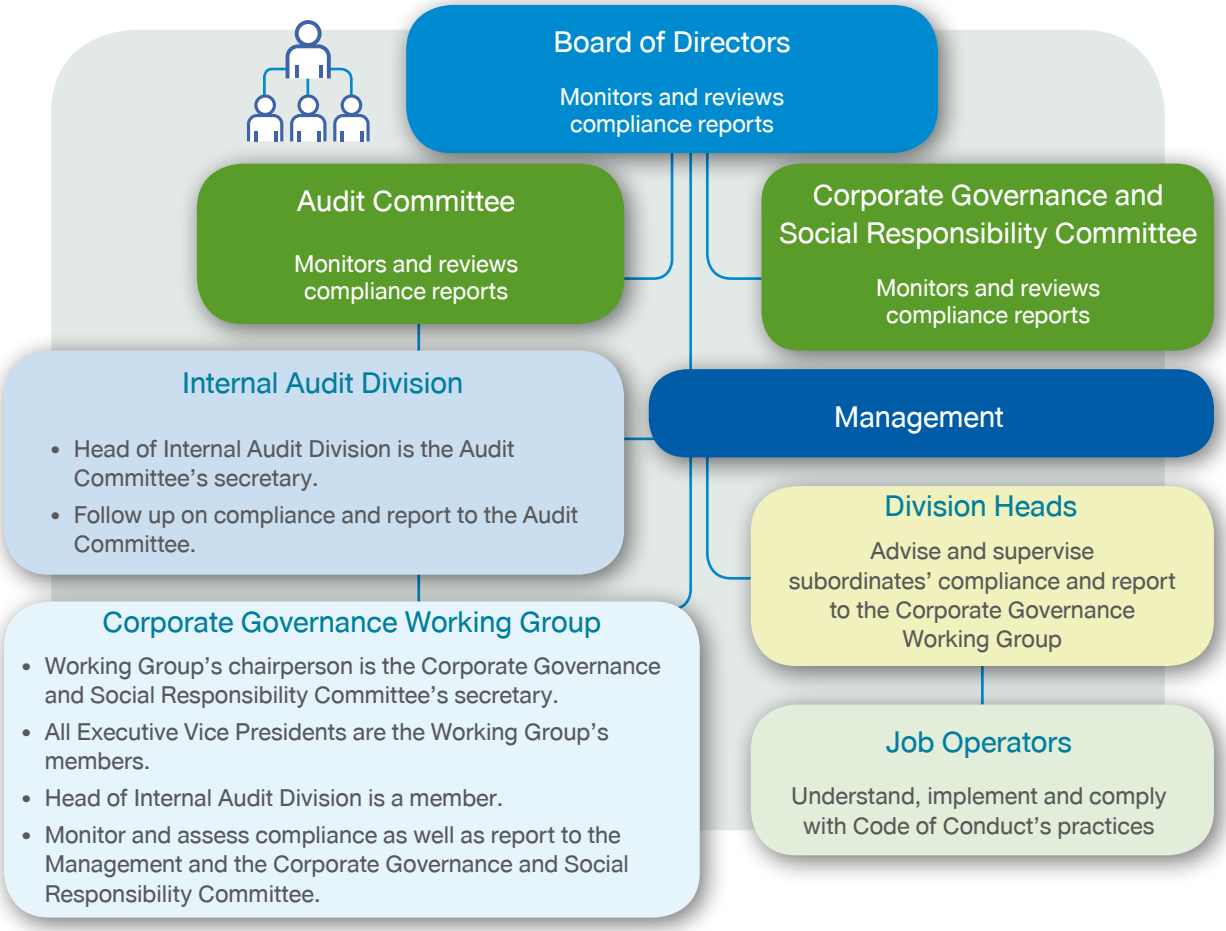
Code of Conduct and Anti-Corruption

RATCH Group Public Company Limited has strictly complied with the Code of Conduct that was shaped by governance and sustainable development principles, in formulating work guidelines.

Code of Conduct



Code of Conduct compliance monitoring process



Performance in 2021

The Corporate Governance Working Group assessed the compliance with the Company's Code of Conduct and reported the results to the Corporate Governance and Social Responsibility Committee. The 2021 compliance score was 100% with zero breach or violation.

Anti-Fraud and Corruption

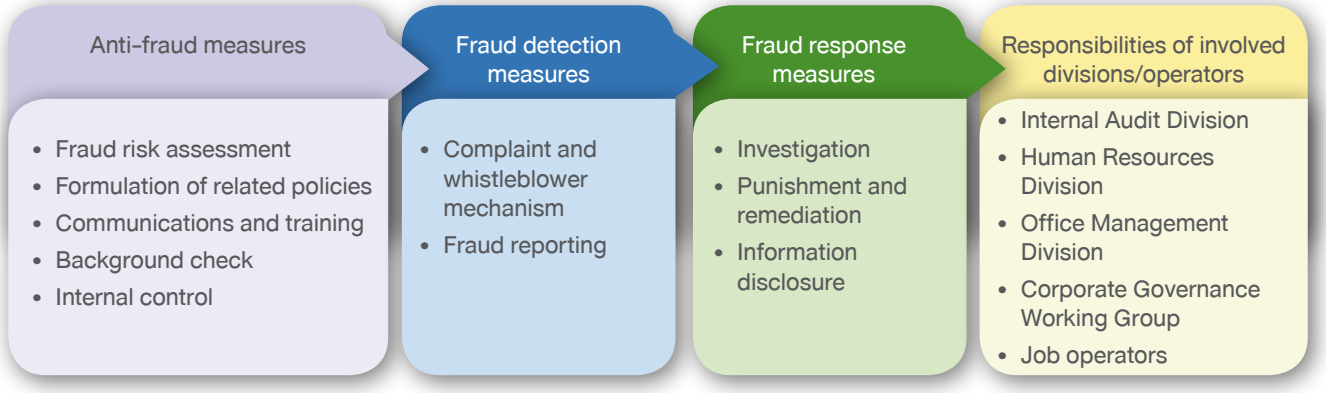
RATCH integrates ethics and morals into business operations and vows not to be negligent of any act that could lead to fraud and corruption, even though the Company will benefit from such act. All job operators are required to understand and strictly comply with laws and regulations relating to fraud and corruption, the Code of Conduct and work processes.

RATCH reiterates the policy to thoroughly and appropriately investigate fraud-related irregularities, while maintaining neutrality in the investigation. Wrongdoers are subjected to maximum penalties. Any job operator who knew of fraudulent acts and failed report the acts are also subjected to disciplinary actions. RATCH pledges not to demote, punish or cause troubles to any job operator who says no to corruption even if that misses business opportunities. Complainants are promised the best protection, as required by laws.

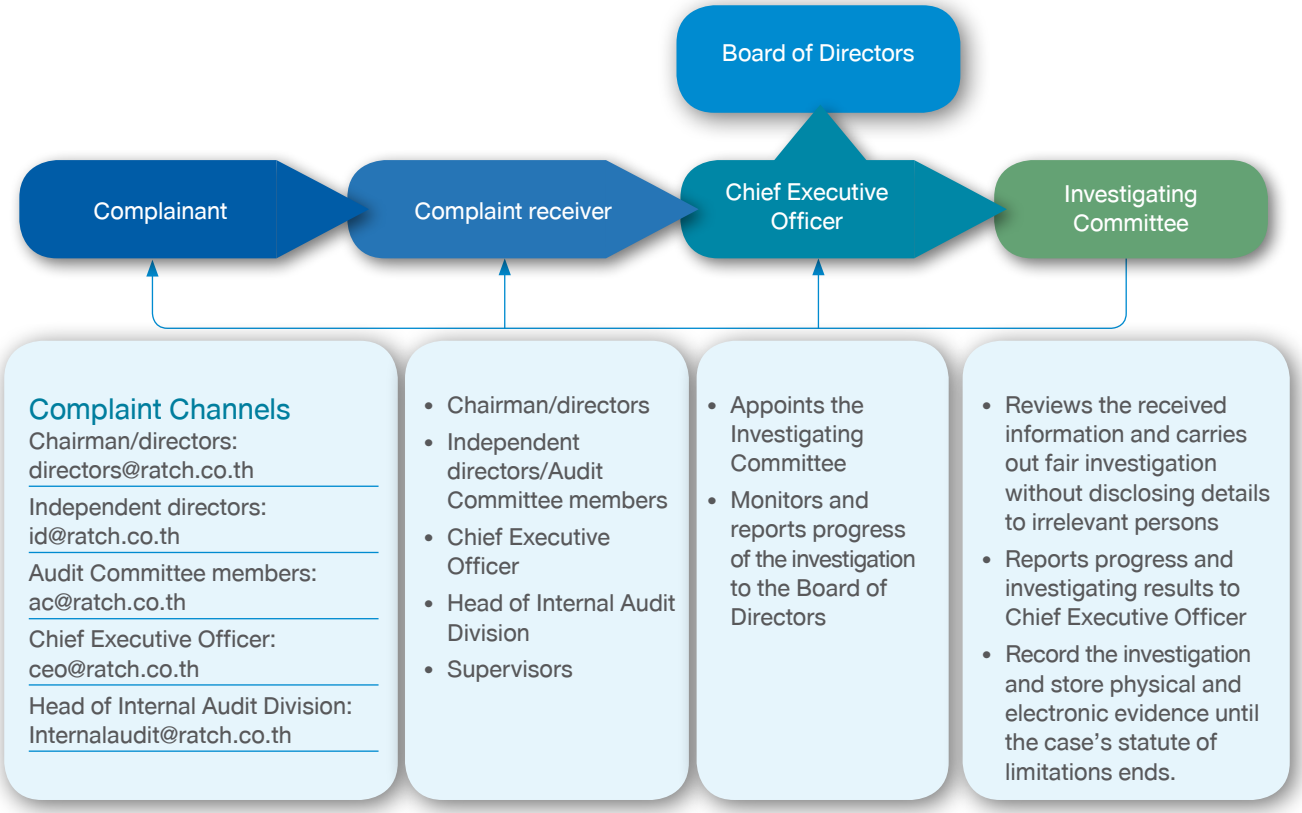
RATCH has its anti-fraud and corruption guidelines in writing, under the Anti-Fraud and Corruption Policy.

Read more in

Anti-Fraud and Corruption guidelines



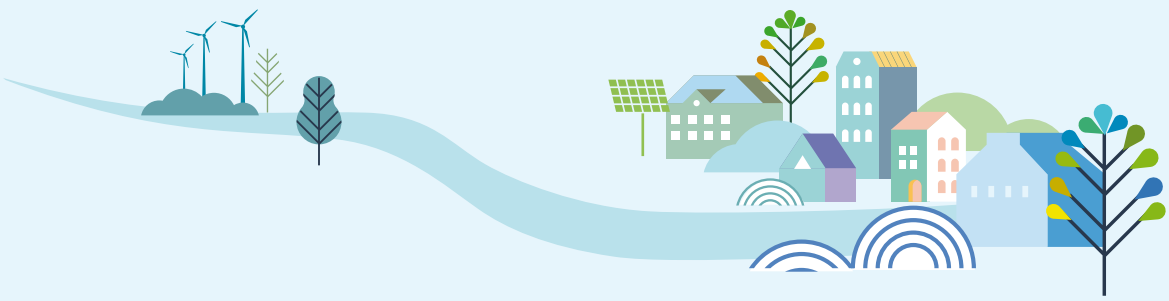
Whistleblowing Procedure



Performance in 2021

- Reviewed RATCH Group Public Company Limited's Regulations of Anti-Fraud and Corruption and resolved to add the rules and criteria on facilitation payments and employment of government officials for greater efficiency or broader coverage of the suppression and preventive measures.
- Reviewed and improved the rules on the giving and taking of gifts, souvenirs, receptions or travel expenses, to be in line with governance principles and generally-accepted practices.
- Reviewed and assessed fraud and corruption risks; improved the Fraud and Corruption Registry; and set preventive measures that are precise and appropriate for the likelihood and impacts.

- Assessed the efficiency and effectiveness of anti-fraud measures and practices; and had the membership of Thai Private Sector Collective Action Against Corruption (CAC) recertified for the second round for the 2025 period.
- Prepared the quarterly whistleblower/complain reports for the Corporate Governance and Social Responsibility Committee and subsequently the Board of Directors.
- In 2021, acknowledged zero whistleblower reports/complaint on fraud or reported suspicious acts.
- Organized training on fraud and corruption-related laws, regulations and the Company's rules and orders as well as relevant case studies.
- Assessed the understanding of executives and employees through the e-learning system. The assessment is part of the annual performance evaluation. All are required to score 80 The average assessment score in 2021 was at 86.97.



Material Aspects in 2021 GRI 102-46

RATCH conducted the 2021 materiality assessment in 4 steps: 1) identification of material topics, 2) prioritization, 3) validation and 4) review, in accordance with the GRI Reporting Standards (GRI Standards) - Core Option. The 2020 performance was not repeated in this report. The process is as follows:

1. Identification

- Assess internal and external risk factors that may affect the organization's strategy and goals.
- Review the organization's short-, medium- and long-term strategies, business plans and goals involving the Board of Directors and the Management.
- Learn about the opinions of internal units dealing with stakeholders and the opinions of significant stakeholders directly from their representatives.
- Assess employee engagement through an opinion survey.
- Compile ESG issues from the questions and sustainability questionnaire of investors, the Stock Exchange of Thailand, stock analysts, media, international sustainability assessment agencies and the recommendations from Sustainability Report 2020's readers.

2. Prioritization

- Classify the topics as economic (including governance), social or environmental issues.
- Set assessment thresholds; outline the level of impacts on operational process, finance, the environment, health and safety, reputation, employee satisfaction, and level of significance to stakeholders; and identify stakeholders for each given issue.
- Involve high-ranking executives, relevant internal units and the representatives of external stakeholders (shareholders, business partners, suppliers, customers, analysts, NGOs and communities) in the prioritization of the material issues.
- Prioritize the topics based on GRI's Materiality Matrix.

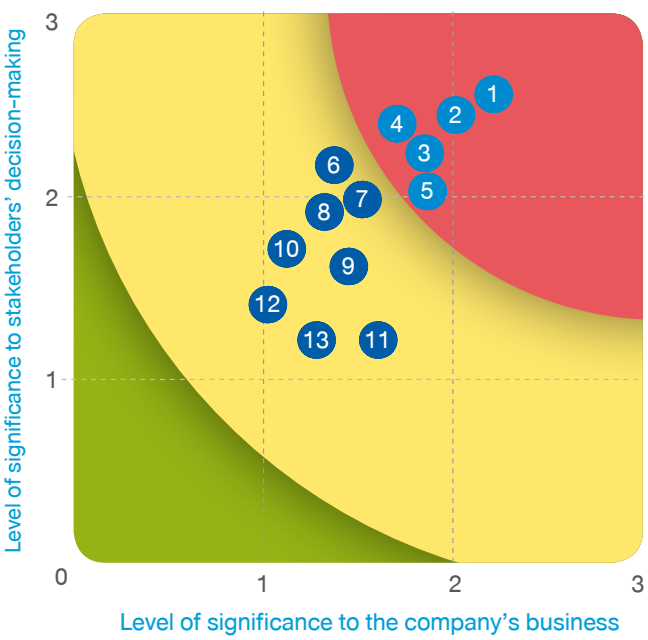
3. Validation

- Have the central unit responsible for Sustainability Report validate the assessments and significant topics according to reporting quality principles.
- Conclude and report the result to the top executive for consideration and approval, to ensure completeness of material aspect assessment and material topics.

4. Review

- Prepare feedback form and insert it in This Report to collect readers' recommendations, which will be gathered for the assessment of material issues in the following year.

Material Issues in 2021



1. Business strategy for sustainable growth
2. Role of the Board of Directors
3. Engagement with stakeholders
4. Risk management
5. Project and operational efficiency management of the Company, subsidiaries, affiliates as well as innovation development
6. Management of resource utilization and environmental quality control
7. Greenhouse gas emission reduction / long-term adaptation to climate change
8. Biodiversity
9. Human rights
10. Compliance with Code of Conduct and anti-corruption policy
11. Management of safety and occupational health for employees, suppliers and community
12. Community stewardship
13. Fair and equitable treatment of labor

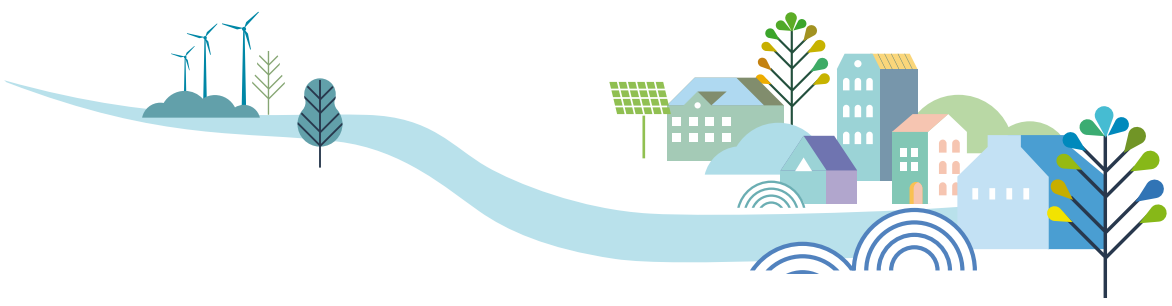
Sustainability Materiality in the 2021 report GRI102-47

Material Issues	GRI Indicators	Topic in the report	Page	Reporting Boundary			
				Internal			External
				Power Generation	Infrastructure	Other businesses	Community/customers/ suppliers/partners/share-holders/creditors/regulators
Economic Aspect							
1 Business strategy for sustainable growth	• GRI 102-14 Statement from senior decision-maker • GRI 102-31 Review of economic, environmental, and social topics • GRI 201-1 Direct economic value generated and distributed	• Message from Chairman and Chief Executive Officer • Good Corporate Governance • Management of Key Material Aspects in 2021 • Sustainability Development Strategy and Progress • Economic Performance	2-3 25-29 39-41 42-63 83-107	✓	✓	✓	-
2 Role of the Board of Directors	• GRI 102-18 Governance structure • GRI 102-22 Composition of the highest governance body and its committees • GRI 102-25 Conflicts of interest • GRI 102-26 Role of highest governance body in setting purpose, values, and strategy • GRI 102-31 Review of economic, environmental, and social topics • GRI 102-35 Remuneration policies • GRI 102-36 Process for determining remuneration	• Good Corporate Governance • Compliance with Code of Conduct and Anti-Corruption • Adaption to Climate Change • Sustainable Environment Management	25-29 30-33 47-61 64-82	✓	✓	✓	-
3 Engagement with stakeholders	• GRI 102-42 Identifying and selecting stakeholders • GRI 102-43 Approach to stakeholder engagement • GRI 102-44 Key topics and concerns raised	• Stakeholder's Engagement and Corporation • Material Aspects in 2021 • Creating Value with Business Partners • Creating Memorable Customer Experiences • Community and Social Stewardship	19-24 34-37 89-95 96-107 133-149	✓	✓	✓	✓

Material Issues	GRI Indicators	Topic in the report	Page	Reporting Boundary			
				Internal			External
				Power Generation	Infrastructure	Other businesses	Community/customers/suppliers/partners/share-holders/creditors/regulators
4 Risk management	• GRI 102-15 Key impacts, risks, and opportunities • GRI 102-30 Effectiveness of risk management processes	• Good Corporate Governance • Code of Conduct and Anti-Corruption • Management of Key Material Aspects in 2021 • Corporate Sustainability Development Strategy and Progress • Adaptation to Climate Change • Emerging Risks Management • Respect to Human Rights	25-29 30-33 39-41 42-46 47-61 62-63 121-122	✓	✓	✓	✓
5 Project and operational efficiency management of the Company, subsidiaries, affiliates as well as innovation development	• GRI 102-31 Review of economic, environmental, and social topics • GRI 201-1 Direct economic value generated and distributed • GRI 302-1 Energy consumption within the organization • GRI 302-4 Reduction of energy consumption • GRI 305-5 Reduction of GHG emission • GRI 419-1 Non-compliance with laws and regulations in the social and economic area	• Sustainability Performance Highlight in 2021 • Management of Key Material Aspects in 2021 • Corporate Sustainability Development Strategy and Progress • Adaptation to Climate Change • Environment Performance • Economic Performance • Community and Social Stewardship	15-17 39-41 42-46 47-61 64-82 83-107 133-149	✓	✓	✓	-
10 Compliance with Code of Conduct and anti-fraud and corruption	• GRI 102-16 Values, principles, standards, and norms of behavior • GRI 102-17 Mechanisms for advice and concerns about ethics • GRI 205-1 Operations assessed for risks related to corruption	• Code of Conduct and Anti-Corruption • Respect to Human Rights • Creating Value with Business Partners	30-33 121-122 89-95	✓	✓	✓	✓

Material Issues	GRI Indicators	Topic in the report	Page	Reporting Boundary			
				Internal			External
				Power Generation	Infrastructure	Other businesses	Community/customers/ suppliers/partners/share-holders/creditors/regulators
Environmental Aspect							
6 Management of resource utilization and environmental quality control	• GRI 301-1 Materials used by weight or volume • GRI 302-1 Energy consumption within the organization • GRI 302-4 Reduction of energy consumption • GRI 303: Water and Effluents 2018 • GRI 305-7 Nitrogen oxides (NO_x), sulfur oxides (SO_x), and other significant air emissions • GRI 306: Waste 2020 • GRI 307-1 Non-compliance with environmental laws and regulations	• Sustainability Performance Highlight in 2021 • Environment Performance • Adaptation to Climate Change • Performance Data (Environment)	15-17 64-82 47-61 157-160	✓	✓	✓	-
7 Greenhouse gas emission reduction / long-term adaptation to climate change	• GRI 305-1 Direct (Scope 1) GHG emissions • GRI 305-2 Energy indirect (Scope 2) GHG emissions • GRI 305-3 Other indirect (Scope 3) GHG emissions • GRI 305-4 GHG emissions intensity • GRI 305-5 Reduction of GHG emissions	• Adaptation to Climate Change	47-61	✓	-	✓	-
8 Biodiversity	• GRI 304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas • GRI 304-2 Significant impacts of activities, products, and services on biodiversity	• Biodiversity Conservation	79-82	✓	-	-	-

Material Issues	GRI Indicators	Topic in the report	Page	Reporting Boundary			
				Internal			External
				Power Generation	Infrastructure	Other businesses	Community/customers/suppliers/partners/share-holders/creditors/regulators
Social Aspect							
9 Human rights	• GRI 406-1 Incidents of discrimination and corrective actions taken • GRI 404-3 Percentage of employees receiving regular performance and career development reviews	• Respect to Human Rights • Employee Stewardship and Capacity Building	121-122 123-132	✓	✓	✓	✓
11 Management of safety and occupational health for employees, suppliers and community	• GRI 403: Occupational Health and Safety 2018	• Safety and Occupational Health Management • Performance Data (Health and Safety)	108-120 150-155	✓	✓	✓	✓
12 Community stewardship	• GRI 413-1 Operations with local community engagement, impact assessments, and development programs	• Community and Social Stewardship	133-149	✓	-	-	✓
13 Fair and equitable treatment of labor	• GRI 401-1 New employee hires and employee turnover • GRI 404-1 Average hours of training per year per employee • GRI 404-3 Percentage of employees receiving regular performance and career development reviews • GRI 406-1 Incidents of discrimination and corrective actions taken	• Employee Stewardship and Capacity Building • Sustainability Performance Highlight in 2021 • Respect to Human Rights • Performance Data (People)	123-132 15 121-122 155-157	✓	✓	✓	-



Management of Key Material Aspects in 2021

1. Business Strategy for Sustainable Growth

Rationale

- The trend of reduction in fossil fuels in electricity generation and increase in renewable energy, plus expectation of further reduction in greenhouse gas emissions in the electricity and energy sector

Risk/Impact

- A possible increase in loan conditions for fossil fuel power plant projects concerning environmental management and an increase in funding cost
- Intensifying competition in the renewable energy business, which will affect cost and return on investment
- The Company Group's fossil fuel power plants may need additional investment to increase efficiency to manage greenhouse gas emissions and may incur risks from regulatory changes in greenhouse gas elimination and/or emission reduction.

Opportunity/ Strategy

- Formulate the sustainability strategy, a 5-year roadmap and target as well as the strategy to cope with Climate Change, a roadmap to reduce greenhouse emissions and tangible targets.
- Explore investment opportunities in renewable power plants in Thailand and abroad, making it the strategy and part of the roadmap to reduce greenhouse gas emissions.
- Explore investment opportunities in power plants that use technology or fuels that offer low or zero carbon emissions.
- Diversify investment to non-power businesses for added value and income stability, in order to reduce business risks.
- Increase an investment in eco-friendly energy and power-related innovation, to create economic value-added, as well as shared values for environment and society.

Target/Year

Short-term targets

- Review strategies and targets on an annual basis.
- Set the investment target of 250-MW capacity from renewable energy per year.
- Set the annual investment target and budget for non-power businesses.
- Complete the strategies on sustainability and climate change as well as a roadmap and targets in 2022.

Medium-term targets (2025)

- Set the target to generate 2,500MW from renewable energy.
- Set the investment ratio in non-electric businesses to 20% of total investment.

Long-term targets (2035)

- Set the target to generate 4,000MW from renewable energy.
- Set the investment ratio in non-electric businesses at 20% of total investment
- Decrease fossil power capacity to 60% out of total 10,000 MW capacity target in 2035

2. Role of Board of Directors

Rationale

- Stakeholders' expectation that the Board of Directors steers the enterprise ESG strategies and targets for clearer and more concrete results.

Risk/Impact

- Ability to achieve business goals which will affect the Company's long-term revenue.
- ESG risks that may increase the investment cost and derail the expected return on investment.
- A possible decrease in stakeholder and investor confidence, which may affect fund-raising in Thailand and abroad and raise the funding cost.

Opportunity/ Strategy	• Improve the sustainability-related plan and target as well as the enterprise greenhouse gas emissions reduction target, in line with the Science Based Targets Initiative (SBTi). • Review the investment plan and target on renewable energy every year, for timely investment opportunities. • Devise a strategy on sustainable development roadmap and targets as well as a strategy on greenhouse gas emission reduction as well as action plans and a concrete performance evaluation process. • The Corporate Governance and Social Responsibility Committee supervises and monitors the implementation and planning on greenhouse gas emission reduction, to support the design of emission reduction projects and other projects to save energy, as well as reforestation and forest conservation as carbon sinks.
Target/Year	• Greenhouse gas emission reduction targets under SBTi achieved in 2022. • The Corporate Governance and Social Responsibility Committee supervises and monitors the fulfilment of ESG responsibility against the action plan and targets on a quarterly basis.

3. Engagement with stakeholders

Rationale	• RATCH's operations involve stakeholders with specialized and recognized expertise and experience, who play an important role in driving the Company towards success.
Risk/Impact	• Selection of stakeholders presents a risk to the Company's success in terms of investment, operating cost and returns. • Stakeholders with ESG risks may affect the Company's credibility and present a risk to the Company's success in terms of investment, operating cost and returns.
Opportunity/ Strategy	• Develop an ESG risk assessment process, containing a strategy and guidelines on risk management for stakeholders, particularly business partners and suppliers. • Review the stakeholder prioritization process and treatment of stakeholders in the Code of Conduct on a regular basis, for alignment with changing circumstances and regulatory requirements and industry best practices. • Develop the Supplier Code of Conduct to cover ESG responsibility of all suppliers throughout the Company and subsidiaries' operating process. • Develop the communication, consultation and remediation process together with stakeholders, to learn and respond to their needs as well as expectations. • Nurture and extend business partnership and/or jointly create new business opportunities.
Target/Year	• To launch the Supplier Code of Conduct in 2022.

4. Risk management

Rationale	• The ability in handling and adapting to Climate Change is a long-term success factor of the organization as stakeholders, in its business and investment decision making, give more importance to the organization's risk management and opportunities in environmental, social and governance aspects.
Risk/Impact	• Climate Change accelerates the frequency and severity of natural disasters, which affect the production process, revenue and the development cost of new projects. • Stakeholders' expectations for the setting of greenhouse gas emission reduction target in alignment with the national targets and the COP26 agreement as well as preparations for changes in national and international regulatory requirements and measures related to greenhouse gas emission reduction may pose risks to the Company's operations, investment costs and revenue.

Opportunity/ Strategy

- Review sustainability/ESG issues significant to the Company's operations and stakeholders' decision making and accordingly develop clear and concrete strategies, roadmaps, targets and action plans.
- Develop an assessment process for Climate Change risks and impacts based on the Recommendations of the Task Force on Climate-related Financial Disclosures (TCFD).
- Devise a greenhouse gas emission reduction plan and target based on the Science Based Targets Initiative (SBTi).
- Devise a human rights-related due diligence process and develop international accepted risk register for the Company and subsidiaries as well as preventive/management measures.

Target/Year

- The assessment process of Climate Change risks and opportunities based on TCFD recommendations to be completed in 2022.
- The human rights due diligence process and the risk register to be completed in 2022.

5. Project and operational efficiency management of the Company, subsidiaries and affiliates as well as innovation development

Rationale

- The Company, as a holding company, earns revenue from dividends and profit sharing from subsidiaries and joint ventures. Climate Change influences power buyers/consumers to demand eco-friendly electricity, products and services. These factors force the Company to ensure production efficiency in the way that fuel and energy consumption can be brought down, and to invest in more-efficient and environmentally-friendly innovation and technology.

Risk/Impact

- The stability of the Company's revenue and financial position as well as the ability to service debt depends on subsidiaries and joint ventures' operational efficiency.
- The efficient management of environmental, social and governance issues as well as compliance with laws, industrial best practices and international standards influence the Company's cost/expenses and credibility.
- Demand for electricity and/or products and services that are environmentally-friendly or show low carbon footprints poses a possible risk to the Company's revenue.

Opportunity/ Strategy

- Analyse and assess subsidiaries's operation and power projects efficiency and availability as well as their environmental quality control and management systems on a regular basis.
- Plan appropriate and synchronized power plant maintenance schedules and ensure standardized maintenance quality.
- Control and monitor projects under construction or development to meet targets or work progress timeline, taking into account chiefly the budget disbursement, scheduled commercial operation dates, safety, the environment and community.
- Set the policy requiring subsidiaries and controlled entities to outline the energy conservation plan and targets as well as the greenhouse gas inventory, carbon footprint assessment and greenhouse gas emission reduction guidelines.
- Seek investment opportunities in electricity and energy innovations, to establish new businesses that present high-growth potential and generate higher revenue.

Target/Year

- Greenhouse gas emissions reduced by renewable power generation
- Year 2022 = 4,100,000 tCO_2e
- Year 2025 = 6,300,000 tCO_2e
- Year 2035 = 10,000,000 tCO_2e
- In 2022 the capital investment in Innopower Company Limited for the development of electricity and energy-related innovation totals THB 135 million.

Corporate Sustainability Development Strategy and Progress

RATCH's corporate sustainability development principles set forth in the Code of Conducts as the operational framework and guidelines are as follows:

- The Company adheres to sustainable development as a guideline for business operations based on responsibilities to economy, society, and environment.
- The Company decides to conduct business based mainly on economic, health, safety, environmental and social issues.
- All activities of the Company must be carried out under sustainability principles and aim for sustainable results in order to maintain the acceptance and trust of all stakeholders.
- All executives and employees have the duty to regularly create good interactions with stakeholders who are related to their operations.
- All executives and employees are obliged to strictly comply with the Company's regulations regarding occupational health, safety, security, and environmental and social responsibilities.
- The Company shall operate business that creates sustainable benefits to the society by taking care of occupational health and safety of employees, partners, and communities while minimizing impacts on the community, keeping greenhouse gases from production to the minimum, best protecting the ecosystem and biodiversity, and using energy, water and other resources with maximum efficiency.

The Corporate Sustainability Development Policy sets force 2 major sustainability development strategies as follows:

- The Corporate Sustainability Development Strategies shall encompass good governance and the management of enterprise risks, project risks and emerging risks.
- The Company shall assess risks that influence the Company's sustainability in economic, social, environmental and governance dimensions and outline responses accordingly. Those risks shall be the priority in business planning, decision-making process and work processes.

The significant aspects that the Company shall emphasize when carrying out business operations and designing guidelines are as follows:

Read more in

Significant progress in sustainable development in 2021

Strategic review

In 2021, RATCH conducted a review on sustainable development strategies as well as economic, social and governance issues significant to the Company and stakeholders. RATCH accordingly considered an improvement to the current principles and international practices. In light of the sustainable development review, the following actions will be completed in 2022 along with the setting of targets and enterprise indicators, are as follows;

- Improve sustainable development strategies, and set the roadmap, targets and 5-year work plans.
- improve the human rights policy and the human rights risk assessment process.
- Develop the Climate Change Strategy, the roadmap and greenhouse gas emission reduction targets.

Sustainable development's economic progress

1. Development and investment in renewable energy

Wind farm in Vietnam

In 2021, RATCH worked on the construction and development of two wind farms in Vietnam that constitute 55.16 MW in equity installed capacity. The two projects are estimated carbondioxide equivalent to reduced 184,064 tCO_2e.

Ecowin Wind Farm Total installed capacity: 29.7 MW RATCH' s equity installed capacity: 15.16 MW	Status
The onshore wind farm is located in Ben Tre Province, south of Ho Chi Minh City, the Socialist Republic of Vietnam • Developer: Ecowin Energy Corporation • Share owned by RATCH: 51% • RATCH's investment value: 97 million baht • Annual energy production: 103,600 MWh • Buyer: Vietnam Electricity • PPA period: 20 years • Expected GHG reduction: 51,489 tCO_2e	Under construction, slated for completion and commercial operation in 2022.

Nexif Energy Ben Tre Wind Farm Total Installed capacity: 80 MW RATCH's equity installed capacity: 40 MW	Status
The near-shore wind farm is located in Thanh Hai Commune, Thanh Phu District, Ben Tre Province in the Socialist Republic of Vietnam. • Developer: Nexif Energy • Share owned by RATCH: 50% • RATCH's investment value: 272.58 million baht • Annual energy production: 166,751 MWh • Buyer: Vietnam Electricity • PPA period: 20 years • Expected GHG reduction: 132,575 tCO_2e	Under construction, slated for completion and commercial operation in 2024.

Investment in Asahan-1 Hydroelectric Power Plant, Indonesia

RATCH acquired an additional 40% interest in Fareast Renewable Development Pte. Limited ("FRD") for USD 54.31 million or approximately 1,789 million baht. The acquisition boosted RATCH's holding in FRD to 90% and raised RATCH's indirect holding in Asahan-1 Hydroelectric Power Plant 47.89%.

Asahan-1 is a 180 MW run-of-river hydroelectric power plant located in Indonesia's North Sumatra Province at the upstream reach of the Asahan River. The acquisition raised RATCH's equity installed capacity by 86.2 MW. The hydropower plant started commercial operation in January 2011, producing 1,175 gigawatt-hour per annum. The output is supplied to PT Perusahaan Listrik Negara (PLN) under a long-term power purchase agreement (2011-2040). It helps cut annually CO_2 by 873,025 tCO_2e

2. Investment in healthcare business

RATCH embarked on a healthcare business investment in 2021 in a bid to strengthen its revenue and growth in the long term. The Company viewed that healthcare is a basic need for all due to an increase in ageing population, the COVID-19 pandemic and other emerging diseases caused by climate change. Healthcare businesses tend to register continuous growth and creates positive impacts in social and economic aspects. Beside this, it is considered a low-carbon industry.

By diversifying into the business, RATCH offers an alternative to society, with emphasis on its partner's experience and quality and affordable services. Aside from this, together with its incumbent partner, RATCH seeks to invest in the businesses along in the healthcare value chain, from the manufacturing of pharmaceutical drugs, food supplements as well as medical tools and equipment to the development of medical and health innovation and technology.

Investment in 2021

Project	% Shareholding	Nature of Business	Target groups
Principal Capital Public Company Limited RATCH's investment: 1,558 million baht	10	• Investing and operating private hospitals as main business; developing properties for rent; and providing IT services for hospitals and investment advisory services • Owning 12 private hospitals with 1,096 beds in emerging cities, an elderly center, and a network of 13 primary-care clinics for gold cardholders • Targeting to boost the number of hospitals to 20, the number of primary-care clinics to 100 and the number of elderly centers to 5	The general public in provinces, chiefly middle-income earners
Bangkok Chain International (Lao) Company Limited RATCH's investment: 190 million baht	9.91	Operating a private hospital with 254 beds and 38 examining rooms on a 1.92-hectare area: a 7-floor building with 110 beds in the initial stage operational in August 2021 and a 12-floor building with 144 beds for the next phase.	The general public in Vientiane, Lao PDR

3. Investment in innovation

RATCH established Innopower Company Limited in 2021, in partnership with the Electricity Generating Authority of Thailand (EGAT) and Electricity Generating Public Company Limited (EGCO) with the shareholding ratio of 30:40:30. Innopower will require a total investment of 2,960 million baht. It was first capitalized at 600 million baht and the remaining capital will be paid up within 5 years.

Innopower is set to play a major role in the development and investment in energy innovations and future technology (New S-Curve), as well as the creation of new energy-related products and the distribution of those products for added value.

Innopower is shaping its organizational and management structures, with RATCH taking part in the process. RATCH's personnel has been assigned to work in the company, Innopower will have 4 major departments:

- Collaborator
- Incubator
- Accelerator
- Corporate Venture Capital (CVC)

Sustainable development's social progress

Remediation and rehabilitation of impacts from saddle dam D failure

RATCH continued monitoring the remediation and rehabilitation of the impacts from the failure of saddle dam D of the Xe Pain-Xe Namnoy hydropower project undertaken by Xe Pain-Xe Namnoy Power Company Limited (PNPC), a joint venture company operating the project since 2018. PNPC's actions as well as the planning, supervision and inspection of the plan implementation has absolutely received the government of Lao's endorsement and has been carried out accordingly to the plan. To date, the remediation and rehabilitation of the affected has shown progress and the impacts have been eased.

Performance in 2021

In 2021, PNPC has paid compensation to the affected communities according to the agreement with Attapeu Provincial Disaster Management Committee of Lao PDR. There are two category of compensation payment as follows:

- Payment of compensation for remediation and rehabilitation of the affected people worth USD 55.5 million. The payments completed in 2021.
- Funding for the Rehabilitation Master Plan of Attapeu Province for restoring and developing impacted area, infrastructure and wellbeing of communities worth USD 36.15 million.

PNPC's funding for the master plan's implementation to Attapeu Province in 2021 summarized below:

Items	Amount (MUSD)	Work done
Relief support to affected households for temporary accommodation, consumption supplies, monthly cash allowance	2.87	22 April
The first allotment payment for construction of 700 permanent houses and rehabilitation on quality of living, healthcare and infrastructure for the affected people.	11.90	28 September
The second allotment payment for continuing construction of 700 permanent houses and rehabilitation on quality of living, healthcare and infrastructure for the affected people.	10.69	7 December
Total	25.46	

At the end of the year 2021, PNPC have handed over USD 25.46 million to Attapeu Province, Lao PDR, or 70.43% of USD 36.15 million sum specified in the agreement on Rehabilitation Master Plan.

PNPC is scheduled to hand over another USD 8.9 million to Attapeu Province in early 2022 and the remaining compensation of USD 1.79 million when permanent house construction managed by Lao authority complete.

Progress of remediation and rehabilitation implementation

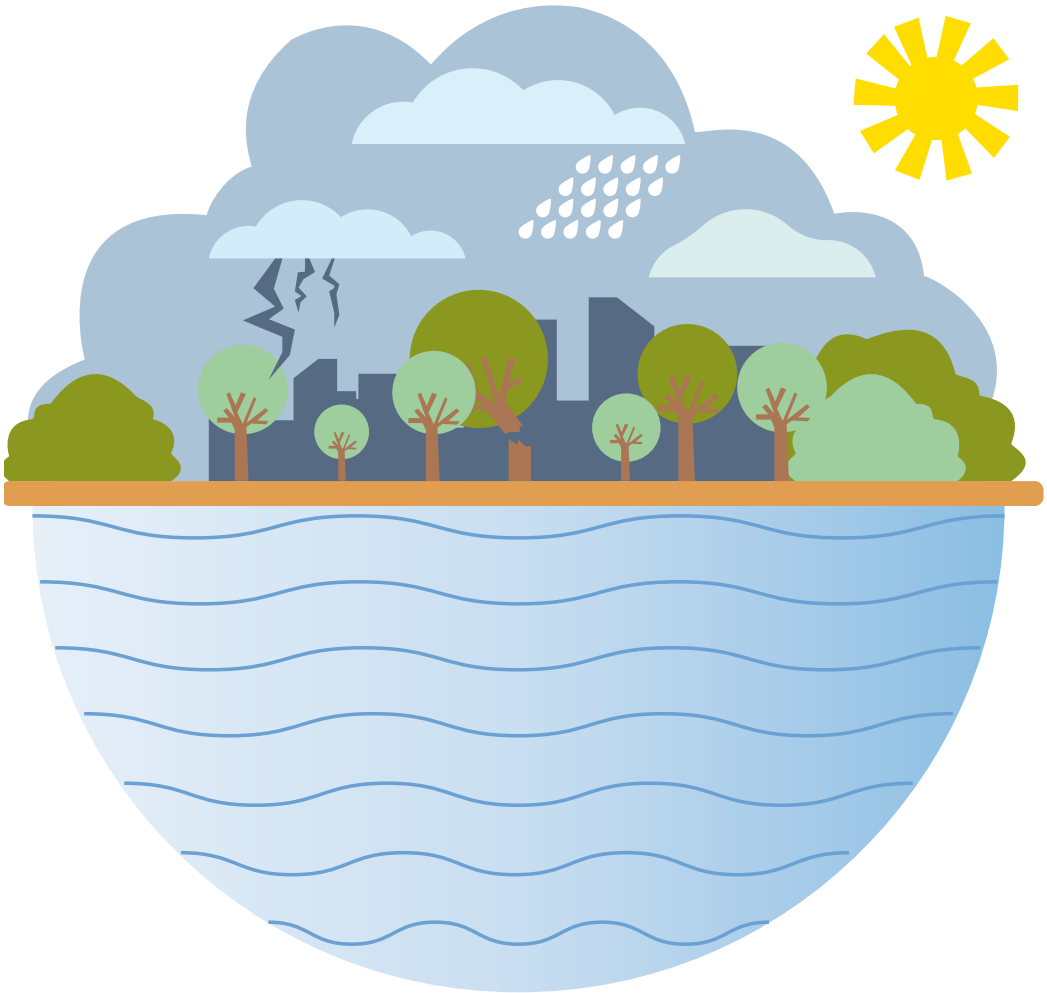
In 2021, Xe-Pian Xe-Namnoy Power Company Limited carried out the rehabilitation of the affected communities. Key actions are as follows:

- 4 new villages for 812 households were constructed.
- Basic infrastructure like health centers, schools, village auditoriums and temples were constructed.
- Roads were repaired while the irrigation system and new agricultural areas were prepared for the affected communities.
- The affected were provided financial supports to cover daily expenses while staying at temporary shelters. Every affected household was also provided allowances and rice.

The task progress is detailed below:

Scheduled tasks	Progress
Survey and clearance of explosive ordnance in 300-hectare areas reserved for the construction of new villages, for 5 affected villages	100%
Survey and clearance of explosive ordnance in 1,700-hectare areas, reserved for new agricultural lands	100%
Construction of access roads leading to new agricultural areas	100%
Construction of intra-village roads in new villages	100%
Construction of 7 new schools – for kindergarten, elementary and high-school education - in 4 new villages	100%
Construction of 812 permanent houses in 4 new villages • Donebok Mai-Sengchanh (Formerly Tasengchanh villages) • Dongbakmai Hinkham (Formerly Mai and Thahin villages) • Hinlath (Formerly Tomoryot village) • Samongmai Pindong (Formerly Samong Tai village)	82%
Construction of a new health centre in Hinlath village	90%
Construction of village halls for new villages • Dongbakmai Hinkham village • Hinlath village • Samongmai Pindong village • Donebok Mai-Sengchanh village	 100% 93% 70% 65%
Construction of irrigation systems • Xe-Pian River irrigation system • Houay Samong irrigation system section 1: 4.9 km • Houay Samong irrigation system section 2: 3.2 km	 100% 93% 62%
Construction of water pipes in new villages • Hinlath village • Samongmai Pindong village • Dongbakmai Hinkham village	 30% 22% 21%
Construction of temples in new villages • Dongbakmai Hinkham village • Hinlath village	 58% 50%
Construction of Lao PDR's Agricultural Training Centre	100%
Construction of GOL's Coordination centre	60%

Adaptation to Climate Change

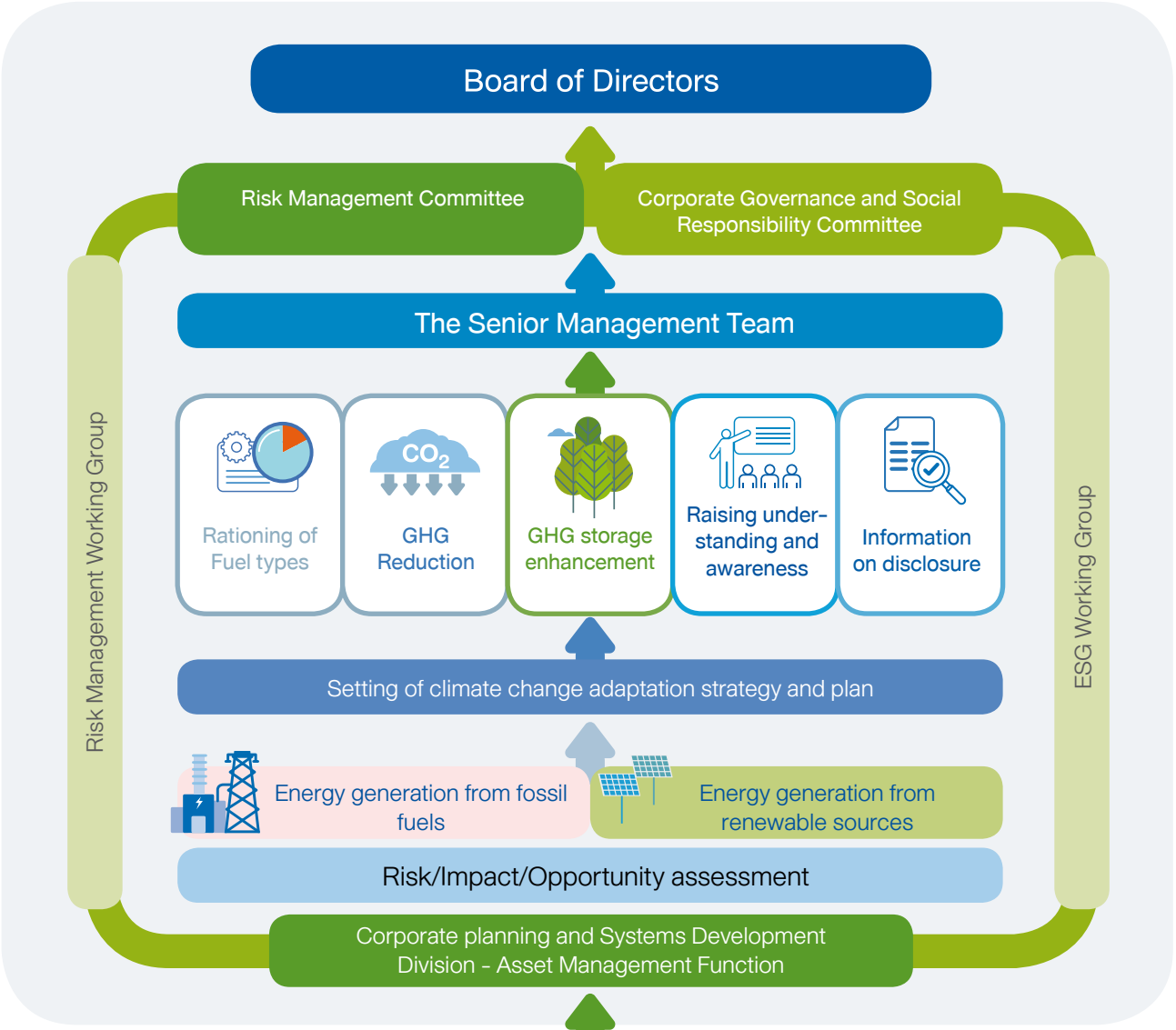


The climate change is a significant factor to RATCH's operations and challenges the Company's ability in adapt to impacts and turning crises to opportunities, particularly when it concerns power generation which is the Company's core business.

RATCH has devised the approach and guidelines in response to climate change and includes them in the Code of Conduct and the Corporate Sustainability Development Policy, which serve as the framework for corporate operations and activities. Climate change risks on the Company's strategies and targets concerning fossil-fuel power project investment and power plant operations have been assessed. The Company also assessed the potential of renewable power plant investment.

The Asset Management Function's Corporate planning and Systems Development Division plays a key role in the risk and impact assessment process. It works with all functions through the Risk Management Working Group and the Environmental, Social and Governance (ESG) Working Group. Together, they seek approaches to manage, prevent and mitigate possible impacts, which will be integrated in the enterprise risk management measures. The measures are then submitted to the Management and subsequently the Board of Directors.

Climate Change Mitigation Supervision Structure



Code of Conduct

- Be aware of the climate change issue and impacts caused by the operations and educate relevant individual for efficient GHG management.
- Reduce GHG emissions through production efficiency maintenance and support to internal and external energy-conservation measures or activities.
- Increase GHG storage sources through forest conservation and green space enhancement activities.
- Stay ready to respond to climate change impacts on the business.

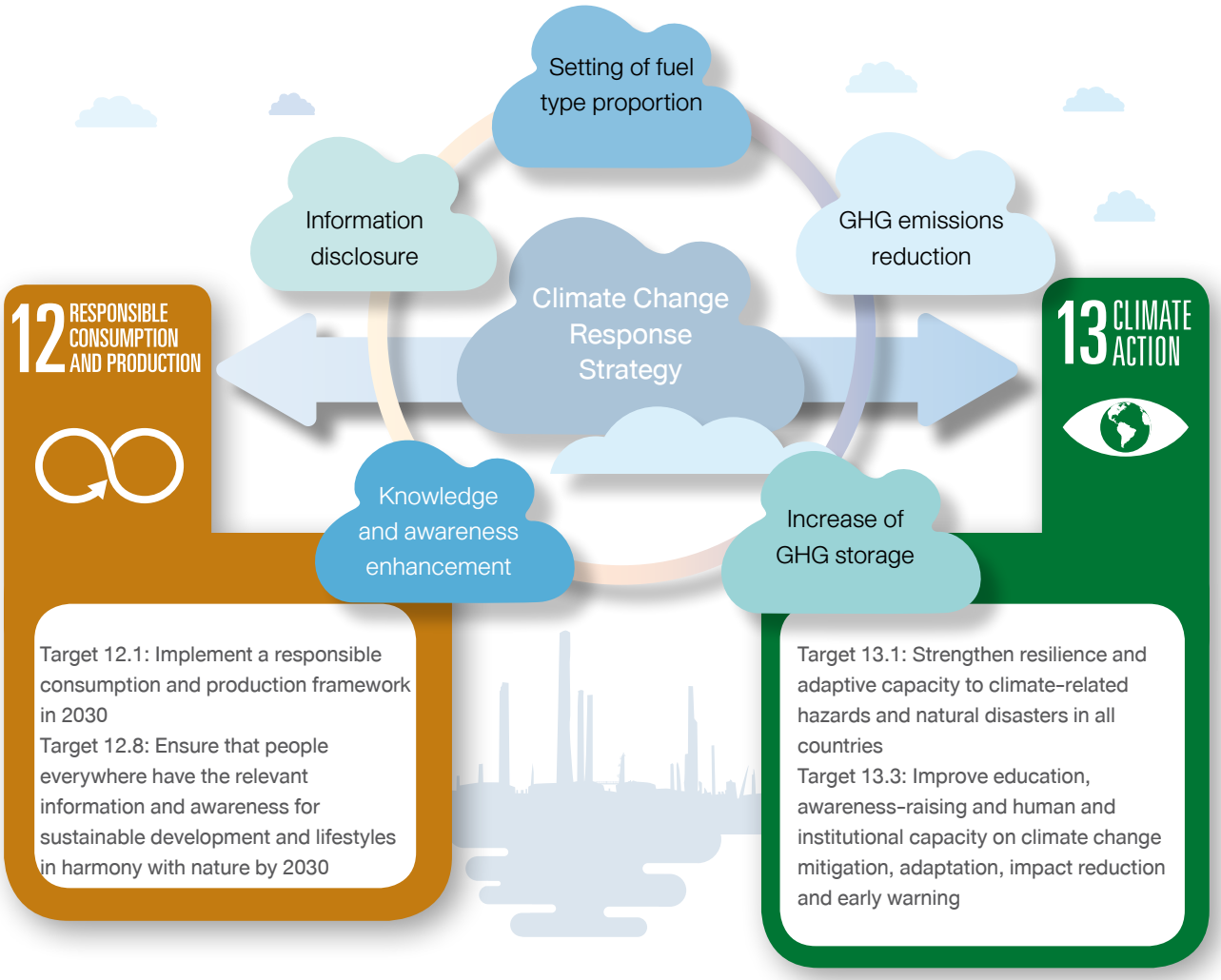
Corporate Sustainability Development Policy

- Seek solutions that reduce resource and energy utilization, to cut pollutant emissions, waste and GHG and lessen impacts on the environment, community and society.
- Set GHG emission targets for power generation and non-generation activities.
- Devise the assessment approach for climate change risks and impacts on power generation and non-generation activities.
- Seek GHG emission reduction and climate change response measures to allow stable and sustainable business growth.

Climate Change Response Strategy

RATCH's climate change response framework is geared towards maintaining business continuity and addressing two Sustainable Development Goals which are Goal 12: Ensure responsible consumption and production and Goal 13: Take urgent action to combat climate change and its impacts.

RATCH's Climate Change Response Strategy covers five aspects: the setting of fuel type proportion, greenhouse gas emissions reduction, enhancement of GHG storage, knowledge and awareness enhancement, and information disclosure.



Strategy	2025 Targets	2035 Targets
1. Setting of fuel type proportion	• Combined capacity: capacity: 10,000 MW • Fossil: 75% • Renewable: 25%	• Combined capacity: capacity: 10,000 MW • Fossil: 60% • Renewable: 40%
2. Greenhouse gas emissions reduction	• GHG reduction: 6,000,000 tCO_2e or 70% compared to the base year 2015 • GHG emissions per kWh down by 15 % compared to the base year 2015	• GHG reduction: 10,000,000 tCO_2e or 100% compared to the base year 2015 • GHG emissions per kWh down by 25% compared to the base year 2015

Strategy	2025 Targets	2035 Targets
3. Increase of GHG storage	• Stored amounts of GHG: 83,000 tCO_2e	• Stored amounts of GHG: 280,000 tCO_2e
4. Knowledge and awareness enhancement	• Employee training attendance: 80% • Energy consumption reduction through Community Energy Project targeting community participation by 80% of the target group	• Employee training attendance: 90% • Energy consumption reduction through Community Energy Project targeting community participation by 90% of the target group
5. Information disclosure	• Sustainability Report according to the Global Reporting Initiatives • 56-1 One Report • Carbon Disclosure Project (CDP) • Participation in Corporate Sustainability Assessment of international institutions	• Sustainability Report • 56-1 One Report • Carbon Disclosure Project (CDP) • Participation in corporate Sustainability Assessment of international institutions

2021 Performance

Assessment of climate change risks and opportunities

RATCH outlines the guidelines to manages likely impacts from the climate change and assesses the emerging opportunities that can bring corporate value-added as follows:

Risk Factor/Impact	Corporate strategic plan/growth target
Managing method	• Review strategic plan and investment target concerning portion of power generation from fossil fuels and renewable energy. • Develop and improve the Climate Change Strategy and the risk/opportunity assessment process in alignment with TCFD recommendations. • Develop a GHG reduction roadmap and emissions reduction targets for the short, medium and long term. • Study and develop the internal carbon pricing scheme.
Opportunity	• An increase in the investing capacity in energy innovations, future trend of energy technology and energy start-ups. • Development of innovations concerning renewable energy, energy trading, energy storage smart grid and electric vehicles. • Development of solar rooftop installation business and Private PPA targeting business and industrial customers, extending from cogeneration plants' customers in industrial estates.
Risk Factor/Impact	**Operations**
Managing method	• Set a policy to have all power plants develop their GHG and carbon footprint inventory to support the formulation of GHG reduction strategy and targets. • Require all power plants to map GHG-reduction plans and targets and fully comply with regulatory requirements concerning climate change.
Opportunity	• Improve/raise renewable energy consumption at power plants to save energy and reduce CO_2. • Develop projects concerning carbon trading/offsetting

Power plants, which are the Company's main revenue contributor have assessed possible climate change risks on their production efficiency. They managed to deliver their contractual outputs and no penalties were incurred.

Ratchaburi Power Plant

Risk factor	Increase in average surface temperature	Risk Level
Impact	• Efficiency and capacity of power-generating machinery/equipment • Penalties incurred from failure to meet contractual production dropped	Medium
Management approach/ measure	• Ratchaburi Thermal Power Plant reduces the air temperature in the Air Inlet Filter to enhance gas turbines' capacity	
Results	• Ratchaburi Thermal Power Plant will achieve the contracted capacity if the average surface temperature increases by 1-5 degree Celcius, with reduced heat rate and hence net emissions of GHG per kilowatt-hour of output.	

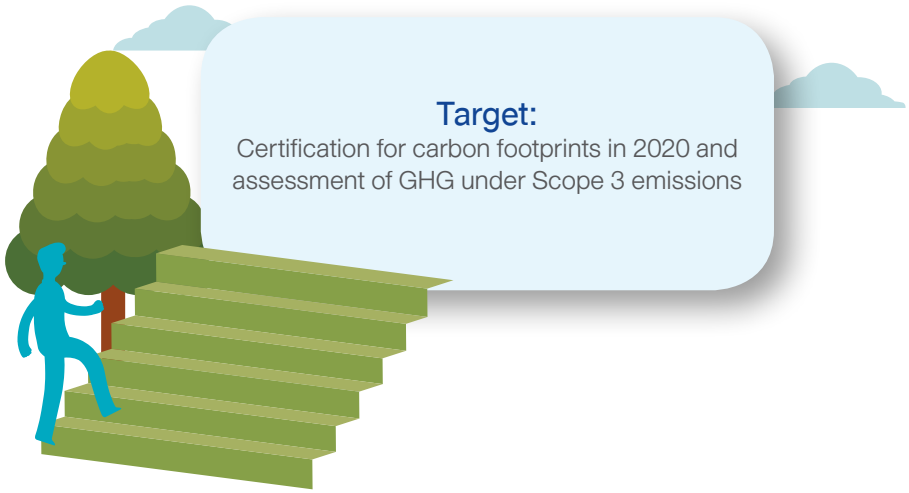
Ratchaburi Power Plant/Nava Nakorn Power Plant/Berkprai Cogeneration Power Plant/RATCH Cogeneration Power Plant

Risk factor	Drought	Risk Level
Impact	• Shortage of raw water, imposing limits on meeting contractual capacity or raising the cost of raw water • Change in raw water quality, affecting the water improvement process • Fight with community/other operators over water	Medium
Management approach/ measure	• Gather and analyze meteorological data, dating back as long as possible, and apply a model to forecast the volume of raw water in the basins. The forecast will assist the assessment of water sources for future projects and preparation of supplementary sources for emergency use. • Regularly monitor the volume of water in their areas and the water stress level of existing projects. For instance, the power plants in Ratchaburi Province monitor water consumption in the Mae Klong River Basin on a monthly basis, in cooperation with EGAT. Such is to stay alert and watch out for drought that may affect the production process or ignite a fight over water with community. • Monitor sea high tide as it is a cause of salty water or water with high total dissolved solids, to determine the utilization of chemicals in the raw water improvement process and water cycles in the cooling system. • Improve the cooling towers' water quality control system for more cycles. • Berkprai Cogeneration Power Plant built a reservoir to store underground water for emergency use when water from the Mae Klong River is insufficient for the production which is a preventive measure set out in the EIA report that has been approved.	
Results	• A backup plan is prepared for the situation when raw water supply from main sources is insufficient for the production. • Based on the monitoring of water withdrawal from the Mae Klong River by Ratchaburi Power Plant and Berkprai Cogeneration Power Plant in Ratchaburi Province, the withdrawal in 2021 averaged 0.7%, compared to the volume of water released from the upstream dam. The level was considered sufficient for the production and high enough to prevent a fight over water with the community and other business operators. • The water consumption and water balance is compared to, to ensure efficient water management against the capacity of sources of water. • The monitoring of the Mae Klong River's raw water quality to support the quality improvement process allowed the power plants to achieve the cooling system's 4-6 water cycles as targeted.	

Ratchaburi Power Plant/Nava Nakorn Power Plant/Berkprai Cogeneration Power Plant/RATCH Cogeneration Power Plant

Risk factor	Flooding	Risk Level
Impact	• Production disruption (without any back-up measures) • Discontinuity in electricity generation • Damage to equipment/building	Low
Management approach/ measure	• Site selection is a must for new projects along with the design of a drainage system. The power plants must also be located on the ground that is higher than the previously-flooded level. • Large power plants Ratchaburi Power Plant are equipped with 3 flood warning stations to monitor water levels and rainfall - inside the power plant and the canal in front of the plant and a system to alert relevant parties and the Group's power plants in the same area. • Flood emergency manual and contingency plan are prepared. Flood drills are regularly held.	
Results	• RATCH Group's power plants reported no flooding incidents in 2021. • All power plants prepared flood emergency response plans and conducted regular drills.	

GHG emission monitoring through carbon footprint assessment



Performance in 2021

RATCH Group, through Ratchaburi Power Plant and RATCH Cogeneration Power Plant, monitored the greenhouse gas emissions in accordance with Carbon Footprint for Organization methodology (Revision #5) of Thailand Greenhouse Gas Management Organization (Public Organization) (TGO). GHG Inventory under Scope 3 emissions was prepared, with this year selected base year as the emissions covered direct emissions from the Group's activities as well as indirect emissions from other sources from upstream to downstream.

Ratchaburi Power Plant, RATCH Cogeneration Power Plant and RATCH Group Building's carbon footprints in 2019 and 2020 were certified by TGO. The 2021 carbon footprints will be filed for certification in 2022.

Greenhouse gas emissions (tCO_2e)										
Carbon Footprint for Organization (CFO)	Direct GHG emissions (Scope 1) • Consumption of fuels like natural gas, bunker oil and diesel in production process • Consumption of fuels for transportation • Utilization of limestone in desulfurization • Leakage of sulfur hexafluoride (SF_6) and coolants				Energy indirect GHG emissions (Scope 2) • Power supply from Electricity Generating Authority of Thailand • Power supply from Provincial Electricity Authority • Power supply from Metropolitan Electricity Authority				Other indirect GHG emissions (Scope 3) • Emissions from upstream sources • Emissions from downstream sources	
Year	(base year)	2019	2020	2021*	(base year)	2019	2020	2021*	2020	2021*
Ratchaburi Power Plant	7,128,375 (2015)	5,201,346	4,997,704	4,950,948	27,702 (2015)	24,090	18,837	28,131	-	1,769,980
RATCH Cogeneration Power Plant	-	-	313,927	300,110	-	-	25	1,069	3,131	88,841
RATCH Group Building	73 (2018)	69	664	43	1,110 (2018)	1,084	888	813	-	36

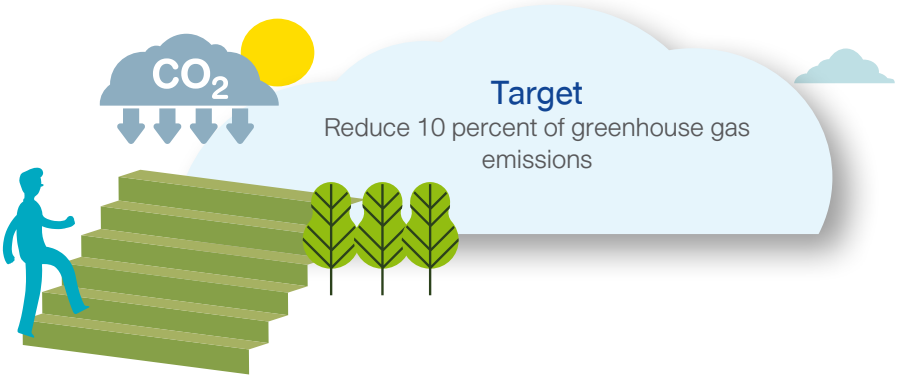
*Remark: *The information is under verification process.*

Ratchaburi Power Plant's greenhouse gas emissions in 2021 increased from the previous year, as Ratchaburi Thermal Power Plant was instructed to generate electric power with bunker oil. Bunker oil consumption in the year totaled 161 million liters, up by 100% and 76% from the previous year and the base year 2015 respectively.

The two power plants' emissions in Scope 1 and Scope 2 to the net energy output were 0.4122 in 2021 compared to the 2015 base year were at 0.4567 tCO_2e per megawatt-hour, or a reduction of 2,177,373 tCO_2e.

The carbon footprint data will support the formulation of the Company's GHG-reduction strategy, roadmap and target, which will be carried out in 2022.

Emission reduction through renewable energy

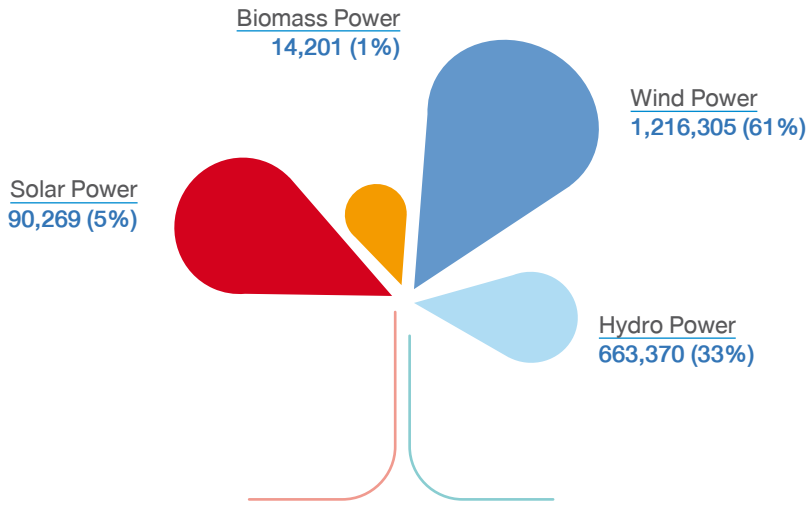


Performance in 2021

RATCH's net output of electric power generated by renewable sources totaled 7,247,621 megawatt-hour, or a reduction of 4,268,513 tCO_2e of greenhouse gas emissions. The reduced GHG accounted for 24 percent of total emissions in 2021.

Renewable sources	Net energy output (megawatt-hour)		Reduced greenhouse gas emissions (tCO_2e)	
	Total	Equity holding base	Total	Equity holding base
1. Solar power	181,886.20	128,753.76	116,829.82	90,268.91
2. Wind power	2,160,931.29	1,641,677.99	1,516,408.62	1,216,304.53
3. Hydro power	4,833,786.52	1,229,590.99	2,599,773.11	663,369.95
4. Biomass power	71,016.70	28,406.68	35,501.25	14,200.50

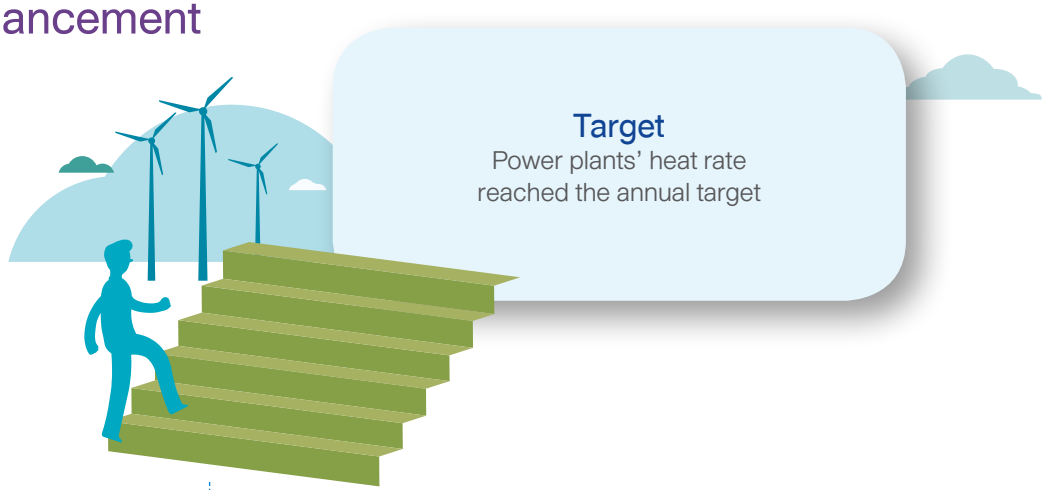
Greenhouse gas emissions reduced by renewable energy projects in 2021 (Unit: tCO_2e)



In 2021, RATCH's equity renewable electricity production capacity totaled 1,088.52* MW, or 11.94 percent of total capacity of 9,115.04 MW.

**Remark: The above mentioned capacity was not included equity capacity of EDL-Generation Public Company, Bangkok Aviation Fuel Services PCL. and Sahacogen (Chonburi) PCL.*

Emission reduction through production efficiency enhancement



Performance in 2021

Each power plant succeeded in carrying out fuel-saving projects and activities, resulting in 140,804 million BTU of saved fuels and 23,717 megawatt-hours of saved electric power. In total, they reduced greenhouse gas emissions by around 21,573 tCO_2e of total emissions. The GHG emission per kilowatt-hour was continuously maintained, while the production cost was cut by Baht 54,992,579.

Project/Activity	Energy-saving target in 2021	Reduced heat usage (million BTU/year)	Saved electricity (kWh per year)	Saved expenses (Baht/year)	Invest-ment (Baht)	Break-even (year)	Reduced GHG emissions (tCO_2e)
Ratchaburi Power Plant							
• Suspending Auxiliary Cooling Water Pump when a block of Combined-Cycle Power Plant shut down	Electric power 228,000 kWh	-	972,782	2,937,800	-	-	486.29
• Halting Control Air Compressor but instead using one Station Air Compressor during preserved operation		-	493,776	1,491,204	-	-	246.84
• Saving power consumption by adjusting angle of fan blade of Auxiliary Cooling Tower		-	66,946	202,178	-	-	33.47
Nava Nakorn Power Plant							
• Raising the temperature of steam entering HP Steam from 505 to 510 degree Celsius to enhance the steam turbine's power	Electric power: 75,603 kWh and heat energy: 27,058 MMBTU	18,305	-	4,194,044	-	-	2,681.82
• Reducing excess energy when the load goes updown to accommodate EGAT's peak and minimize loss		4,420	-	372,579	-	-	647.51
• Saving power consumption of the Lighting Cooling Tower system (extension) and Core Central Room (CCR) through LED lighting replacement and turning off unused parts		-	47,136	116,186	-	-	23.56

Project/Activity	Energy-saving target in 2021	Reduced heat usage (million BTU/year)	Saved electricity (kWh per year)	Saved expenses (Baht/year)	Invest-ment (Baht)	Break-even (year)	Reduced GHG emissions (tCO_2e)
Berkprai Cogeneration Power Plant							
• Changing the final filter of gas turbines to enhance combustion efficiency and reduce heat loss	42,241.61 MMBTU	43,598	-	9,659,054	1,614,000	0.17	6,387.32
RATCH Cogeneration Power Plant							
• Installing variable speed drive (VSD) in cooling water tower fan unit 2 and cool water pump in the loop heating system of the gas turbine #2	74,480.05 MMBTU	3,787	1,109,769	3,683,118	1,152,861	0.31	554.77
• Reducing operating hour of cooling water system or chiller of the gas turbine		16,506	4,837,076	16,053,367	-	0.00	2,418.05
• Utilize high efficient Air Compressor		943	276,307	917,013	1,166,667	1.27	138.13
• Offline Compressor Wash		53,245	15,603,640	14,164,112	214,999	0.22	7,800.26
RATCH Group Building							
• Promoting energy saving under the program Turn-off, Unplug, Adjust, Change	Lower 1% from average energy used in 2017-2019	-	298,333	1,201,923	-	-	154.64
Total		140,804	23,716,765	54,992,579	4,148,527	-	21,573

Performance of Ratchaburi Power Plant

Ratchaburi Power Plant sets a five year energy-saving plan (2021-2025), with the goal to save energy consumption by at least 79.4988 million megajoules or 228,400 kilowatt-hour per year and reduce greenhouse gas emissions by 115 tCO_2e.

First year outcome (2021): The power plant saved 1,534 megawatt-hours from three projects, reducing greenhouse gas emissions by 767 tCO_2e which achieved the goal.

Emission reduction under T-VER program

Ratchaburi Power Plant submitted two projects for carbon credit certification under Thailand Voluntary Emission Reduction Program (T-VER), in preparation for Thailand's Emission Trading Scheme (ETS).

Performance

Regis-tration N0.	Project	Type of project	Status		Crediting period	Amounts of carbon credit (tCO_2e)		Certification plan (years)
			Regis-tered	Carbon Credit Certified		Estimated entire period	Certified	
105	Energy Efficiency Project through LED Lighting Replacement by Ratchaburi Electricity Generating Co.,Ltd.	Energy efficiency (EE)	✓	✓	7 years	5,397	3,064 (4 years)	2024
131	Solar Floating Project at Ratchaburi Electricity Generating Co.,Ltd.	Renewable energy (RE)	✓	✓	7 years	12,418	1,513 (1 year)	2023
185	Sustainable Forestation Project of Ratchaburi Power Plant	Forest and Green area (FOR)	✓	2022	20 years	1,140	-	2022

RATCH Group has implemented other GHG-reduction activities or projects including the Green Office Project that seeks to reduce electricity, water, paper consumption and the waste and Waste Bank Project at Ratchaburi Power Plant. The projects further reduced greenhouse gas emissions by 175.4 tCO_2e

RATCH Group was bestowed the Green Office Award 2021: Excellent Level (G-Gold), for its success in meeting the criteria and reducing greenhouse gas emissions by 167 tCO_2e

Green Office Award: Excellent Level (G-Gold) by the Department of Environmental Quality Promotion

Promotion of external emission reduction

Community Energy Project Phase 3 (2020–2022), at Yang Hak sub-district, Pak Tho District, Ratchaburi Province

In the second year of the Community Energy Project, RATCH promoted the use of solar-powered water pumps. Eight pumps were handed out to the community and they were used for agricultural purposes. Aside from this, two energy learning centers were established to transfer the knowledge in solar power application for equipment and tools instead of fossil fuels, to help reduce greenhouse gas emissions. The centers also demonstrated how solar-powered tools and equipment worked.

Assessment of impacts

Activity	Social benefit	Environmental benefit	Economic benefit
Activation of 8 solar-powered pumps	100 households benefit from the pumps.	• Consumption and combustion of gasoline, 17,280 liters per year for traditional pumps, was cut. • Combustion-based emissions were slashed by 37,836.29 $kgCO_2e$* (37.8 tCO_2e) per year.	• Reduce expenses on pumps for household use • Reduce expenses on gasoline by Baht 518,400 (based on t the average fuel price of Baht 30 per liter)
• For agricultural purposes	• 98 households		
• For consumption purposes	• 17 households		

** Based on TGO's calculation methodology: Gasoline combustion of not-moving engine releases 2.1896 kg. of carbon dioxide per liter ($kgCO_2e$).*

Solar-powered innovations installed at 2 learning centers

Charoen Phol Farm Learning Center and Tanaosri Coffee Community Enterprise Learning Center	Amount/center
• 3,400-watt solar-powered pump	1
• 340-watt solar panel	10
• Solar panel mounting structure	1
• 2,500-watt power converter	1
• Electrical control panel and lightning surge protector	1

Low Emission Support Scheme (LESS)

The Company submitted two community energy-saving projects and Head Office's energy-saving project to GHG evaluation under LESS Scheme in the energy-efficiency category. The projects reduced GHG emissions by 4.86 tCO_2e per year.

Project	Certification period under LESS Scheme	Reduced GHG (tCO_2e)
Solar-power promotion at Ban Hua Ha, Mae Hong Son Province (Off-grid solar power generation)	1 July 2020 – 15 June 2021	2.987
Community Energy Project at Yang Hak Sub-district, Pak Tho District, Ratchaburi Province (Renewable power generation in replacement of purchasing of power from the grid)	16 December 2020 – 15 June 2021	1.874
Total		4.861

Carbon sink creation

RATCH has shown support to community forests across the country through its "Love the Forest and the Community Project". Under the project, community forest contests have been organized and prize money has been awarded to the forests with sustainable management that covers safeguarding, rehabilitation and utilization of forest resources. The project has been implemented in collaboration with the Royal Forest Department since 2008.

Community Forest Contests (2008-2021)

Indicators	Results
Number of entries	15,868 forests
Awarded community forests (before Community Forest Act B.E. 2562 effective)	1,974 forests
Awarded community forests (after Community Forest Act B.E. 2562 effective)	1,395 forests
Areas of awarded forests	1,276,389.24 rai
Prize money	43,020,000 Baht
Environmental benefit from contests	
Carbon capture (6.3 tons/rai on average)	8,041,252.21 tco_2e
Water storage and runoff discharge (≈ 686 cubic meters/rai)	875,603,019 cubic meters
Value of forest ecosystem services (≈ Baht 89,737 per rai)	114,539 million Baht

In 2021, RATCH prepared a forest reforestation project (2022-2025) to create a carbon sink. The project will be improved and registered under TGO's T-VER Scheme in the forest and green area category. Encompassing approximately 50,100 rai, the project is expected to capture a total of 670,000 tons of carbon dioxide equivalent throughout the initial 10-year crediting period. It is part of the carbon sink-creation strategy.

Forest conservation for GHG reduction and biodiversity enhancement

Objectives

- To demonstrate and affirm RATCH's commitment in forest and biodiversity conservation, which is a material issue to the enterprise's sustainability
- To support RATCH's GHG-reduction approach and targets through expansion of forest areas that will capture more carbon dioxide and generate carbon credits
- To enhance community's capability in safeguarding and utilizing forests and assess forests' carbon capture capacity and biodiversity in support of SDG 13

Targets

- Seek certification for carbon credits for 670,000 tCO_2e throughout crediting period.
- Support the Company's planning, target setting and roadmap preparation for GHG reduction in the short, medium and long term.
- Demonstrate the Company's commitment to protect forests and promote biodiversity.
- Facilitate the adaptation to climate change in terms of flood and drought prevention food security forest conservation to build corridors; and forest conservation to build forest buffers, to enhance the efficiency of the community's ecosystem and biodiversity conservation. Reforestation and enhancement of forest abundance supports SDG13: Climate Action

Expected benefits

Direct benefits

1. Reduce or prevent GHG emitted from the Company's activities.
2. Increase carbon storage by reforestation.
3. Increase green area and rehabilitation forest and biodiversity for capturing carbon dioxide.

Co-benefits

1. The project supports the national low-emission strategy (with energy sector being the prime target) and the 20-year national strategy that sets to increase green areas to 55 percent by 2037 and sequester 120 million tons of carbon dioxide equivalent.
2. Community engagement is promoted through their participation in the study and collection of data in respective forests. Local workers will be hired to plant and take care of trees.
3. Communities will obtain additional knowledge climate change and carbon stored in trees. Their capacity to prepare carbon data and assess carbon in trees will be enhanced.

Coverage area in 2022

600 rai in initial stage

- Mangrove forest area: 100 rai, in cooperation with the Department of Marine and Coastal Resources under the department's regulations of mangrove reforestation and rehabilitation for external organizations and individuals announced in 2021.
- Terrestrial forest area: 500 rai, in cooperation with the Royal Forest Department under the department's regulations of carbon credit sharing from reforestation, conservation and rehabilitation in forest areas announced in 2021.

GHG disclosure

Disclosure method	Target group
Sustainability Report 2020 based on GRI Standards	Shareholders, investors, stakeholders, and the interested
Participating in Stock Exchange of Thailand's sustainability assessment	Shareholders, investors, stakeholders, and the interested
Taking part in survey on Carbon Disclosure Project	Investors and stakeholders
Taking part in S&P ESG Indices Corporate Sustainability Assessment	Investors and stakeholders

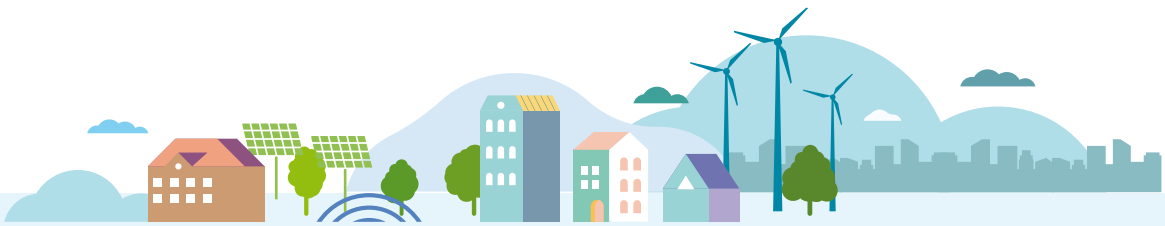
RATCH received "The Sustainability Disclosure Award" from Thaipat Institute for the third consecutive year, recognized for the Completeness, Credibility and Communication of its publicly-disclosed Sustainability Report based on the Ceres-ACCA criteria.

Emerging Risks Management

RATCH foresees that climate change will remain a major factor that influences businesses in the future, particularly those in the electricity and energy industry. Several countries are setting their Carbon Neutrality and Net Zero Emission targets after the 26th UN Climate Change Conference (COP26) and that is a catalyst for changes in all dimensions. Such can constitute emerging risks that affect the Company's competitiveness and business sustainability. The risks that are expected to emerge in the next 3-5 years and create significant impacts on the Company are as follows:

Emerging risk	Cause/Possible impacts	Management approach/opportunity
Laws, regulations and measures that support a reduction in green-house gases and the net zero target, to limit global warming to 1.5 degrees Celsius above pre-industrial levels	• A law may be enacted to support the national targets on emission reduction that may involve the emission cap or GHG management (Cap & Trade); and/or emission reduction target or carbon taxes. • The financial market has imposed measures and practices involving ESG. Emission reduction has become a condition that all businesses shall honor, especially those in the electricity generation industry. • The operating cost will increase and this will limit the electricity generation industry's growth, especially when it involves fossil fuels.	• Monitor and study the power development plans, national carbon strategy and investment targets of the countries that are investment destinations, as well as the likelihood in regulatory changes concerning GHG management to assess financial impacts and business/investment opportunity as well as return on investment in the countries. • Specify the fossil fuel ratio for the electricity generation business; devise the strategy, roadmap and target to reduce the Company's greenhouse gas emissions; and apply TCFD recommendations in assessing financial impacts and planning the approach/methods in tackling and mitigating the impacts. • Study and follow up on the development and amendments in the law and rules on the financial market, as they can be a condition in the fund-raising through various channels and instruments as well as required compliance with other conditions. • Study and follow up on the development/improvement in emission reduction mechanism, compulsory or voluntary, in the national and international levels the development of carbon trading and carbon credit pricing and the implementation of emission taxes. • Improve personnel capability, for the right knowledge and skills supportive to the new business context and conditions as well as future businesses.

Emerging risk	Cause/Possible impacts	Management approach/opportunity
Development of low-carbon innovation and technology for decreasing GHG in support of global efforts to limit global warming to 1.5 degrees Celsius above pre-industrial levels	• The development of decarbonizing technology to turn fossil fuels to clean energy and improvement in the efficiency of technology for increasingly demanded renewable electricity generation may affect the Company's operating cost. • The advancement in Carbon Capture and Storage (CCS) technology development, to reduce emissions to the atmosphere, may affect the operating cost of the Company's existing fossil fuel power plants and future investment.	• Monitor the advancement in electricity generation technology; study and analyze carbon footprint per unit for comparison with that of the Company's projects, commercially-operated and under development; draw up the approaches for efficiency management as well as resource utilization and conservation; and use the information as the basis for future project consideration. • Explore investment opportunities in the innovation and technology concerning emission management, renewable energy, storage and energy management; and build up partnership with technology developers, experts or start-ups. • Monitor changes or improvement in regulatory rules/criteria/measures in environment impact reduction and environmental quality management concerning the application of Carbon Capture and Storage (CCS) technology in the electricity and energy sector.



Sustainable Environmental Management

RATCH has strictly upheld and fully complied with environmental laws and relevant regulations. Aside from this, environmental management principles have been included in the Code of Conduct while management guidelines are integrated in the Company's Environment Policy and Corporate Sustainability Development Policy's environmental dimension. The guidelines have been communicated with all businesses under the Company's control.

Code of Conduct

- Utilize resources efficiently
- Make sure production process meets prescribed standards to reduce natural resource utilization and pollution
- Outline natural resource and biodiversity conservation measures
- Respond promptly to operational impacts on natural resources and biodiversity
- Examine the efficiency of measures in remedying and preventing impacts in environmental, economic and social dimensions

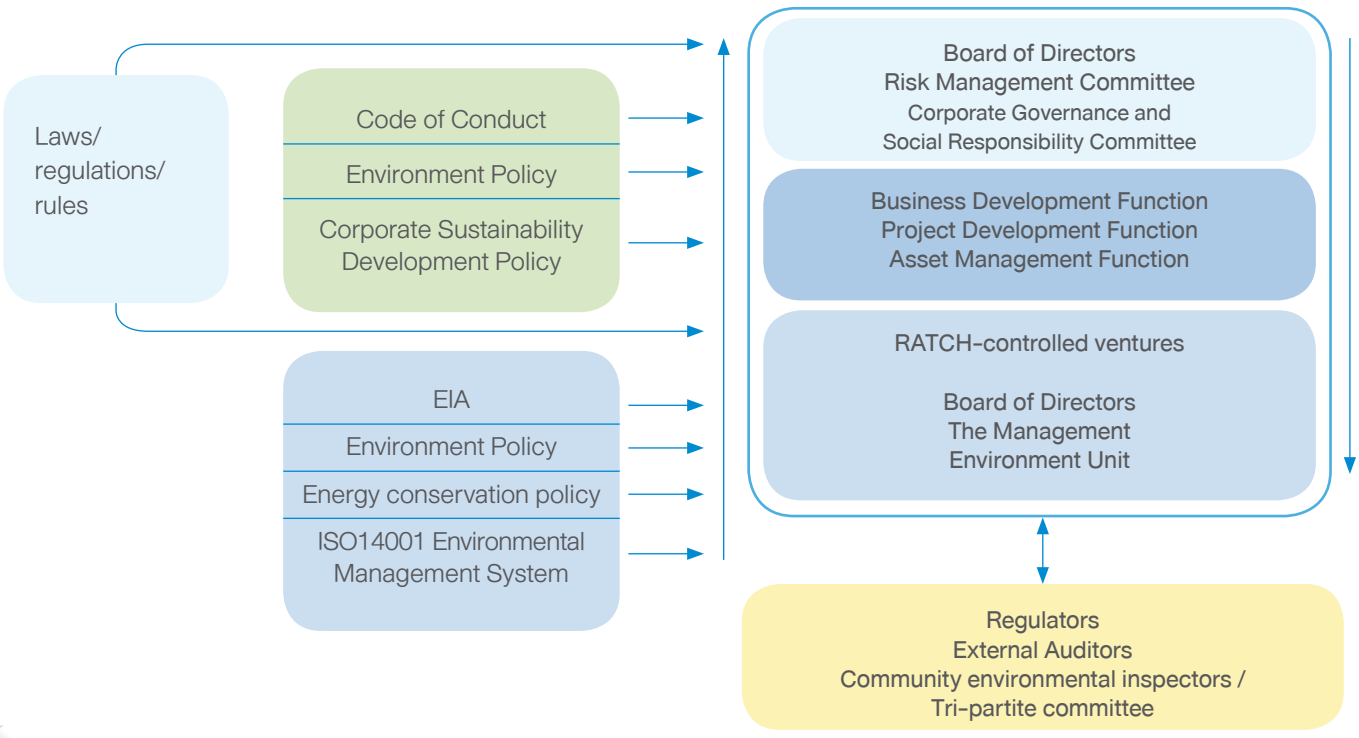
Environment Policy

- Manage environmental quality and biodiversity accordingly to rules and laws
- Invest, develop and improve environmental management to uplift management efficiency and environmental quality control
- Invent and find ways to reduce resources/energy consumption as well as pollutants, waste and greenhouse gases to reduce impacts on the environment, community and society

Corporate Sustainability Development Policy

- Strictly comply with rules and laws
- Promote engagement in environmental and energy activities
- Emphasize efficient resource and energy utilization
- Protect the environment and prevent pollution caused by raw materials through continual impact evaluation or evaluation in light of changes in raw materials or process
- Communicate with stakeholders to ensure their understanding

Structure of Environmental Supervision

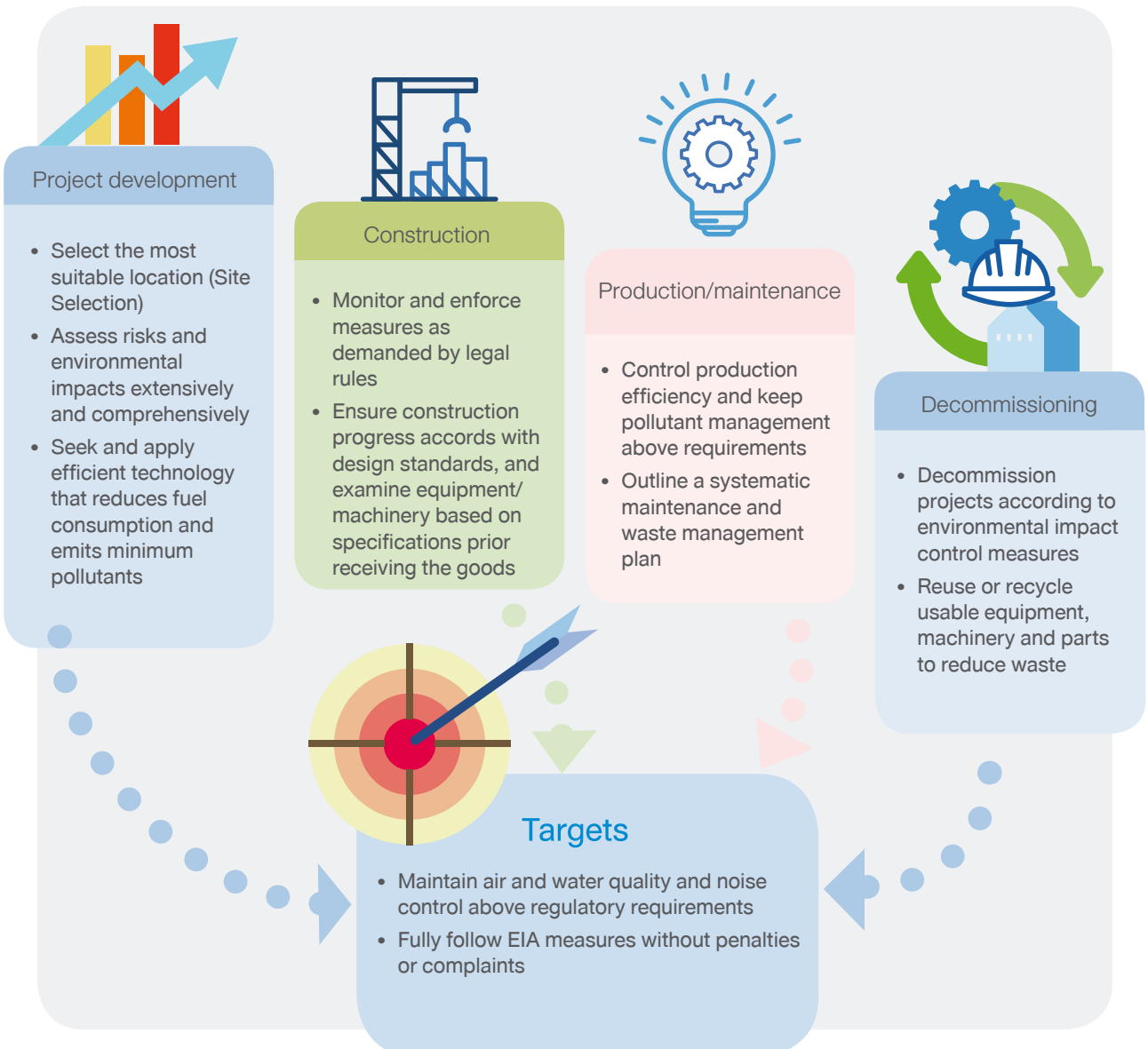


RATCH's core business, electricity generation, requires a large amount of resources throughout the life cycle from construction to operations, maintenance and decommissioning. Each stage emits pollutants into the atmosphere. The operations stage, in particular, burns fossil fuels such as natural gas, oil and coal and emits pollutants and waste that may affect the air, water, soil and ecosystem without efficient management and control.

Environmental Management Process

In all stages, from project development, construction, and production and maintenance to decommissioning, the Company puts in place an environmental management process that emphasizes maximum resource utilization and minimum environmental impacts. The objectives are to deliver eco-friendly electricity to customers, reflect the Company's product responsibility and support the Sustainable Development Goal on sustainable consumption and production. (SDG 12: Ensure sustainable consumption and production Target 12.5: Substantially reduce waste generation through prevention, reduction, recycling and reuse.)

Environmental Management Approach of Electricity Generation Businesses



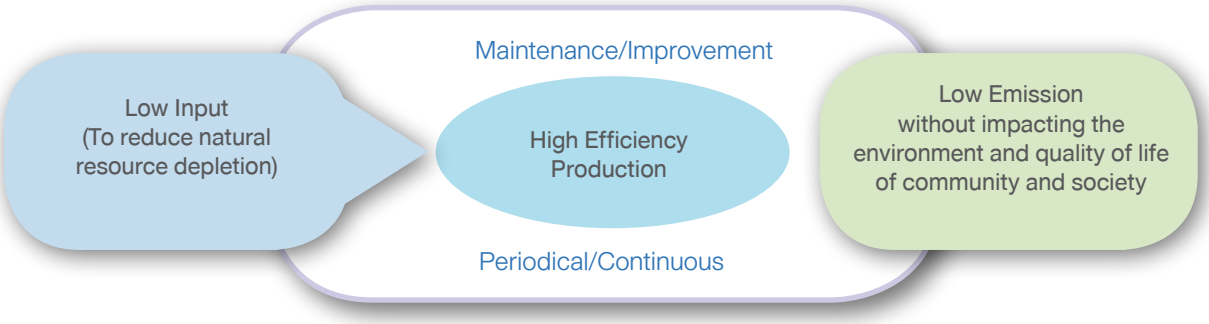
Targets

Fuel consumption	Water consumption	Waste management
Average Heat Rate of IPP 7,189 BTU/kWh	Reduced Water Withdrawal 500,000 cubic meter	Waste diverted from disposal by recovery operation >95%
Average Heat Rate of SPP 7,582 BTU/kWh	Water Consumption 1 cubic meter/MWh	Waste directed to disposal by disposal operation ≤ 5%

Performance in 2021

1. Resource and energy consumption

Resource and energy consumption principles and targets



Fuels

In 2021, the power plants over which RATCH had operational control were: Ratchaburi Power Plant, Nava Nakorn Power Plant, Berkprai Cogeneration Power Plant and RATCH Cogeneration Power Plant in Thailand; and Kemerton Power Station and Townsville Power Station in Australia. All have ably maintained their efficiency, hence keeping the utilization of resources at a reasonable level compared to output. Moreover, some power plants have invented and adjusted generating techniques that have saved fuel consumption or enhanced the efficiency of heat utilization.

- Berkprai Cogeneration Power Plant changed the final filter of gas turbines, to enhance combustion efficiency and reduce heat loss that reduced the consumption of natural gas by 53 million cubic feet, which is equivalent to 43,598 million BTU of reduced heat utilization.

Reduced fuels: 53 million cubic feet	Reduced heat: 43,598 million BTU	Reduced GHG emissions: 6,387 tons

Fuel consumption at RATCH-controlled power plants in 2019-2021

The four RATCH-controlled power plants in Thailand (contributing 76.2% of total revenue in 2021) utilized fuel for generating electricity of 124.25 megajoules in total.

In 2021, Ratchaburi Thermal Power Plant Unit 1 and 2 with 735 MW capacity each resumed operations on the National Control Center's order, having been put under reserved shutdown since 2018 to support fuel security and the stability of domestic electricity prices. Bunker oil was specified for generation.

Indicators	Unit	2021	2020	2019
Volume of natural gas	million cubic feet	121,482	129.310	121,916
Volume of bunker oil	liter	161,121,423	0	0
Volume of diesel	liter	9,244,423	2,020,571	395,848
Net generation output	megawatt-hour	14,625,418	14,933,403	14,249,996
Average heat rate (IPP Plant)	BTU/ kilowatt-hour	7,184	7,144	7,094
Average heat rate (SPP Plant)	BTU/ kilowatt-hour	7,671	7,755	7,872
Energy Consumption	terajoule	71.4	77.9	72.9

Note: The average heat utilization data concerns only the power plants in Thailand.

Raw water

The four controlled power plants (contributing 76.2% of total revenue in 2021) used raw water for electricity generation activities from two major sources:

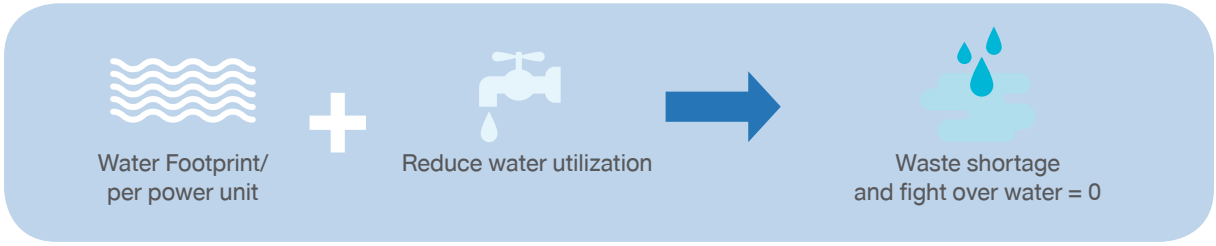
- Mae Klong River Basin for Ratchaburi Power Plant and Berkprai Cogeneration Power Plant (contributing 70.5% of total revenue in 2021) used 0.71% of Mae Klong River's water volume in 2021.
- Chao Phraya River Basin used in tap water production for Nava Nakorn Power Plant and RATCH Cogeneration Power Plant (contributing 5.7% of total revenue in 2021)

Mae Klong River Basin is classified as a basin with a low water stress level, while Chao Phraya River Basin shows a high water stress level based on the ranking by World Resources Institute (Aqueduct Water Risk Atlas and the WWF (Water Risk Filter).

RATCH and its power plants thus have continually monitored and evaluated the water levels and imposed strict measures to monitor and prevent raw-water related issues as specified in the EIA. The process is crucial to prevent water shortages that may affect operations and send a chain effect on the economy and the general public, as well as to reduce impacts on communities that rely on water, particularly from the Chao Phraya River, for consumption and agricultural purposes.

In 2021, the four power plants' water withdrawal from the two river basins did not change water levels, cause shortages or spark conflict with the community over water.

Targets in 2021



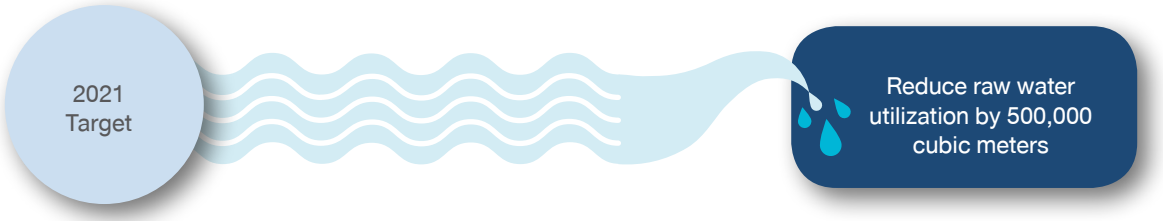
Water withdrawal and power generation based on water stress levels

Power plant	Water source	Water stress level			Water utilization per power unit (cubic meter/ megawatt-hour)	Power generation based on water stress levels
		low-medium (10-20%)	medium-high (21-40%)	high (41-80%)		
Ratchaburi	Mae Klong River	✓	-	-	0.96	82.59
Berkprai Cogeneration	Mae Klong River	✓	-	-	1.55	4.38
Nava Nakorn	Tap water coming from Chao Phraya River	-	-	✓	1.56	8.28
RATCH Cogeneration	Tap water coming from Chao Phraya River	-	-	✓	1.40	4.76

Water use in power generation by RATCH-controlled power plants in 2021

Power plant	Water source	Raw water (million cubic meter)	Water utilization per power unit (cubic meter/ megawatt-hour)	Water discharge		Net water utilization (raw water – water discharge) (million cubic meter)
				Volume (million cubic meter)	% of utilized raw water	
Ratchaburi	Mae Klong River	11.60	0.96	0.99	8.57	10.60
Berkprai Cogeneration	Mae Klong River	0.99	1.55	0.29	28.89	0.70
Nava Nakorn	Tap water coming from Chao Phraya River	1.88	1.56	0.10	5.23	1.79
RATCH	Tap water coming from Chao Phraya River	0.97	1.40	0.12	12.70	0.85
Australia Base • Kemerton • Townsville	Tap water and surface water	0.12	0.35	0.03	27.83	0.09

Water management guidelines of RATCH's power plants in Thailand

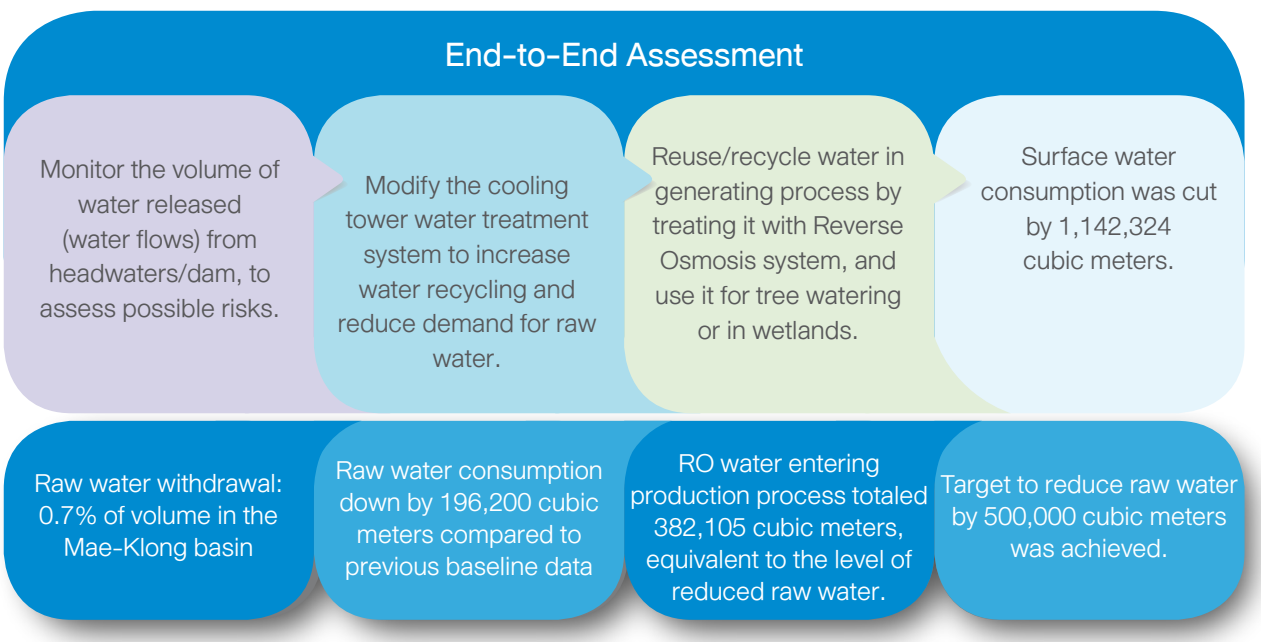


The four RATCH-controlled power plants (contributing (contributing 76.2% of total revenue in 2021) have put efforts in continually finding solutions that will reduce water utilization in power generation. An emphasis is placed on enhancing the efficiency of the cooling tower water treatment system to maximize water recycling.

Performance in 2021

Power plant	Province	Recycling target (cycles)	Average cycles (cycles)		
			2021	2020	2019
Ratchaburi Thermal (1,470 MW)	Ratchaburi	4-6	2.67	Non-operation	Non-operation
Ratchaburi Combined Cycle (2,175 MW)		4-6	5.01	4.81	4.91
Berkprai Cogeneration (99.23 MW)		5	3.73	4.07	-
Nava Nakorn (199.11 MW)	Pathum Thani	5	4.11	4.16	4.82
RATCH Cogeneration (119.15 MW)		6	8.08	6.67	-

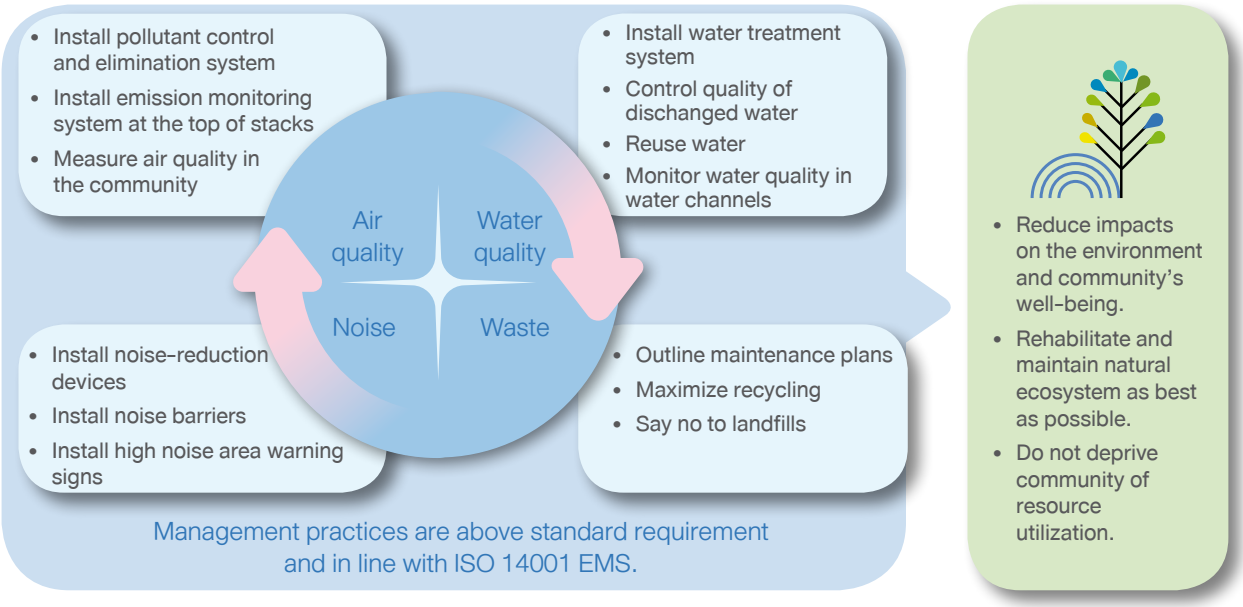
To meet the target in reducing raw water withdrawal by 500,000 cubic meters, the power plants also reused the blow-down water in the production process.



2. Environmental Quality Management

RATCH and its power plants give importance to factors that influence the four aspects of environmental quality – air quality, water quality, waste and noise – and the management of those factors. Preventive and remedial measures are in place, in line with EIA, legal requirements and international environmental standards.

Environmental Management Approach and Process



From the development stage, all power plants were designed to include the environmental management system to control and reduce impacts to a level that would not harm the natural environment and community. The system's technology and efficiency had to match the EIA and approved by relevant regulators.

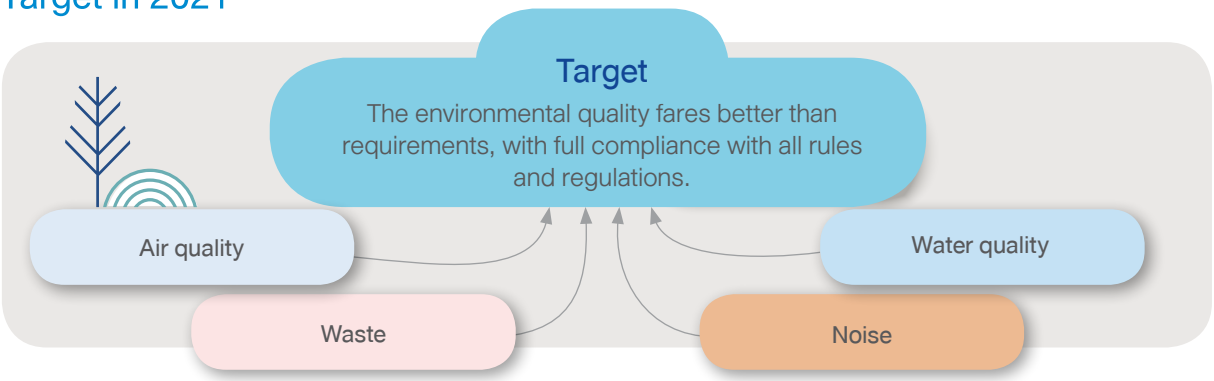
Each power plant thus has its own measures according to project designs to control physical impacts concerning air, water and waste; biological impacts concerning animals in the waters and wildlife; impacts on people, concerning raw water consumption and the quality of life; and socioeconomic impacts.

All power plants are equipped with the pollution elimination system along with a warning signal. The results are monitored by regulators through an online real-time monitoring system and periodical reports. This is to ensure constant compliance with requirements.

Environmental Management of RATCH's power plants in Thailand

Development Stage	Construction Stage	Operation & Maintenance Stage	Decommissioning Stage
• Location selection • Project design • License application	• Ensure conformity with design specification • Testing/inspection on completion • Reporting performance	• Control operation/ maintenance • Manage pollutant/waste as required by raw • Submit report	• Machinery/equipment utilization • Compliance with obligations/land rehabilitation • Reporting
Reference regulations and standard on environment, health and social impact assessment	Regulatory requirements/measures in reducing environmental impacts	Regulatory requirements/measures in reducing environmental impacts and monitoring environmental quality	Regulatory requirements/measures in reducing environmental impacts

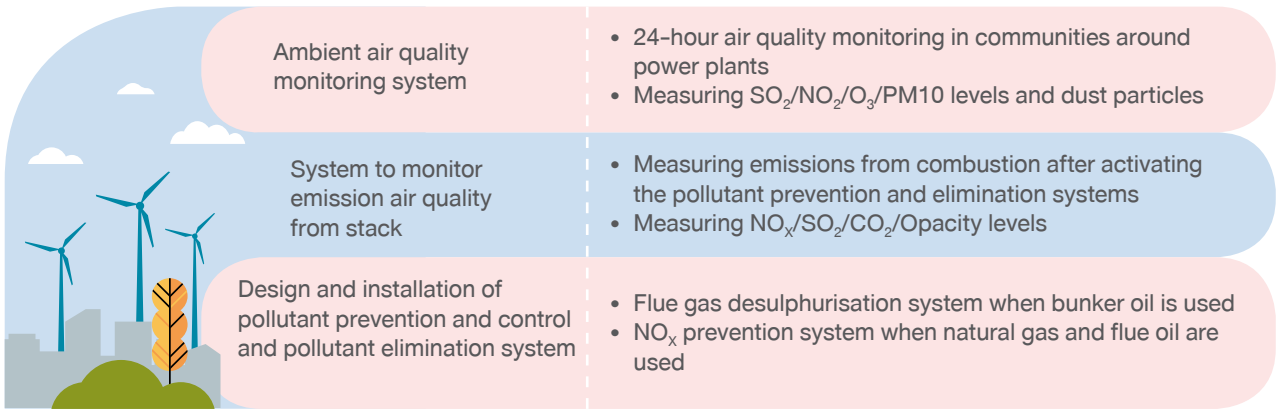
Target in 2021



Performance in 2021

Air quality management

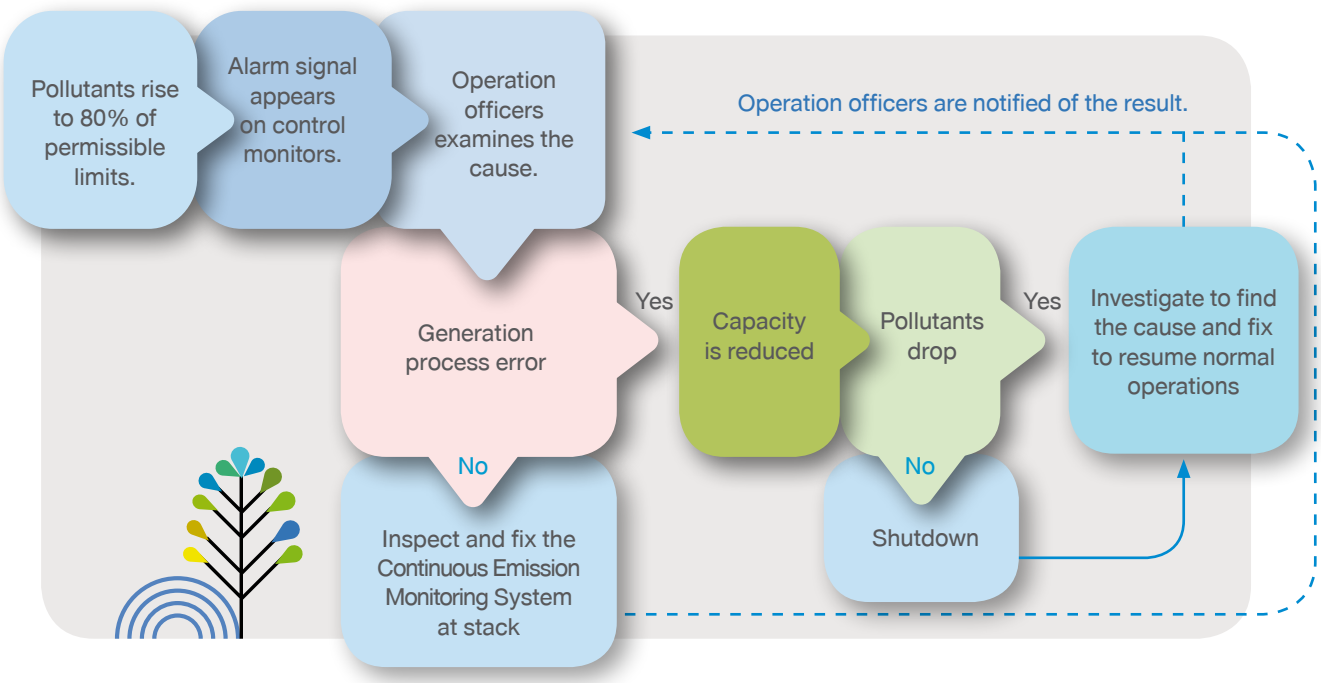
The air quality management system is designed to control, reduce and eliminate pollutants from the production process in order to meet requirements and to not cause impacts on community and the environment.



Ambient air quality monitoring system	• 24-hour air quality monitoring in communities around power plants • Measuring SO_2/NO_2/O_3/PM10 levels and dust particles
System to monitor emission air quality from stack	• Measuring emissions from combustion after activating the pollutant prevention and elimination systems • Measuring NO_x/SO_2/CO_2/Opacity levels
Design and installation of pollutant prevention and control and pollutant elimination system	• Flue gas desulphurisation system when bunker oil is used • NO_x prevention system when natural gas and flue oil are used

Measures to Tackle Risks Deriving from Pollutant Irregularities at Stacks

All power plants have outlined risk-management measures in case the air quality control system malfunctions and pollutants rise to 80% of permissible limits. The measures are shown in the chart below:



Results of air quality measurement at RATCH's power plants in Thailand

The pollutant intensity of the four power plants (contributing 76.2% of total revenue in 2021) has been monitored continuously, and combustion pollutants have remained within permissible limits. Besides this, the air quality at stack measuring system has been tested and verified by an external examiner on an annual basis.

In 2021, Ratchaburi Thermal Power Plant Unit 1 and Unit 2 resumed operations, having bunker oil (with 2% sulfur) as fuel. That prompted stringent and continuous air quality monitoring to control pollutants, particularly sulfur dioxide.

Power Plant	Average concentration of pollutant emissions*				
	NO_x (ppm)		SO_2 (ppm)		Backup fuel
	Natural gas	Fuel oil	Natural gas	Fuel oil	
Ratchaburi Thermal	57.98	88.92	6.33	142.99	Bunker oil
Ratchaburi Combined Cycle	27.26	89.93	2.53	17.20	Diesel
Target (Not exceeding legal limits)**	120	180	20	320	-
Nava Nakorn	35.58	-	0.42	-	None
Berkprai Cogeneration	39.25	-	3.52	-	None
RATCH Cogeneration	27.00	-	0	-	None
Target (Not exceeding EIA limit)	60	-	10	-	-

Note : ** Average pollutant concentration from Continuous Emission Monitoring Systems*

*** Standards as in the notification of Ministry of Industry on the limit of air pollutants emitted by power-generating, transmission or distribution plants B.E. 2547*

The two gas-fired power plants in Australia-Townsville located in Queensland and Kemerton in Western Australia, are specifically ordered electricity generation during high power demand period or in the peak hour only. As such, the power plant's air quality monitoring at the stack according to regulatory environment standard have been required to conduct every two years for Townsville and five years for Kemerton. The recent air quality monitoring results of the two power plants conducted in 2020 were above the required standard. Townsville Power Plant schedules the next monitoring inspection in 2023 and Kemerton in 2025.

Ambient air quality monitoring in communities

Being a large-scaled power plant, Ratchaburi Power Plant installed ambient air quality monitoring systems (AAQMs) at four stations around the premises to cover wind directions in all seasons. A similar monitoring process is exercised by other power plants to cover wind directions and monitor the air quality in all seasons. The system efficiency is inspected every year. At Ratchaburi Power Plant, the efficiency and accuracy are verified by external inspectors on an annual basis.

The monitoring showed the ambient air quality at all power plants stayed within permissible limits, and ozone only around Ratchaburi Power Plant always spikes above the limits in the dry season every year. The contaminants are found in the power plant's upwind and downwind direction.

Air quality monitoring stations at nearby communities	24-hour average			1-hour average		
	Total Suspended Particulate ($\mu g/m^3$)	Particulate Matter smaller than 10 micron ($\mu g/m^3$)	SO_2 (ppb)	SO_2 (ppb)	NO_2 (ppb)	O_3 (ppb)
Ratchaburi Power Plant	11-142	2-115	1-4	1-19	0-46	0-149
Nava Nakorn Power Plant	17-67	8-48	2-4	2-5	1-45	No monitoring
RATCH Cogeneration Power Plant	21-168	12-116	1-7	1-9	1-67	No monitoring
Berkprai Cogeneration Power Plant	28-90	13-50	2-4	1-6	1-36	10-37
Target (Not exceeding permissible limits)	330[1]	120[1]	120[1]	300[2]	170[3]	100[4]

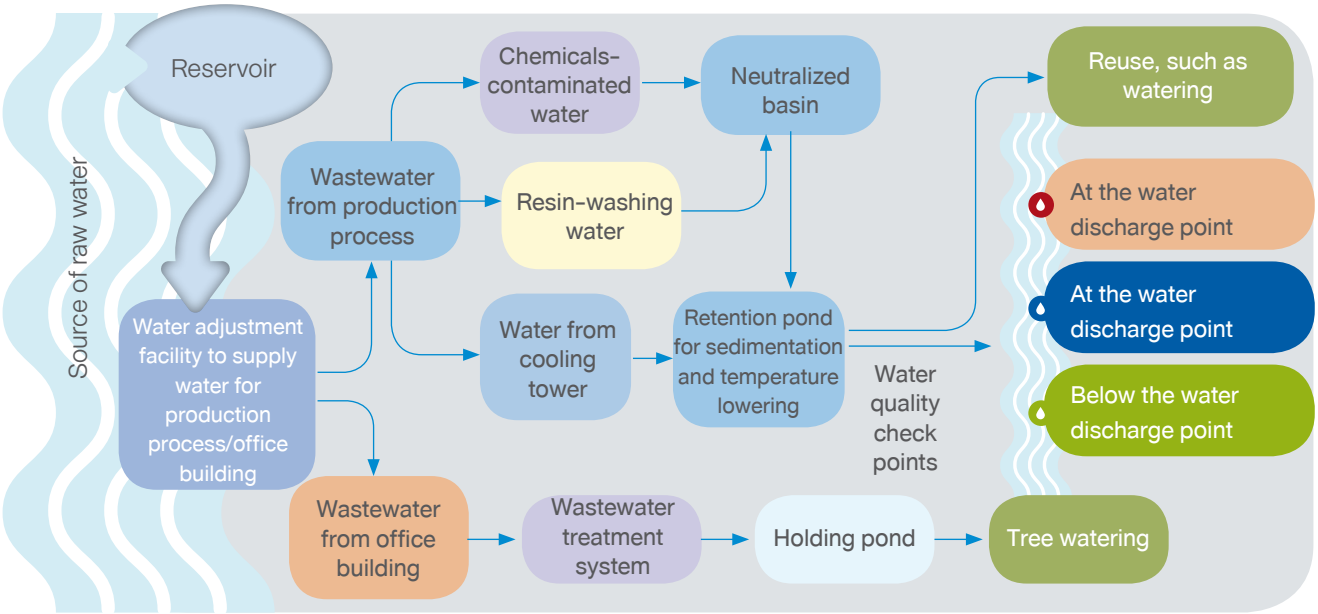
Note: µg/m3 = microgram per cubic meter
ppb = part per billion
Standards in line with the Notification of National Environment Board:
[1] as specified in the No.24 announcement of the National Environmental Board (B.E.2547) on ambient air quality standards
[2] as specified in the No.21 announcement of the National Environmental Board (B.E.2544) on 1-hour sulfur dioxide standard in ambient air
[3] as specified in the No.33 announcement of the National Environmental Board (B.E.2552) on Nitrogen dioxide standard in ambient air
[4] as specified in the No.28 announcement of the National Environmental Board (B.E.2550) on ambient air quality standards

Water Quality Management Process

All power plants are equipped with water treatment systems designed specifically for types of wastewater from each step of the production process.

Ratchaburi Power Plant's water quality management

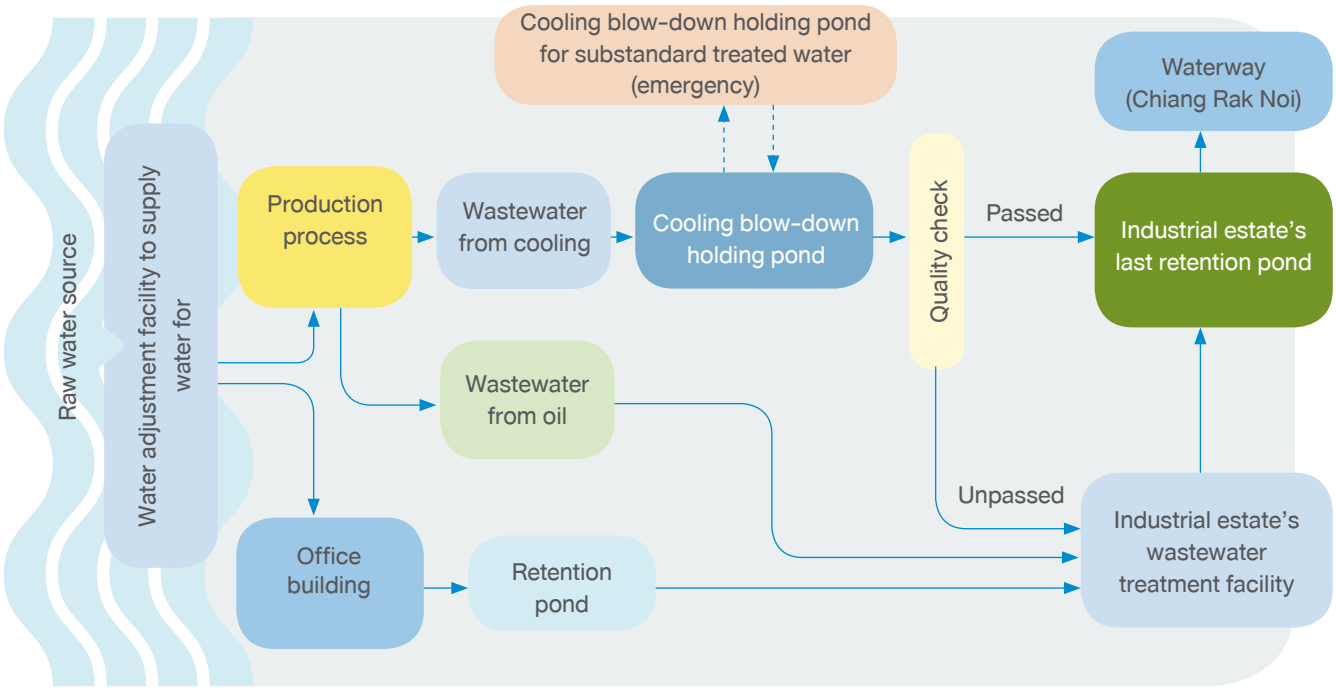
Ratchaburi Power Plant (contributing 70.2% of total revenue in 2021) has its own system in treating raw water from the Mae Klong River for its production, along with a wastewater treatment system and retention ponds that ensure the quality is close to its natural condition.



Some of the treated water is further improved through the reverse osmosis filter system for reuse in the production process. The quality of water at the discharge point, above and below, is checked to ensure that the power plant's discharge will not impact runoff water, and downstream communities can safely use the water.

Small power plants' water quality management

The water management process at Nava Nakorn Power Plant, RATCH Cogeneration Power Plant and Berkprai Cogeneration Power Plant (contributing 6.0% of total revenue in 2021) is as follows:



Note: Flowcharts of Nava Nakorn Power Plant's water quality management process (including Extension facility)

Performance in 2021

Power plants' water discharge

Power Plant	Discharge (cubic meter)	Discharge point
Ratchaburi	993,491	Khlong Bang Pa, Mae Klong River
Nava Nakorn	98,498	Nava Nakorn Industrial Zone's treatment system
Berkprai Cogeneration	286,175	Mae Klong River
RATCH Cogeneration	123,356	Given to other organizations as requested

Results of water quality monitoring

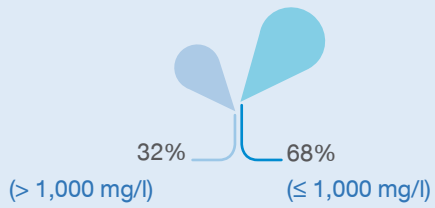
Indicator (average)	Unit	RGCO	NNEG	BPC	RCO	Target		
						Royal Irrigation Department's standard limit [2]	Industry Ministry's standard limit[3]	MNRE's standard limit [4]
Temperature	degrees Celcius	31.3	29.9	28.6	28.7	Not exceeding 33 (only for Ratchaburi Power Plant) and not exceeding 40 (power plants in general)	Not exceeding 40	Not exceeding 40
pH	-	7.6	7.6	7.8	8.2	6.5-8.5	5.5-9.0	5.5-9.0
Biochemical Oxygen Demand (BOD)	Milligrams/ liter	4.0	5.0	2.1	3.3	Not exceeding 20	Not exceeding 20	Not exceeding 20
Chemical Oxygen Demand (COD)	Milligrams/ liter	24.3	-	31.6	60.8	Not exceeding 120	Not exceeding 120	Not exceeding 120
Total Dissolved Solids (TDS)	Milligrams/ liter	952	230	880	1,631	Not exceeding 1,300	Not exceeding 3,000	Not exceeding 3,000
Conductivity	Microsie-mens/ centimeter	1,247	-	1,302	-	Not exceeding 2,000	Unspecified	No limit

Note: Biochemical Oxygen Demand (BOD) is the amount of oxygen consumed by microorganisms to decompose organic matter.
Chemical Oxygen Demand (COD) is the oxygen required to oxidize soluble and particulate organic matter in water.
Total Dissolved Solids (TDS) is the dissolved combined content of all inorganic and organic substances.
[1] Quality of wastewater from Ratchaburi Power Plant and Ratchaburi-Power's Power Plant
[2] The Royal Irrigation Department's standard is based on Order #73/2011 regarding the prevention and mitigation of low-quality water discharge to irrigation channels and all channels connected with irrigation channels.
[3] Industry Ministry's standard regarding the specifications of factories' discharged water B.E 2560
[4] Ministry of Natural Resources and Environment's standard is based on Ministerial Regulation regarding water discharges by industrial plants, industrial estates and industrial zones; as well as Industry Ministry's Ministerial Regulation B.E. 2560 concerning the control of factories' water discharges prior to transportation to NNCL's retention ponds.

Measurement of contaminants in wastewater

Based on the ISO 14046: Environmental management's (Water Footprint-Principles, requirements and guidelines) permissible limit of total dissolved solids (TDS) in wastewater at 1,000 milligrams/liter, the following chart shows TDS in the wastewater of four RATCH-controlled power plants:

Amount of wastewater classified by the level of total dissolved solids (TDS)

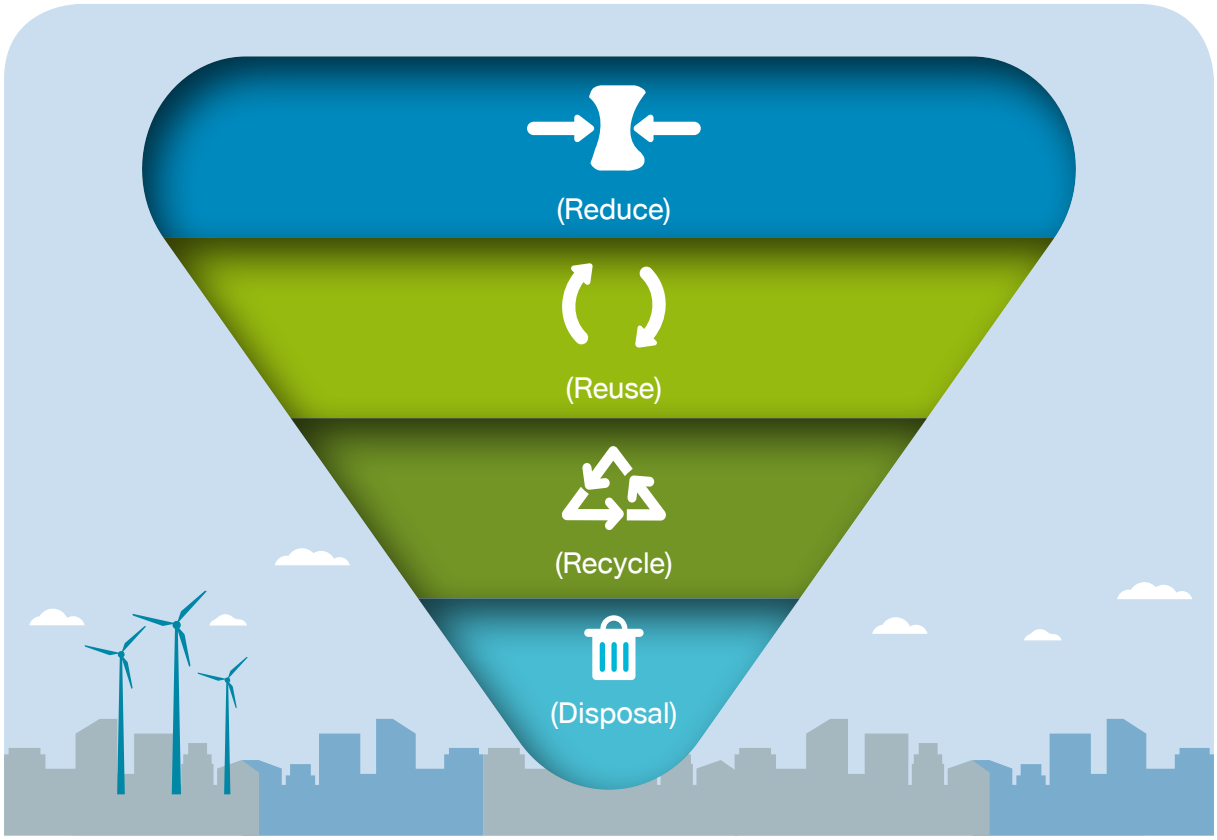


Treated wastewater with TDS below 1,000 milligram/liter	1,475,168 cubic meters (68%)
Treated wastewater with TDS above 1,000 milligram/liter	698,548 cubic meters (32%)

Waste Management

Theoretically, power plants choose waste management approaches that have proved best for their waste and comply with regulatory requirements, industrial best practices and international environmental standards.

The process starts with a study of approaches that utilize less resources to keep waste as low as possible. Waste will be processed or used as raw materials for the making of other products, or go to furnaces for steam production. Landfills are usually the last option. RATCH has put in place a policy demanding the Company's power plants to set a zero landfill target, so as to reduce impact on soil, groundwater, surface water, ecosystems and all beings.



Waste management at RATCH-controlled power plants in Thailand

The power plants follow the Ministry of Industry's Notification B.E. 2548 regarding waste disposal. Permission is needed when waste is to be transported to an outside site or if the power plants want to dispose waste on site through landfilling or fertilizer making, for example. The power plants' hazardous waste management system controller is obliged to submit annual disposal reports (Form Sor. Kor. 3) to the Department of Industrial Works within 1 March of the following year. All power plants are held responsible for the waste until it reaches disposal companies, and the companies must notify the Department of Industrial Works of the disposal.

Types of waste and management methods

The primary waste and management methods of the four RATCH-controlled power plants (contributing 76.2% of total revenue in 2021) are as follows:

Source of waste		Type of waste	Type		Location		Management methods
			Hazard-ous	None Hazard-ous	Onsite	Offsite	
Production waste	Genera-tion activities	• Sediment from treatment • Gypsum	-	✓	✓	-	• Store gypsum in the pond constructed on an HDPE liner. The gypsum can be used in the manufacturing of gypsum boards, for example. • Monitor groundwater quality every six months.
	Mainte-nance activities	• Insulation • Steel scraps • Wood or paper packaging	-	✓	-	✓	• Dispose of unused materials according to Ministry of Industry's notification • Monitor the disposal through the Non-Hazardous Waste Manifest system
		• Used lubricants • Rags/oil-tainted gloves • Fire-resistant bricks	✓	-	-	✓	• Store them in a hazardous waste collection facility before pickup by Department of Industrial Works-authorized disposal companies who dispose of it by recycling or as industrial fuel
Office waste		• General waste	-	✓	-	✓	• Sort waste for recycle banks, store for the recycling by handlers • Hire local handlers to handle non-recyclable waste for segregation and disposal
		• Light bulbs, batteries • Discarded electric equipment • Spray cans	✓	-	-	✓	• Collect and dispose through Hazardous Waste Manifest System (landfilling)

Performance in 2021

The volume of waste from the four power plants and management methods are as follows:

Management methods	Type of waste	Applied Method	On-site handling	Off-site handling	Total	%
			Volume (ton)			
Reuse through recovery process (93.7% of total waste)	Hazardous Waste	Reuse	0	0	0	0
		Recycle	0	79.44	79.44	1.48
		Other Recovery Operations	0	0	0	0
	Non-hazardous Waste	Reuse	0	0	0	0
		Recycle	0	4,946.13	4,946.13	92.22
		Other Recovery Operations	0	0	0	0

Management methods	Type of waste	Applied Method	On-site handling	Off-site handling	Total	%
			Volume (ton)			
Disposal (6.3% of total waste)	Hazardous Waste	Incineration with Energy Recovery	0	249.09	249.09	4.64
		Incineration without Energy Recovery	0	12.90	12.90	0.24
		Landfilling/On-site storage	3.34	0.61	3.95	0.07
		Other Disposal Operations	0	16.37	16.37	0.31
	Non-hazardous Waste	Incineration with Energy Recovery	0	9.38	9.38	0.17
		Incineration without Energy Recovery	0	0	0	0
		Landfilling/On-site storage	2.00	32.49	34.49	0.64
		Other Disposal Operations	0	11.77	11.77	0.22

Volume of recovered waste

- Gypsum is the waste that is recycled the most, amounting to 92% of total waste.
- Gypsum is a by-product generated during the flue gas desulfurization process at Ratchaburi Power Plant when bunker oil was used as fuel in 2021. The gypsum, totaling 4,946 tons, is stored in the gypsum pond to wait to be recycled into, for example, gypsum boards.
- Ratchaburi Power Plant gradually uses the stored gypsum in gypsum board manufacturing for community use. In 2021, 4,946 tons of gypsum was used. Since 2016, 40,701 tons of gypsum has been used. The gypsum board manufacturing is a collaboration between Ratchaburi Power Plant and Siam Gypsum Industry (Songkhla) Company Limited and Knauf Gypsum (Thailand) Company Limited. The gypsum boards are given to the community.

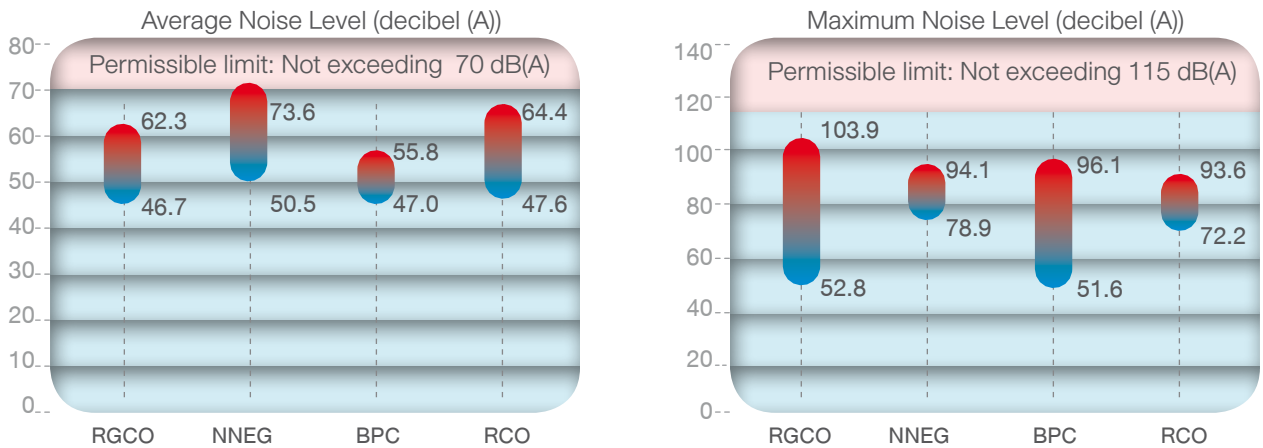
Noise Management

Noise generated by power generation may have a significant impact on operators, communities and all beings in the vicinity. Power plants' design thus includes a noise prevention system, and there are measures to reduce noise from the following three factors:

Factors	Key mitigation measures
Noise from power plants such as noise from generators	• Install silencer for noise control near the area or equipment that cause loud noise • Install mobile silencer for activities such as pipe cleaning
Noise pollution passage (interval from source location to receptors)	• Grow trees as sound barrier around power plants • Install noise barrier in the areas close to community
Sound receptors • Employees • Nearby community or environment	• Install noise area safety signs, provide employees with personal protection equipment like earplugs and ear muffs, and specify the working time in loud-noise areas • Issue letters to community ahead of any activity that might cause louder-than-usual noise

Results of noise level monitoring in 2021

Four RATCH-controlled power plants (contributing 76.2% of total revenue in 2021) have been able to keep noise level below permissible limits. Only at Thammanava temple monitoring station of Nava Nakorn Cogeneration Power Plant, the noise level was exceeding permissible limit on 25-26 August where it's raining caused animals and bugs raising lound noises.



Note: The 24-hour equivalent continuous sound level (Leq 24 hr) and the maximum sound level (Lmax) stay within the standards prescribed in the National Environmental Board's Notification No. 15 (B.E.2540) on standard sound levels.

3. Biodiversity Conservation

RATCH's criteria for the development or joint investment in power generation or related businesses require a comprehensive assessment of project risks and impacts on the environment and ecosystems. RATCH vows to reject the development or joint investment in projects located close to World Heritage Sites, historical sites or areas that constitute high risks to endangered species, local animal breeds or the species enlisted in IUCN Red List.

Biodiversity Management Approach

RATCH demands the group's power plants outline measures to prevent and reduce impacts on the environment and ecosystems and thoroughly follow the environmental quality/ecosystem impact monitoring system. The measures call for the seasonal monitoring of the quantity and density of population as well as similarities on an annual basis.

Aside from this, the Company Group is meeting its commitment to biodiversity and plans to enforce the policy in mid-2022.

Assessment of impacts on power plants' biodiversity

The Company Group controls eight power plants (contributing 84.9% of total revenue in 2021): four in Thailand and four in Australia. The eight power plants span through a total area of 150,106 rai or 24,017 hectares. The following is the assessment of impacts on biodiversity as well as preventive, surveillance and monitoring measures:

Item	Power plant/Project	Country	Area (Hectares)	Possible impacts on ecosystem/ biodiversity	Preventive, surveillance and monitoring measures
1	Ratchaburi	Thailand	322.4	Construction and operation may affect the habitat and food sources of all four animal types (birds, mammals, amphibians and reptiles) as well as living organisms in wastewater reservoir (phytoplankton, zooplankton and benthos)	• Track wildlife quantity and diversity. • Track sum of species, density and biodiversity index of living organisms in wastewater reservoir biannually.
2	RATCH Cogeneration	Thailand	8.1	An impact assessment shows the operation will have no impact on the ecosystem and biodiversity, as the project location is in a city area and wastewater is not discharged to natural water channels (but given to other organizations).	Not specified
3	Nava Nakorn	Thailand	6.9	Construction and operation may affect the ecosystem and fishery activities in Khlong Chiang Rak Noi (phytoplankton, zooplankton, benthos, fish eggs and baby fish).	Track sum of species, density, biodiversity index and evenness index of living organisms in wastewater reservoir biannually.
4	Berkprai Cogeneration	Thailand	8.6	Discharge of water from the operation may affect the ecosystem (phytoplankton, zooplankton and benthos).	Track sum of species, abundance, density and biodiversity index at checkpoints biannually.
5	Collinsville Solar Farm	Australia	70.9	The environmental impact assessment shows no the project's risk and impact against terrestrial/aquatic organisms.	Not specified
6	Mount Emerald Wind Farm	Australia	2,400.0	Construction and operation may affect local animal breeds' habitat.	Track quantity and type of species of animals • Bird and bat : annually • Quoll : triannually
7	Yandin Wind Farm	Australia	15,000.0	Construction and operation may affect local plant fields as well as birds that may hit wind turbines, cable wire or maintenance vehicles.	Track quantity and diversity of local animals, birds and plants in every 2 years
8	Collector Wind Farm	Australia	6,200.0	Construction and operation may affect plants, animals, forests and pastures.	Track quantity and diversity of • Bat and bird : annually • Carcass : monthly

Areas surveyed and monitored for impacts on ecosystem and biodiversity

Six of the Company Group's power plants have been operating commercially (contributing 79.5% of total revenue in 2021). They control a combined area of 149,612 rai or 23,938 hectares and have studied and monitored impacts on the ecosystem and biodiversity as follows:

- Ratchaburi Power Plant (contributing 70.2% of total revenue in 2021) covers 2,015 rai or 322.4 hectares. The power plant plans a 10-year survey since 1997 on the sum of species and diversity of birds, mammals, amphibians and reptiles biannually, in the rainy season (August) and in the winter (December), due to the large project size that may affect the ecosystem and livelihood of all beings in the vicinity. The survey is ongoing as one of the indicators of operational impacts.
- Nava Nakorn Power Plant and Berkprai Cogeneration Power Plant (contributing 0.6% of total revenue in 2021) surveys the density and diversity of living organisms in wastewater biannually. At Berkprai Cogeneration Power Plant, the survey also covers the sum of species and diversity of wildlife.
- Mount Emerald Wind Farm, Yandin Wind Farm and Collector Wind Farm in Australia are operated by RATCH-Australia Corporation Pty Limited, a subsidiary. The plants (contributing 8.7% of total revenue in 2021) cover 147,500 rai or 23,600 hectares. Measures to monitor the possible impacts on animals and biodiversity have been outlined.

Biodiversity survey results

Ratchaburi Power Plant	Tracking of wildlife quantity and diversity as well as sum of species, density and biodiversity index of living organisms in wastewater reservoir biannually.

- In 2021, 97 species of wild animals were found: 69 bird species, six mammal species, nine amphibian species, and thirteen reptile species.
  - ◊ 70 species (65 bird species and five reptile species) were protected under the Wildlife Reservation and Protection Act B.E. 2562
  - ◊ 102 species were classified under Thailand's bio-resources status (2017). In total, two species were near-threatened species - *Ploceus hypoxanthus* and *Phalacrocorax fuscicollis*; two species were vulnerable - *Anhinga melanogaster* and *Ardea purpurea*; and 98 were least-concerned species which are of high numbers and show low risk of extinction.
  - ◊ 101 species were enlisted in IUCN Red List (2021). In total, two were near threatened species - *Ploceus hypoxanthus* and *Anhinga melanogaster*; and 99 were least concerned species consisting of six mammal species, 73 bird species, eleven reptile species and nine amphibian species.
- The survey on the species, density and biodiversity of living beings in the water pond that entailed phytoplankton, zooplankton and benthos found unstable results. The results depended on the conditions of the pond, which was partly surrounded by community, livestock or agricultural farms or covered by aquatic plants.

Nava Nakorn Power Plant	Tracking the sum of species, density and biodiversity index of living organisms in wastewater reservoir (biannually)

- In 2021, Nava Nakorn Power Plant found no change in the sum of species, density, biodiversity and evenness of plant plankton and animal plankton in a survey that covered the pumping station near the Chao Phraya River and Khlong Chiang Rak Noi (where Nava Nakorn Industrial Zone's wastewater is discharged), at the discharge point, below it and above. The sum of species and biodiversity index of baby fish showed no change. No fish eggs were found at the survey points

Berkprai Cogeneration Power Plant	Tracking the sum of species, diversity index and evenness index of living organisms in water (biannually)

- The 2021 survey on the sum of species, density and diversity of plant plankton, animal plankton, benthos, fish eggs and freshwater fish at the pumping station and three points in the Mae Klong River (50 meter above the pumping station and 50, 500 and 1,000 meters below the discharge point). The finding of the four survey points shown that diversity index of phytoplankton, zooplankton and benthos were likely the same, while diversity index of fish indicated low diversity.

Mount Emerald Wind Farm	Tracking the sum of species and diversity of fauna species

- The survey tracked local animal species like Quoll, in five survey points (including two points at the wind farm).
- The survey found no change in Quoll population.

Yandin Wind Farm	Tracking the sum of species and diversity of flora and fauna species

- The survey tracked fauna like birds and flora species.
- The 2021 survey found none of birds and bats impacted from the wind farm.

Collector Windfarm	Tracking the sum of species and diversity of fauna species

- The survey tracked quantity and diversity of flora and fauna such as bat, birds.
- The 2021 survey tracked number of local bird and bat carcasses in vicinity of wind turbine and they were not protected and rare species.

Economic Performance

RATCH's economic values in 2021

Item	Value (Million Baht)
Economic value generated	
Revenue from sales/service and leases contracts	37,326.78
Profit sharing from associates and joint ventures	5,902.40
Dividend income	58.83
Other revenues	1,005.28
Economic value distributed to stakeholders	
Fuel expenses	26,892.61
Operations and maintenance expenses	1,675.26
Cost of maintenance and parts	1,354.98
Power plant insurance premium	440.10
Administrative expenses and payments	1,701.84
Financial cost	1,868.07
Taxes payment*	615.02
Fees for specialized services	297.71
Audit fee	18.16
Local taxes payment**	2.68
Dividend payments	3,480.00
Community and social investment	179.99
Economic value received by RATCH	
RATCH's profits	7,772.02

** Inclusive of corporate taxes, withholding tax, and special business tax of RATCH and subsidiaries in Thailand*

*** Local taxes are the taxes collected by local administrative offices to finance local development projects. Local taxes are subjected to local administrative offices' consideration and are not remitted to the government. They are land and building tax, local development tax, and signboard tax.*

Revenues in 2021

RATCH showed 44,293.29 million baht in total revenue in 2021. Of total, 38,157.08 million baht or 86.1% was generated by the entities covered in this report.

Revenue structure	Revenue of entities in reporting boundary (million Baht)	Total Revenue (million Baht)
Revenue from sales/service and leases contracts	36,968.94	37,326.78
Profit sharing from associates and joint ventures	444.96	5,902.40
Dividend income	33.85	58.83
Other revenues	709.33	1,005.28

Revenue from power generation business and non-power businesses

1. Revenue from power generation business totaled 95.5% of total revenue.
   - Revenue from fossil fuel power plants: 76.3% of total revenue.
   - Revenue from renewable power plants: 19.2% of total revenue.
2. Revenue from non-power businesses totaled 4.5% of total revenue.

Investment progress in 2021

Total investment = 12,459.49 million baht

Transaction	New projects		Committed projects	
	No. of projects	Value (Million Baht)	No. of projects	Value (Million Baht)
Power generation business				
• Fossil fuel power plants	2	4,227.86	4	634.83
• Renewable power plants	1	1,575.76	4	927.84
Non-power businesses				
• Infrastructure	2	2,744.39	3	531.10
• Healthcare	2	1,747.71	-	-
• Electricity and energy-related and innovation	1	45.00	3	25.00

Transactions completed and in progress in 2021

1. Power generation business

Transaction	Brief nature of transaction	Results/Expectation
Nexif Energy BT Pte. Ltd. in Singapore	Acquisition of a 50% stake worth 272.58 million baht, for indirect interest in Nexif Energy Ben Tre One Member Co., Ltd.	• A joint project to develop the 80-MW Nexif Ben Tre Wind Farm, located southeast of Ho Chi Minh City, Vietnam and scheduled for commercial operation in 2024. The output will be sold to Vietnam Electricity (EVN) under a 20-year power purchase agreement. • RATCH realizes 40 MW in equity installed capacity from this project.
Fareast Renewable Development Pte. Ltd. (FRD) in Singapore	Acquisition of a 40% stake worth USD 54.31 million or approximately 1,789 million baht, which raised RATCH's holding in FRD to 90% and allowed RATCH to hold a 47.89% indirect holding in PT Bajradaya Sentranusa (BDSN).	• FRD holds a 53.21% stake in BDSN, a major independent power producer that operates 180-MW Asahan-1 Hydroelectric Power Plant, located on the Asahan River, North Sumatra. The output is sold to PLN under a long-term power purchase agreement (2011-2040). • RATCH will realize 86.20 MW in equity installed capacity from this project.

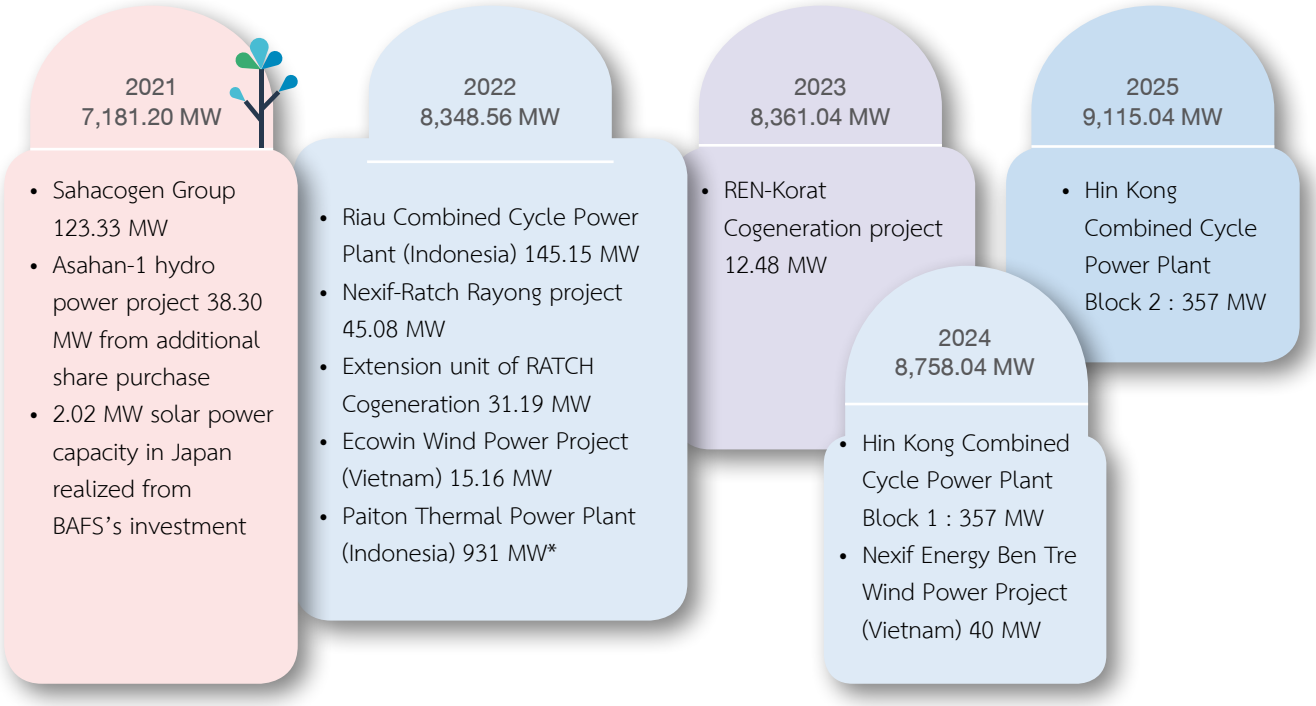
Transaction	Brief nature of transaction	Results/Expectation
Sahacogen (Chonburi) Public Company Limited (SCG)	Acquisition of existing and newly-issued common shares at the value of 3,413 million baht, constituting a 51% stake. RATCH announced the intention to make a tender offer (Form 247-3) and filed the tender offer (Form 247-4) for the remaining 570,210,869 shares of SCG (or 49% of all issued shares) at 5.75 baht apiece, to the SEC, the SET and SCG in January 2022. The transaction is expected to be completed within the first quarter of 2022.	• SCG operates a cogeneration power plant with 214 MW installed capacity and 96 tons/hour in steam capacity. Of total, 90 MW of electric power is sold to while the rest and steam are distributed to industrial users in Saha Industrial Park Sriracha. SCG owns 2 biomass power plants. One in Saha Group Industrial Park Lamphun in Lamphun Province has 9.6 MW installed capacity and the other with 7.5 MW installed capacity in Kamphaengphet Province. SCG also has an industrial solar rooftop-installing joint venture. • RATCH realizes 123.34 MW in equity installed capacity from this project.

Paiton Energy Group in Indonesia	RATCH received the approval reached at the 1/2021 extraordinary shareholder meeting on 21 October 2021 to purchase Paiton Energy Group's shares from Mitsui & Co., Ltd. for USD 809.60 million or approximately 25,421.68 million baht. The transaction involved;
	• a 45.515% stake in PT Paiton Energy (PE) Ltd. that operates 2 power plants (3 generating units) valued at USD 707.20 million or approximately 22,206.29 million baht
	• a 45.515% stake in Minejesa Capital B.V. (MCBV) which sought funding for PE worth USD 53.50 million or approximately 1,679.92 million baht.
	• a 65% stake in IPM Asia Pte. Ltd. (IPM) which owns 84% of PT Paiton Operation and Maintenance Indonesia, the operation and maintenance service provider for PE's 2 power plants. The holding is valued at USD 48.90 million or approximately 1,535.47 million baht.
		• PE owns 2 thermal power plants fueled by sub-bituminous coal, with combined capacity of 2,045 MW. The remaining life of PPA with PLN is 21 years.
		  • Power plant #1 (P7/8) has 2 generating units, with combined capacity of 1,230 MW. The output is sold to PLN under a 43-year PPA (2009-2042).
		  • Power plant #2 (P3) has 815 MW capacity. The output is sold to PLN under a 43-year (2012-2042).
		• RATCH realizes 930.78 MW in equity installed capacity from this transaction. The power plants will also become major revenue generators, to substitute the revenue from Ratchaburi Power Plant of which PPA will expire in 2025.

2. Non-power businesses

Transaction	Brief nature of transaction	Results/Expectation
Bangkok Aviation Fuel Services Public Company Limited (BAFS)	Acquisition of 98,983,125 BAFS shares, 15.53% of total shares, for 2,700 million baht through Thai Airways International Public Company Limited's auction.	BAFS' business plan and objectives are aligned with RATCH Business synergy is expected, in terms of the investment in renewable power plants, digital technology and fuel and energy-related businesses.
Principal Capital Public Company Limited	Acquisition of 346,233,682 shares issued under a general mandate and 34,623,369 shares or major shareholders. Altogether, the 380,857,051 shares, worth 1,557,705,338.59 baht, account for 10% of total issued shares.	Healthcare business shows high-growth potential and can benefit from health technology and innovations. Principal Capital seeks to become a leader in digital medical platform for the betterment of experience and quality of life of Thais, especially the residents of emerging cities. The business seeks to boost Thais' affordability to quality healthcare services and reduces government hospitals' workload.
Bangkok Chain International (Lao) Company Limited	Acquisition of a 9.91% stake for 190 million baht.	The company penetrates the healthcare business in Lao PDR, presenting an affordable and quality choice for Lao people as well as foreign investors and Thai expatriates in Lao PDR.
BGSR 6 Company Limited and BGSR 81 Company Limited (each 10% owned by RATCH)	Both companies have signed the PPP Agreements with the Department of Highways on the O&M contracts for intercity highways No.6 (Bang Pa-in - Nakhon Ratchasima) and No.81 (Bang Yai - Kanchanaburi).	Both projects will contribute stable revenue and stabilize RATCH's cashflow. The projects will be implemented in 2 phases: Phase 1 concerns the design, construction and installation of toll-collection systems; for 3 years and Phase 2 concerns the 30-year operation and maintenance. The joint ventures for Phase 1 works will be paid for on a quarterly basis for 20 years, while the O&M fee will be paid quarterly for 30 years.
Innopower Company Limited	• A 30:40:30 joint venture with the Electricity Generating Authority of Thailand (EGAT) and Electricity Generating Public Company Limited. • The joint venture requires 2,960 million baht in investment, starting with an initial 150 million paid-up capital. The remaining capital will be gradually injected within 5 years.	The transaction is to bolster RATCH's investment potential in the fields of energy innovation, future energy as well as energy start-ups. It will also the commercialization of EGAT and EGAT Group's R&D and innovations. Innopower will have 4 major departments: Collaborator, Incubator, Accelerator and Corporate Venture Capital (CVC).

Commercial operation schedules of power plants in RATCH's portfolio



**The project is in progress, the terms and conditions of the share purchase agreement are expected to be completed in the second quarter of 2022.*

Success in sustainable fund sourcing and financial position

RATCH successfully obtained a USD 150 million sustainable loan from International Finance Corporation, being the first sustainable loan in Asia and the first to support sustainability of Thai infrastructure.

A part of the sustainable loan will finance the development of new hospitals in emerging cities in collaboration with Principal Capital Public Company Limited which plans to have 20 hospitals in emerging cities within 2023. The other part will finance the investment in Asahan-1 Hydroelectric Power Plant.

Financial information

Item	2021	2020	2019
Assets (Million Baht)	154,855.31	112,132.25	100,229.43
Liabilities (Million Baht)	77,045.77	51,610.68	40,815.50
Shareholders' equity (Million Baht)	77,809.54	60,521.57	59,413.93

Financial ratios

Item	2021	2020	2019
Current ratio (times)	1.25	2.69	2.70
Profit to total revenue (excluding fuel cost) (%)	40.30	37.03	38.90
Return on equity ratio (%)	11.57	9.98	10.21
Return on total assets ratio (%)	7.10	7.24	8.33
EBITDA to total assets (%)	8.74	9.10	9.92
Total debt to equity ratio (times)	0.99	0.85	0.69
Net debt to equity ratio (times)	0.64	0.55	0.38

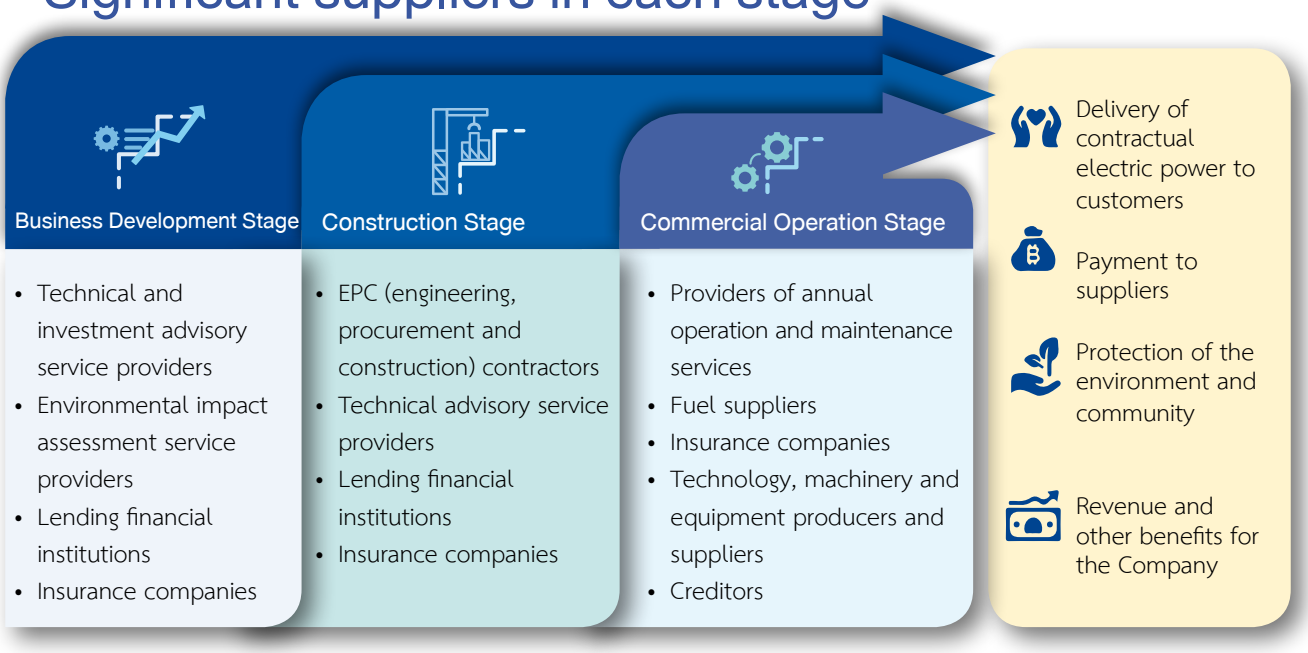
Credit ratings

TRIS Ratings	Moody's	S&P Ratings
AA+	Baa1	BBB
Outlook: Stable	Outlook: Stable	Outlook: Stable

Creating Value with business partners

RATCH Group Public Company Limited chiefly adheres to the Code of Conduct's guidelines in managing the relationships with suppliers, a crucial part in the supply chain. This is due to the fact that the power generation business requires huge investments and takes years for completion, from business development to construction and commercial operations. In each stage, the Company needs to work with a number of suppliers to ensure project success.

Significant suppliers in each stage



Supplier Relationship Management Approach and Performance in 2021

Procurement

RATCH outlined the procurement procedures that involve producers, distributors or providers of products and services based on the procurement value and authorization to ensure transparency, fairness and verifiability.

Price negotiation method	Price Inquiry method	Competitive bidding method	Special procurement method
Value ≤ Bath 100,000	Value ≤ Baht 5 million	Value > Baht 5 million	• Specific product and service/ task or services that demand special expertise • Value > Baht 100,000
Authorized persons - Vice President or above	Authorized persons - Executive Vice President or above	Authorized persons - Chief Executive officer	Authorized persons - Chief Executive officer

Product and Service Procurement in 2021

Procurement method	No. of transactions			Value (million Baht)		
	RATCH Group	Ratchaburi Electricity Generating	RATCH Cogeneration	RATCH Group	Ratchaburi Electricity Generating	RATCH Cogeneration
Price negotiation	101	828	319	6.9	82.70	26.20
Price inquiry	15	16	12	18.8	21.10	17.00
Competitive bidding	2	-	6	17.8	-	550.00
Special procurement	44	93	16	27.2	137.50	381.00

In 2021, RATCH and subsidiaries-Ratchaburi Electricity Generating Company Limited and RATCH Cogeneration Company Limited, (that constituted 76.2 percent of total revenue), made 1,452 transactions with 461 business partners with a combined value of 1,286.20 million Baht.

Green procurements in 2020-2021

Products and services	2020		2021	
	No. of transactions	Value (Baht)	No. of transactions	Value (Baht)
RATCH Group Public Company Limited				
Eco-friendly products or services	27	19,758,530	35	3,736,610
Ratchaburi Electricity Generating Company Limited				
Eco-friendly products	5	291,515	1	30,450

RATCH and Ratchaburi Electricity Generating Company Limited procured 36 items of environmental-friendly products, accounting for 12.50% increasing from 32 items in 2020.

Supplier qualification assessment

RATCH outlines the following criteria to assess suppliers' qualifications as well as screen and select desirable suppliers:

Supplier qualification criteria

Governance

- Integrity/transparency/responsibility
  - No record of all forms of corruption
  - No record of job desertion
- Conflict of interest
  - Executive/Director hold no position in a competing bidder
  - No personal relationship with RATCH's executive/employees

Environmental

- Environmental management and accountability
  - Certification on environmental standards or compliance
  - Compliance with environmental law/regulations/process

Social

- Labor, community and social care
  - Zero employment of child or illegal labor
  - Respect for worker's human rights/No infringement to basic human rights
  - Operate with social care, causing no impact on nearby communities

Performance in 2021

Company	Qualification assessment results			
	No. of assessed suppliers	No. of qualified suppliers		
		Existing suppliers	Newly-listed suppliers	%
1. RATCH Group	106	69	37	100
2. RATCH Cogeneration	173	39	134	100

RATCH Group

The Company pre-qualified all 106 suppliers according to the pre-set criteria. Of total, 69 were existing suppliers and 37 were newly-listed. All suppliers were qualified and resulted in complete delivery of products and services and zero job desertion. The assessment results were delivered to suppliers together with recommendations for further improvement.

Results of supplier qualification assessment at RATCH Group's Head Office

Qualification criteria	No. of suppliers			
	No. of assessed suppliers	Existing suppliers	No. of qualified suppliers	%
Governance				
1. Integrity/transparency/responsibility				
• Zero corruption history	69	37	106	100
• No history of desertion	69	37	106	100
2. Conflict of interest				
• RATCH's executives/directors hold no position in bidding companies	69	37	106	100
• No personal relationship with RATCH's executives/ employees	69	37	106	100
Environmental				
3. Environmental management and responsibility				
• Certification on environmental standards or compliance with ISO 14000/EIA standards	3	2	5	4.71
• Compliance with environmental impact management laws/regulations/process	3	2	5	4.71
Social				
4. Labor and community/society care				
• Zero employment of child or illegal labor	69	37	106	100
• Respect for workers' human rights/No infringement to basic human rights	69	37	106	100
• Operate with social responsibility, causing no impact on nearby communities	69	37	106	100

Ratchaburi Electricity Generating Company Limited

The company is underway in identifying the environmental, social and governance aspects which will be the supplier's qualification criteria for the selection process. In 2021, the company made transactions with 832 suppliers.

No. of suppliers		No. of qualified suppliers
existing suppliers	newly-listed suppliers	
764	68	832

RATCH Cogeneration Company Limited

Qualification criteria	No of suppliers		No. of qualified suppliers	%
	existing suppliers	newly-listed suppliers		
Quality	39	134	173	100

Management of Suppliers' Risks

RATCH assessed suppliers' risk factors that may create spill-over effects on the Company and the results were the basis of the formation of risk management, preventive and mitigating measures.

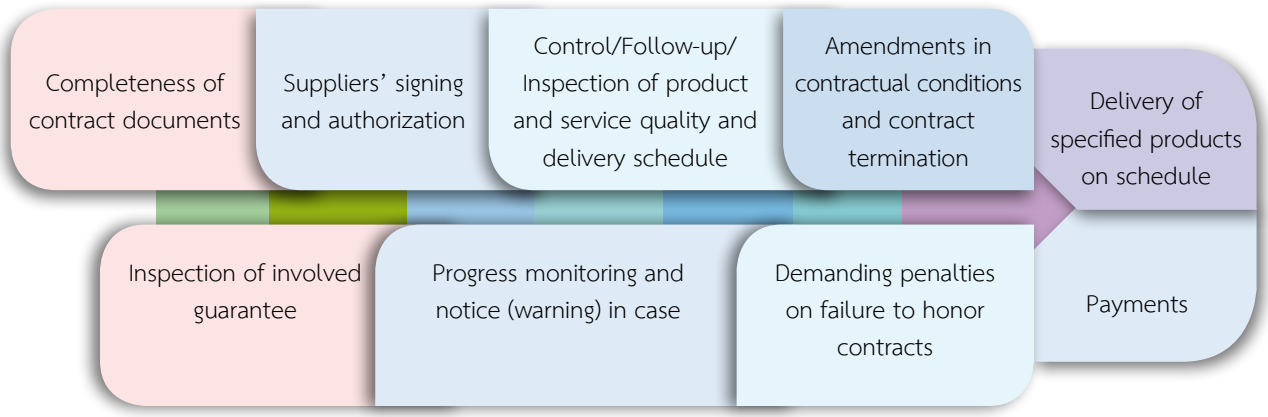
Dimension	Suppliers' risks	Preventive measures	Performance in 2021
Economic	Suppliers' financial status and stability	• Require collateral/bank guarantee placement • Probe financial track record dating back 2 years and the qualification on governance to examine job desertion and blacklisting history	• Suppliers ably provided/ warranties/guarantee as required. • Suppliers showed no history of job desertion.
	Collusion and conflict of interest	• Set supplier qualification assessment criteria • Inquire suppliers' history from previous hirers • Examine the company Certificate • Include them in supplier blacklist if finding irregularities	No collusion case or suppliers with conflicts of interest
	Job desertion/delivery failure/substandard products or services	• Set penalties • Confiscate guarantee • Cancel contract • File lawsuits • Include them in supplier blacklist if they fail to honor contracts	1 supplier could not meet the delivery schedule and was included in the blacklist
	Suppliers with contract worth more than Baht 10 million who fail to honor contracts	• Require collateral placement • Inspect compliance with contract and delivery • Set a condition to make payment in instalments, based on work progress • make a company visit	34 suppliers of RATCH and subsidiaries-RGCO, RCO and RAC were awarded contracts worth more than Baht 10 million and all honored delivery schedules.

Dimension	Suppliers' risks	Preventive measures	Performance in 2021
Social	Employment of child-illegal labor/ violation of human rights or use of forced labor	• Set supplier qualification assessment criteria • Make a company visit • Require reporting on workers' essential information • Require registration documents for migrant workers • Include them in the blacklist in case of violations	No supplier violated labor regulations.
	Workers' safety and occupational health	• Require orientation and safety-related risk assessment prior to start of work • Specify use and provision of safety equipment in contracts • Demand insurance for workers involved with high-risk tasks	Suppliers assessed their risks as required.
Social/ Economic	Suppliers' sub-contractor management	• Require job risk assessment • Set ESG conditions on sub-contractors in the main contract with main contractors • Monitor compliance with the Company's safety measures	The 6 sub-contractors followed the Company's rules.
Environment	Suppliers' environmental and waste management	• Make it a prerequisite in supplier qualification assessment • Make it part of the contracts and monitor compliance • Make a company visit	RATCH included environmental management condition in the contracts awarded to all suppliers that demonstrated environmental risks. Five suppliers were certified for the ISO 14001/EIA, environmental standards.

Management of procurement contracts

The contract management starts immediately after signing and run until the job inspection and delivery. The Procurement Department coordinates with the requesting unit in monitoring the contractual parties' compliances.

Key issues under compliance monitoring



Performance in 2021: Ninety nine percent of suppliers followed through with contract conditions. Only one supplier failed to meet the deadline.

Supplier performance assessment

After the delivery of goods or services, the Procurement Department and the requesting unit will assess suppliers' performance with focus on quality, volume, delivery and compliance with specified criteria. Suppliers will then be put into two groups: suppliers that pass assessment criteria and suppliers that fail the assessment. RATCH sends recommendations to suppliers in the latter category. If the recommendations are rejected, the suppliers will be included in the blacklist. Suppliers that passed the assessment are included in the Supplier Registry, which is the basis for the consideration of future contracts.

In 2021, 105 from 106 suppliers of RATCH Group passed the assessment, or 99.05 percent. The failed supplier was blacklisted, following the behind-schedule delivery. RATCH accordingly sent the supplier recommendations for future improvement.

Supplier Classification

RATCH's suppliers are classified into five groups based on following criteria:

Supplier group	No. of suppliers			
	RATCH	Ratchaburi Electricity Generating	RATCH Cogeneration	RATCH-Australia
Relationship duration				
• Existing suppliers	69	764	39	332
• New suppliers	37	68	134	(Supplier classification is underway)
Procurement value				
• Not more than Baht 1,000,000	91	130	162	235
• Baht 1,000,000 – Baht 5,000,000	13	44	6	57
• Baht 5,000,001 – Baht 10,000,000	1	3	1	16
• Baht 10,000,000 or higher	1	5	4	24
Qualification assessment results				
• Fully-qualified suppliers	106	182	173	332
• Sub-standard suppliers	0	0	0	0
• Failed suppliers	0	0	0	0

Supplier group	No. of suppliers			
	RATCH	Ratchaburi Electricity Generating	RATCH Cogeneration	RATCH-Australia
Post-delivery performance assessment results				
• Qualified suppliers	105	182	173	332
• Suppliers subjected to improvements	0	0	0	0
• Blacklisted suppliers	1	0	0	0
Type of procurement contracts				
• General goods procurement	64	142	133	45
• Services procurement	37	39	40	287
• Green procurement	5	1	0	0

Engagement with suppliers and long-term cooperation

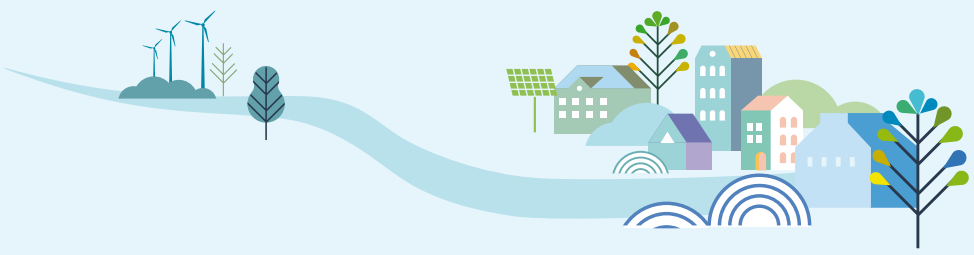
Suppliers are considered business partners that help drive the Company's business and propel corporate growth. As such, RATCH is committed to nurturing the relationships and engaging them as long-term strategic partners.

Collaboration in recycling production waste

Ratchaburi Power plant has collaborated with Siam Gypsum Industry (Songkhla) Company Limited in turning gypsum, waste from desulfurization process (when bunker oil is in use), into a material for the manufacturing of gypsum boards for community use.

2022 Plan

The Supplier Code of Conduct will be completed as business guidelines for the Company's suppliers. They will be required to emphasize key areas that include business ethics, safety, occupational health, treatment of workers, human rights, and environmental and social care.



Creating Memorable Customer Experiences

Electricity is the prime product of RATCH Group, contributing 95.5 percent of the group's revenue. As such, RATCH is determined to address customer needs and expectations accordingly to power purchase agreements while maintaining generation efficiency for optimized energy utilization and least impacts on the environment and community. Once all goals are achieved, the group's product will be environmental-friendly with the carbon footprint well below the country's average.

Code of Conduct Treatment of customer

- Produce and deliver quality products and services with responsibility and determination to continuously raise standards.
- Arrange the system and procedure through which customers can file complaints about products and services, so that customer demands are quickly addressed.
- Strictly comply with customers' conditions and inform customers if the conditions cannot be fulfilled so as to explore mutual solutions.
- Produce quality products and services with responsibility to the environment and community.
- Safekeep customer confidential information and do not use the information for the benefit of themselves or those involved.
- Disclose complete and accurate information about products and services without distorting facts.
- Do not ask for, accept or pay any illegal benefits while dealing with customers.

Approach

- Hold regular discussions on production plan and approach as well as customer demands.
- Maintain power plants' equivalent availability factor, trustworthiness and heat rate as specified in contracts.
- Have power plants prepared with quality maintenance as scheduled, to meet customer demands in terms of quantity and quality.
- Produce electric power with the process that does not cause impacts on the environment and community, as required by laws and EIA; and prepare GHG Registry for carbon footprint assessment as well as greenhouse gas emission reduction target.
- Respect to customer confidentiality and do not use the information for wrongful benefits. In case the information shall be disclosed by legal orders, customers shall be always informed and requested for approval in writing.
- Establish a communications channel that allows customers to file recommendations and issues of concerns and collaboration in problem solving.
- Conduct a customer satisfaction survey and use the results as the basis for improvement for optimized effectiveness as well as information disclosure.

Goal

Economic dimension

- Deliver products in full as specified in Power Purchase Agreement (PPA).
- Maintain Equivalent Availability Factor (EAF) and Heat Rate as specified in PPA.
- Set the limit of penalties incurring from failure to honor contractual agreements.

Performance in 2021

- Power plants fully delivered electric power accordingly to the Contracted Availability Hour (CAH).
- EAF and Heat Rate were better than required.
- Ratchaburi Power Plant's average penalties were better than the annual target.

Environmental dimension

- Production-based pollutant emissions are under target or stay within legal limits.

Social dimension

- No complaint from community regarding to environmental issues caused by the electricity production process.
- No complaint on violation of confidentiality agreements.

Performance in 2021

- Production-based pollutant emissions stayed within legal limits and EIA measures.
- Neighboring communities filed no complaint on environmental issues.
- There was no complaint on violation of confidentiality agreements.

Key performance in 2021

Electricity generation for sale in Thailand and abroad involved mainly customers with long-term power purchase agreements in 2021

- Total electricity output: 42,451,847 megawatts-hour
- Total steam output: 233,438 tons
- Electricity output based on equity installed capacity: 23,935,957 megawatts-hour
- Steam output based on equity installed capacity: 106,636 tons

1. Customers in Thailand

Distribution of electricity and steam

The customers that buy electric power and steam from RATCH's power plants are:

- Electricity Generating Authority of Thailand (EGAT), buying electric power from fossil fuel and renewable power plants
- Provincial Electricity Authority (PEA), buying electric power from very small renewable power plants
- Industrial users, buying electric power and steam from cogeneration power plants located in industrial zones

	RATCH Group's electricity customers		
	Electricity Generating Authority of Thailand (EGAT)	Provincial Electricity Authority (PEA)	Industrial users
RATCH Group's power plants	• Independent Power Producer (IPP) • Small Power Producer (SPP) • Renewable Power Producer	• Very Small Power Producer (VSPP) - Renewable energy	• Small Power Producer-Cogeneration located in industrial zones
Type of products	Electricity	Electricity	Electricity and steam
Equity installed capacity depends on shareholding proportion	5,393.44 MW	33.33 MW	68.02 MW 23 tons/hour
Volume of distributed electricity (MWh)	33,157,995	169,366	768,332
Volume of distributed steam (tons)	None	None	233,438

Power plants that supply electricity to Electricity Generating Authority of Thailand (EGAT)

(contributing 86.9 percent of total revenue) Total distribution volume in 2021: 33,157,995.09 megawatts-hour.

- Fossil fuel power plants generated 29,368,497 megawatts-hour of electricity, or 18,929,749 megawatts-hour in equity capacity.
- Renewable power plants (hydro, wind, solar and biomass) generated 3,789,498 megawatts-hour of electricity, or 928,986 megawatts-hour in equity capacity.

Power plant	Equity installed capacity (MW)	Contract period (year)	Total volume of distributed electricity (MWh)	Volume by equity capacity (MWh)
Independent Power Producer (IPP)				
Ratchaburi Power Plant	3,645.00	2000-2027	12,143,560	12,143,560
Ratchaburi-Power Power Plant	372.50	2008-2033	2,921,780	730,445
Nam Ngum 2 Hydroelectric Power Plant (Lao PDR)	153.75	2011-2038	1,768,487	442,122
HongsaThermal PowerPlant (LaoPDR)	751.20	2015-2040	11,223,770	4,489,508
Xe-pian Xe-Namnoy Hydroelectric Power Plant (Lao PDR)	102.50	2019-2046	1,653,242	413,311
Small Power Producer (SPP)				
Huay Bong 3 Wind Power Plant	20.70	2012-2017 (5-yr Non-Firm)	197,596	39,519
Huay Bong 2 Wind Power Plant	20.70	2013-2018 (5-yr Non-Firm)	170,173	34,035
RATCH Cogeneration Power Plant	119.11	2013-2038	610,050	609,867
Ratchaburi World Cogeneration	93.60	2014-2039	1,210,810	484,324
Nava Nakorn Power Plant	55.65	2016-2041	636,211	252,485
Berkprai Cogeneration Power Plant	34.73	2019-2044	627,316	219,561

Power plants that supply electricity to Provincial Electricity Authority (PEA)

(contributing 0.7 percent of total revenue) Total distribution volume: 169,365.64 megawatts-hour or 73,623.18 megawatts-hour in equity capacity

Power plant	Equity installed capacity (MW)	Contract period (year)	Total volume of distributed electricity (MWh)	Volume by equity capacity (MWh)
Solar Power (3 projects)	8.64	5 (auto- renewal)	33,050	13,220
Solarta Solar Farms (8 projects)	20.73	5 (auto- renewal)	65,299	31,997
Songkhla Biomass Power Plant	3.96	5 (auto- renewal)	71,017	28,407

Power plants that supply electricity to industrial customers

(contributing 6.4 percent of total revenue)

- Total distribution volume: 768,332 megawatts-hour or 358,195 megawatts-hour in equity capacity
- Steam distribution: 233,438 tons or 106,636 tons in equity capacity

Power plant	Equity capacity (MW)	Contract period (year)	Total volume of distributed electricity (MWh)	Volume by equity capacity (MWh)	Total volume of distributed steam (ton)	Volume of distributed steam by equity capacity (ton)
RATCH Cogeneration	119.11	2013-2038	85,872	85,846	23,814	23,807
Ratchaburi World Cogeneration	93.60	2014-2039	90,703	36,281	68,566	27,426
Nava Nakorn	55.65	2016-2041	579,050	231,620	120,643	48,257
Berkprai Cogeneration	34.73	2019-2044	12,707	4,447	20,415	7,145

2. Customers abroad

Electricity distribution in Australia

Power plants in Australia distribute their electric power in 3 patterns:

Distributed under offtake agreements (Off-takers)

- Buyers are registered as National Electricity Market participants.

Distributed via National Electricity Market

- Power plants receive the pool price at time of sale.
- Power plants hold Hedged Agreements with electricity retailers.

Volume of electricity distribution in Australia

Total volume: 2,780,097 megawatts-hour or 2,170,277 megawatts-hour in equity capacity

Distribution pattern	Total distribution volume (MWh)	Distribution volume by equity capacity (MWh)
Distributed under offtake agreements (Off-takers)	2,581,375	1,971,555
Distributed via National Electricity Market	198,772	198,772

Of total distribution volume,

- Gas-fired power plants generated 903,398 megawatts-hour, or 518,615 megawatts-hour in equity capacity.
- Wind farms generated 1,793,162 megawatts-hour, or 1,568,124 megawatts-hour in equity capacity.
- Solar farms generated 83,537 megawatts-hour and RATCH's equity capacity was 100 percent.

Power plants operating in 2021 and outputs

Power plant	Type of power plant	Equity installed capacity (MW)	Contract period (year)	Total volume of distributed electricity (MWh)	Volume by equity installed capacity (MWh)
Kemerton	Gas turbine (Open Cycle)	308.00	2005 - 2030	150,070	150,070
BP Kwinana	Cogeneration	35.40	1996 - 2021	549,689	164,907
Townsville	Combined cycle	234.00	2005 - 2025	203,639	203,639
Kemerton (Black Start)	Diesel engine	7.20	2018 - 2028	0	0
Starfish Hill	Wind power	33.00	2017 - 2000	83,921	83,921
Mount Emerald	Wind power	180.45	2018 – 2030	422,489	422,489
Collinsville	Solar power	42.50	2019 - 2030	83,537	83,537
Windy Hill	Wind power	12.00	Distribution via National Electricity Market	19,868	19,868
Toora	Wind power	21.00		55,916	55,916
Collector	Wind power	226.80		460,841	460,841
Yandin	Wind power	149.94	2021-2035	750,127	525,089

Electricity distribution in Vietnam

Total volume of electricity distribution: 3,145,579 megawatts-hour or 693,600 megawatts-hour in equity capacity

Power plant	Type of power plant	Equity installed capacity (MW)	Contract period (year)	Total volume of distributed electricity (MWh)	Volume by equity capacity (MWh)
Thang Long	Coal-fired	136.71	2021-2043	3,145,579	693,600

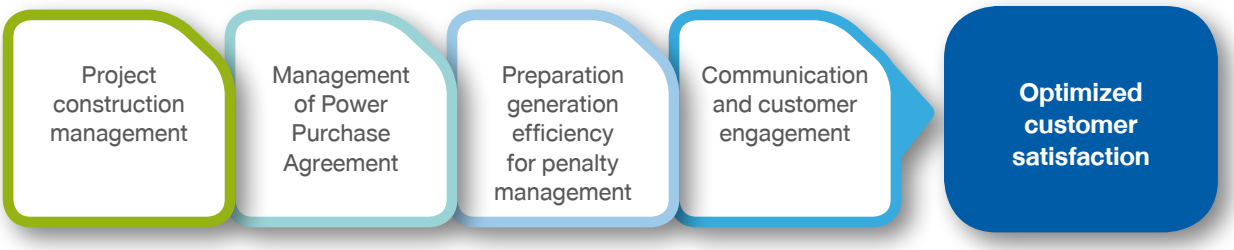
Electricity distribution in Indonesia

Total volume of electricity distribution: 1,313,314 megawatts-hour or 349,473 megawatts-hour in equity capacity

Power plant	Type of power plant	Equity installed capacity (MW)	Contract period (year)	Total volume of distrib-uted electricity (MWh)	Volume by equity capacity (MWh)
Asahan-1	Hydroelectric	47.90*	2011-2040	1,313,314	349,473

**Equity installed capacity prior to the acquisition of additional 50% stake in Fareast Renewable Development Company Limited, a shareholder of Asahan-1 Hydroelectric Power Plant, on 19 November 2021. After the transaction, the equity installed capacity will be 86.20 megawatts.*

Approach to satisfy customer demands and create memorable customer experience



Managing project construction to meet commercial operation schedule

RATCH's Project Development Function is tasked to manage under-construction projects and monitor their progress against the construction plan. It also supervises progresses in budget management, risk management, conditions in the power purchase agreements and compliance with legal requirements. Strict supervision is required so that the construction works and commissioning are completed in scheduled commercial operations. In 2021, under-construction projects occupied combined capacity of 1,003.06 megawatts.

Under-construction projects in Thailand and abroad

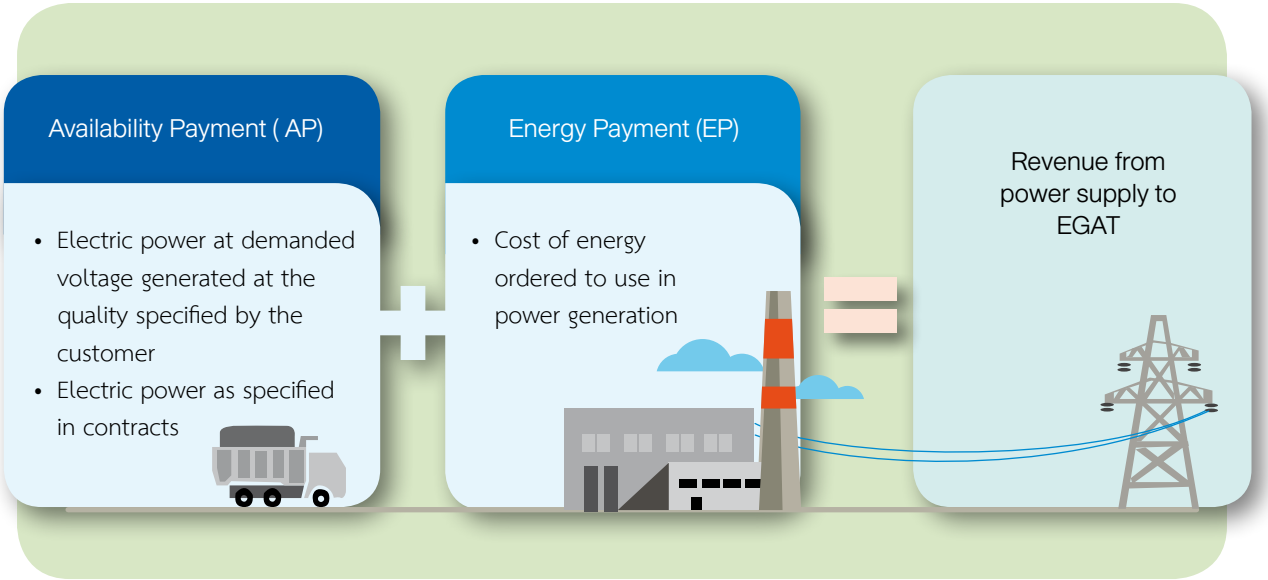
Location	Project	Equity installed capacity (MW)	Type of fuel	Scheduled operations	Customers/ Stakeholders
Thailand	RATCH Cogeneration Extension unit	31.19	Natural gas	2022	Industrial customers
	Hin Kong Combined Cycle Power Plant	714.00	Natural gas	2025	EGAT
	Nexif RATCH Energy Rayong Cogeneration	45.08	Natural gas	2022	EGAT and industrial customers
	REN Cogeneration	12.48	Natural gas	2023	Industrial customers
Indonesia	Riau Combined Cycle Power Plant	145.15	Natural gas	2022	PLN-State Electric Company of Indonesia
Vietnam	Ecowin Wind Farm	15.16	Wind power	2022	Vietnam Electricity
	Nexif Energy Ben Tre	40.00	Wind power	2024	Vietnam Electricity

Under-construction infrastructure projects

Location	Project	Scheduled operations	End-2021 progress	Customers/Stakeholders
Thailand	MRT Pink Line	2022	85.59%	Commuters/MRT
	MRT Yellow Line	2022	90.60%	Commuters/MRT

Management of Power Purchase Agreements

As EGAT is a major customer that takes up 78 percent of total output, all power plants put an emphasis on the management of power purchase agreements to fulfil the customer's demand in terms of quantity and quality. The power plants' revenue reaped from power supply to EGAT was generated chiefly by: 1) Availability Payment (AP) concerning the availability of demanded supply and 2) Energy Payment (EP) concerning contractual energy and heat rate efficiency. The two parts must be managed efficiently to satisfy customers and reap the expected revenue.



Efficiency management targets

To deliver the electric power that meets contractual quality and quantity, RATCH emphasizes the production efficiency supported by the following 3 factors;

Availability	Reliability	Heat Rate
• Crucial to customer expectation • Target availability is set in line with the Contracted Availability Hour (CAH). • Inability to maintain contractual availability will result in penalties.	• Reliability refers to the number of operating hours against unplanned outage hours. • In power purchase agreements, unplanned outage hour is set at 3-5 percent of contracted availability hour. • Unplanned outage hour is a key factor to determine availability payment.	• Heat rate reflects customers' cost of electricity. • Heat rate is specified in PPAs (covering the amount of energy used to generate one kilowatt-hour (kWh). • Low heat rate indicates high efficiency. • Production efficiency is maintained for optimized resource utilization.

Overall efficiency of power plants in 2021

Availability and Reliability

Power plant	Equivalent Availability Factor (EAF)		Reliability Factor (RF)	
	Target	Performance	Target	Performance
Ratchaburi Thermal Power Plant Unit 1	85.01	91.59	95.47	99.72
Ratchaburi Thermal Power Plant Unit 2	85.01	90.56	95.47	98.44
Ratchaburi Combined Cycle Power Plant Block 1	83.38	87.67	93.19	98.04
Ratchaburi Combined Cycle Power Plant Block 2	85.91	90.41	93.20	97.60
Ratchaburi Combined Cycle Power Plant Block 3	85.70	91.62	92.97	98.80
Nava Nakorn Cogeneration	98.48	98.68	Unspecified	
Berkprai Cogeneration	94.94	97.36		
RATCH Cogeneration	94.08	94.86		

Heat Rate (Unit: BTU/kilowatt-hour)

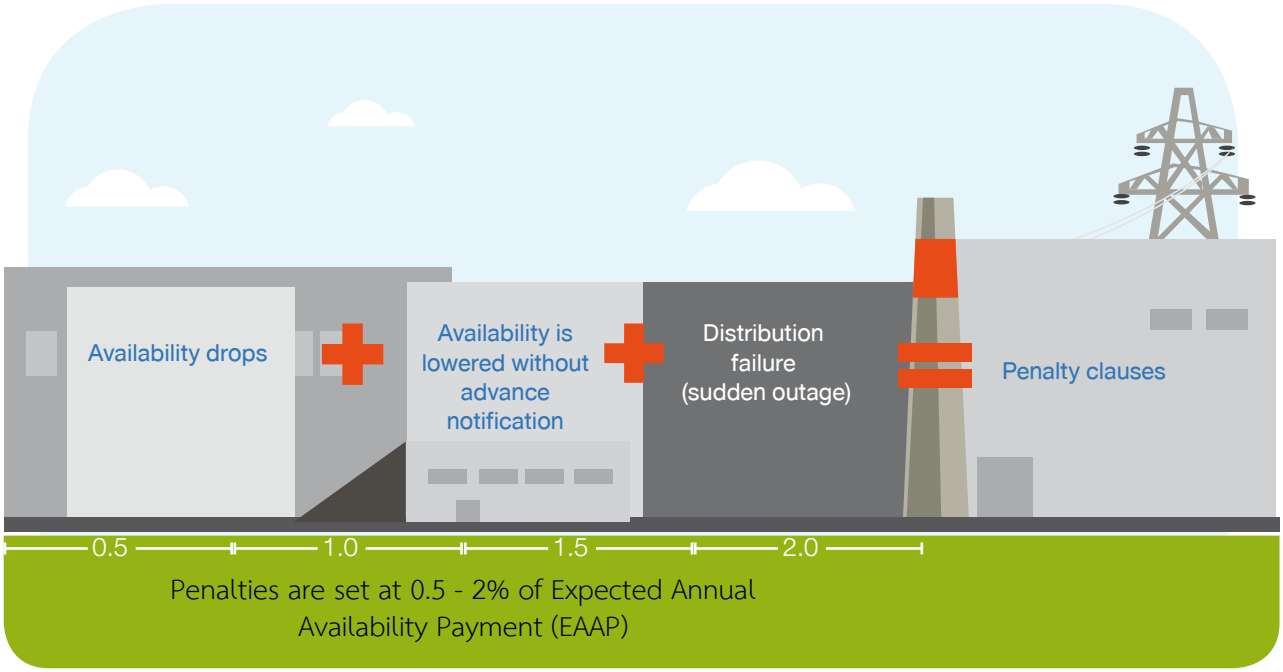
Power plant	Natural gas		Bunker oil		Diesel oil	
	Target	Performance	Target	Performance	Target	Performance
Ratchaburi Thermal Power Plant Unit 1	Not ordered to operate with natural gas		Unspecified as it's back-up fuel and used only in emergency event		Not used	
Ratchaburi Thermal Power Plant Unit 2						
Ratchaburi Combined Cycle Power Plant Block 1	7,173.37	7,116.39	Not used		Unspecified as diesel oil is secondary fuel and will be used only in emergency cases	
Ratchaburi Combined Cycle Power Plant Block 2	7,196.48	7,167.51				
Ratchaburi Combined Cycle Power Plant Block 3	7,196.99	7,160.14				
Nava Nakorn Cogeneration	7,718.83	7,793.30			Not used	
Berkprai Cogeneration	7,185.27	7,308.50				
RATCH Cogeneration	7,843.37	7,909.77				

Penalty Management

Penalties reflect customer satisfaction. Penalties also reflect power plants' efficiency management. To avoid penalties, hours of outage time must be maintained within contractual agreements and the outage must not affect the national electricity system or customers' operation.

Penalties on Independent Power Producers

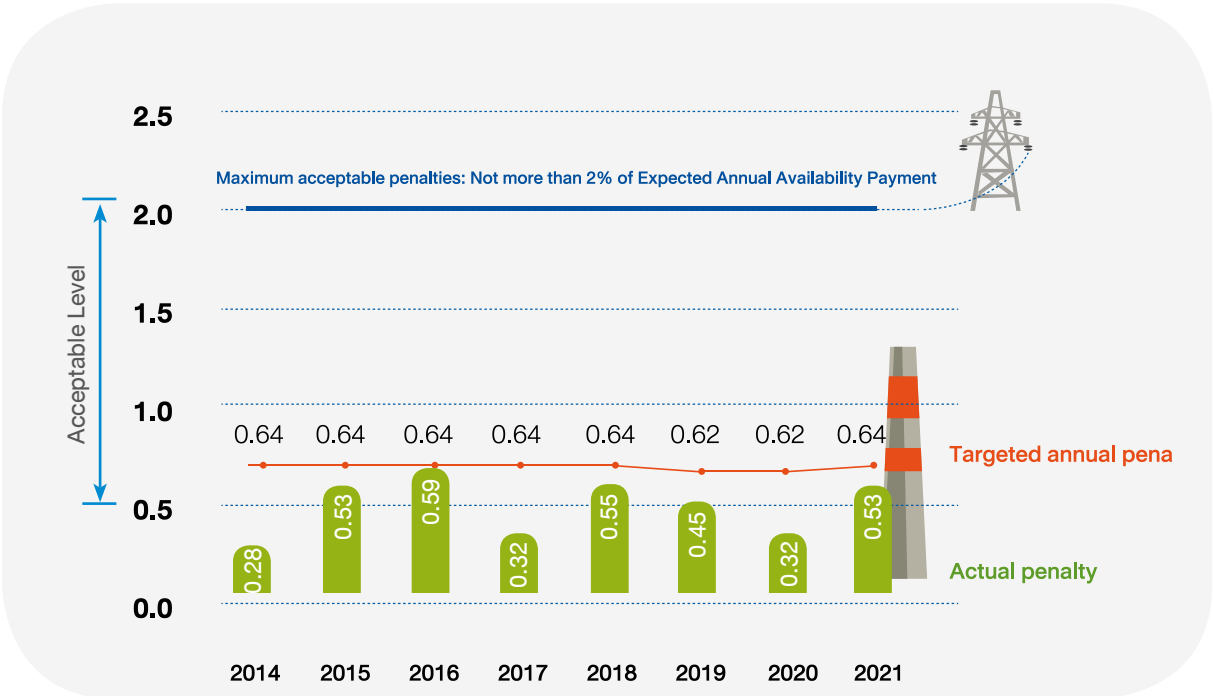
EGAT sets outage limits and penalties in case power plants cannot maintain availability as specified in the agreements because of the following 3 reasons:



Ratchaburi Power Plant's penalty management

In 2021, Ratchaburi Power Plant assessed production efficiency, taking into consideration the capacity of key machinery and equipment accordingly to their ages. After the analysis on the maximum Availability Payment, the penalty ceiling was capped at 0.64 percent of Expected Annual Availability Payment.

In the year, the Availability Payment was successfully maintained within target, thus keeping penalties within the pre-set ceiling.



Penalties on Small Power Producers

EGAT as customer

Under firm power purchase agreements with EGAT, small power producers are bound to supply no more than 90 megawatts to EGAT. The power plants are notified of demanded supply a month ahead and they must fulfill the orders.

EGAT will levy penalties if the power plants cannot fulfill the orders due to the following 2 reasons:

- Power plants fail to supply demanded electricity for 18 months, in the past 24 months.
- Power plants fail to supply demanded electricity because of distribution to a third party or their own use.

EGAT also sets 2 conditions that are equivalent to penalties:

1. Demanded supply will be lowered to match the actual supply in the latest month and specified as such in the new contracts.
2. Power plants must return the Energy Payment accordingly to the lowered supply order.

Industrial customer

Under purchase agreements, industrial customers demand the fixed supply volume of electric power and steam and power plants honor the agreements by adhering to reliability standards which depend on the pre-agreed System Average Interruption Frequency Index (SAIFI) and System Average Interruption Duration Index (SAIDI).

Penalty management of small power producers

EGAT as customer

- Power plants ensure maximum Availability Payment and Reliability or minimize unplanned maintenance as much as possible.
- Power plants estimate industrial customers' power demand and plan the production accordingly, without affecting the contractual supply to EGAT.

Industrial customers

- Power plants enter into power purchase agreements with the Provincial Electricity Authority for supplementary power supply to industrial customers during scheduled maintenance and/or unplanned maintenance, to ensure customers' business continuity.
- Industrial customers' opinions and recommendations are welcomed so that power plants can better address their demands.

Communications and customer engagement

RATCH's power plants schedule meetings to hear customers' opinions and suggestions so that they can operate accordingly to customer expectations. Issues of concern and obstacles are discussed for prompt actions. On the issues that need lengthy improvements, both parties brainstorm for solutions. The resolutions will guide power plants on how to improve their operations and better meet customer expectations.

Customer engagement

Method/Platform	Customer/stakeholder	Frequency	Issues in 2021 /Target
Ratchaburi Power Plant			
Meeting	EGAT executives	At least 6 times a year (depending on incidents in the year)	Discuss issues of concern in PPA and clarify operational approach for mutual understanding
	Operational-level officers	At least 6 times a year (depending on incidents in the year)	
Seminar	Customers and suppliers	None, due to COVID-19 outbreak	Exchange knowledge on the care and maintenance of machinery efficiency as well as production planning
Social activity	Customers' executive-level and operational-level representatives		Build good relationships through engagement in social activities
Nava Nakorn Power Plant			
Meeting	EGAT executives	Once a year or more (depending on the issues that occur each year)	Discuss contractual issues of concern and production improvement approaches
	Industrial customers' executives	Twice a year or more (depending on the issues that occur each year)	Discuss issues and acknowledge customers' demands to provide production improvement approaches
Meeting	EGAT officers	Once a year or more (depending on the issues that occur each year)	Discuss on contractual agreements
	Industrial customers' operational officers	Four times a year (depending on the issues that occur each year)	Discuss on contractual agreements
Berkprai Cogeneration Power Plant			
Meeting	EGAT executives	Once a year	Talk about 2022 plan of dispatch and supply guiding for generation and distribution planning
	Industrial customers' executives		Discuss on measures of electricity and steam distribution
Meeting	EGAT officers		Discuss on measures of lowering voltage of the grid during New Year's holidays in 2022
	Industrial customers' operational officers		Discuss on customers' planning of power and steam purchase, as well as maintenance schedule
RATCH Cogeneration Power Plant			
Meeting	EGAT executives	Twice a year	Discuss issues of concern and production improvement approaches
	Industrial customers' executives	Once a month	Discuss issues of concern and production improvement approaches
Meeting	EGAT officers	Twice a year	Discuss operational approach for mutual understanding in contractual agreements
	Industrial customers' operational officers	Once a month	Discuss operational approach for mutual understanding in contractual agreements

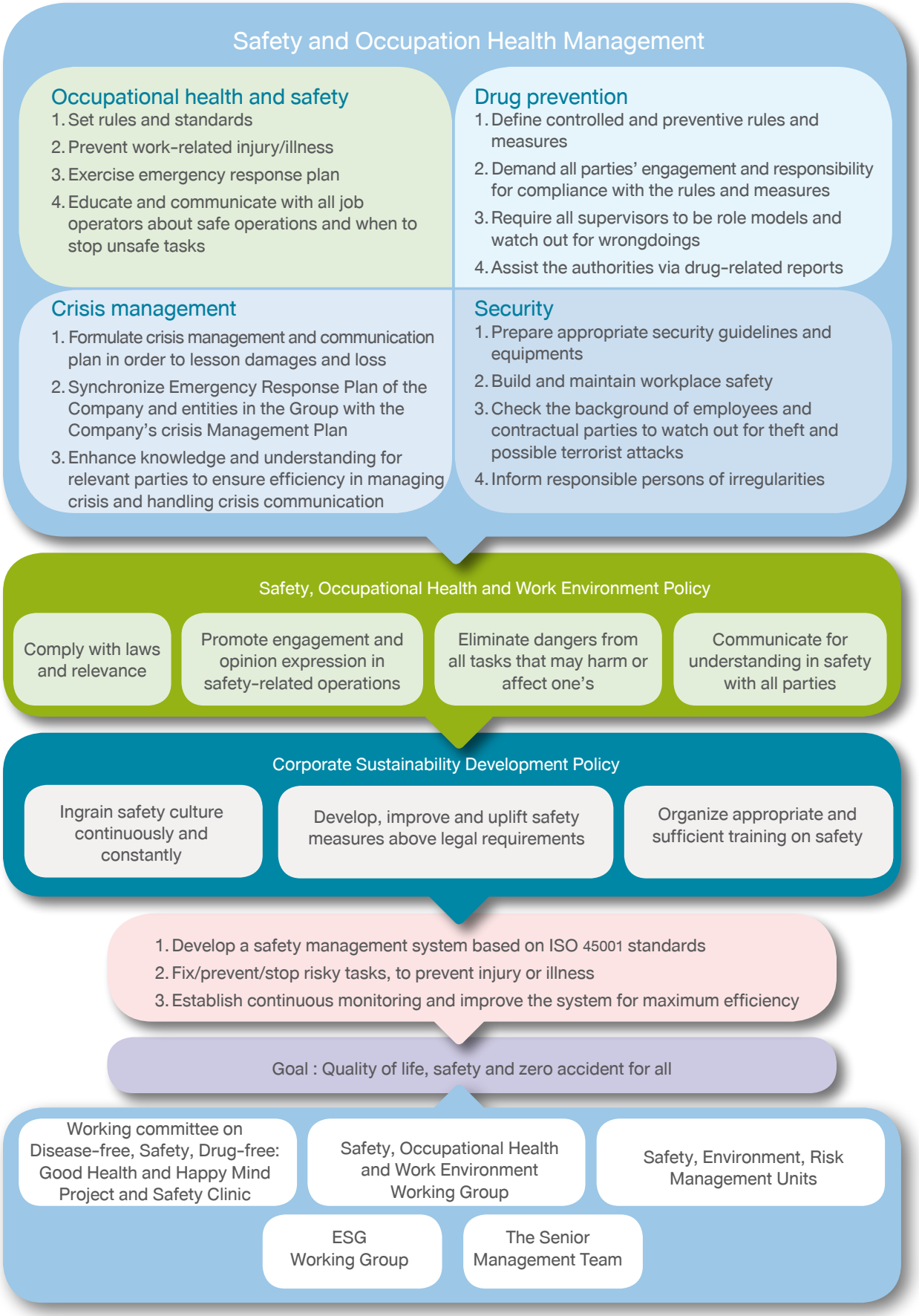
Actions to satisfy customer demands

Issue	Action
Ratchaburi Power Plant	
Management approach for secondary fuel	Discuss the procurement method for bunker oil (secondary fuel of the thermal power plant) to ensure sufficient volume
Nava Nakorn Power Plant	
Welcoming of customer expectations to formulate right actions	EGAT Improve the power plant's efficiency to honor production and supply agreements throughout the PPA period
	Industrial customers Improve transmission stability in line with electricity system standards
	Customer satisfaction survey • The satisfaction score from electrical power buyers was 88.99%. • The satisfaction score from steam buyers was 93.20%. • Overall satisfaction score was 89.83%.
Berkprai Cogeneration	
Welcoming of customer expectations to formulate right actions	EGAT Reducing generation capacity during 31th December 2021-2nd January 2022, to lower load during New Year holiday period as requested by EGAT
	Industrial customers Increasing steam supply by 5 tons per hour above contractual agreements, without affecting electric power supply to EGAT
RATCH Cogeneration	
Welcoming of customer expectations to formulate right actions	EGAT Raise generation capacity as requested by EGAT during 29th-30th March 2021, 17th October 2021, 20th-22nd November 2021 and on the 17th, 19th and 26th December 2021, without affecting power sale to industrial customers
	Industrial customers Raise steam supply above contractual agreements by 2 tons per hour, without affecting power sale to EGAT

Industrial customers' overall satisfaction

Number of Power plant	No. of industrial customers	No. of survey respondents	No. of customers of which satisfaction score reached target level	Target satisfaction score (%) 2021	Average satisfaction score (%) 2021
Nava Nakorn Power Plant	56	56	56	81.22	89.83
Berkprai Cogeneration Power Plant	1	1	1	75.00	90.00
RATCH Cogeneration Power Plant	25	25	17	80.00	96.52

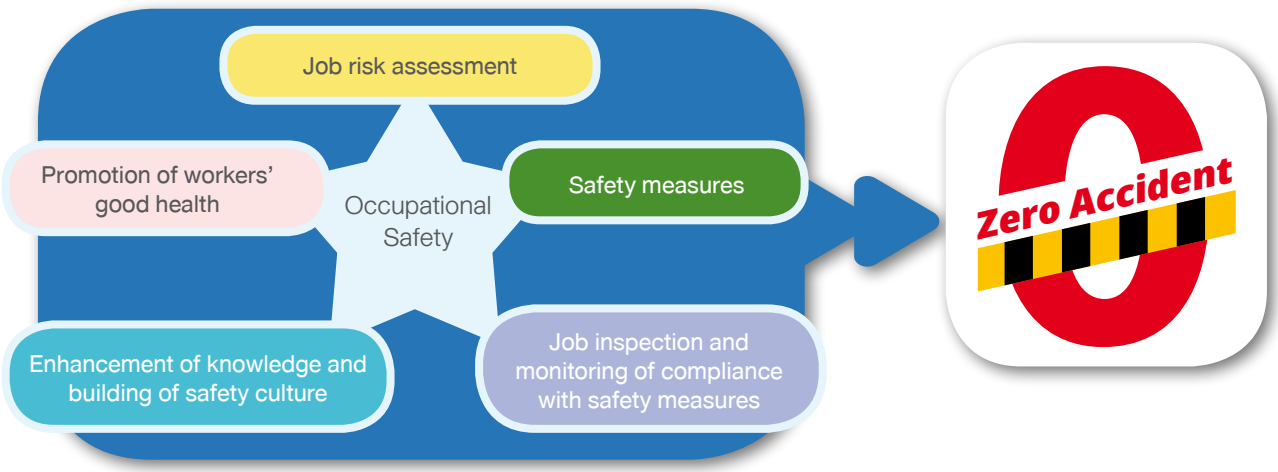
Safety and Occupational Health Management



Safety operations

RATCH Group remains committed to revise and improve work processes and conditions, so that all job operators can work in a safe and zero-accident environment without getting injured or falling ill. The work safety culture has been promoted along with risk management and crisis management. Cautious measures to prevent and protect workers from the COVID-19 were in place.

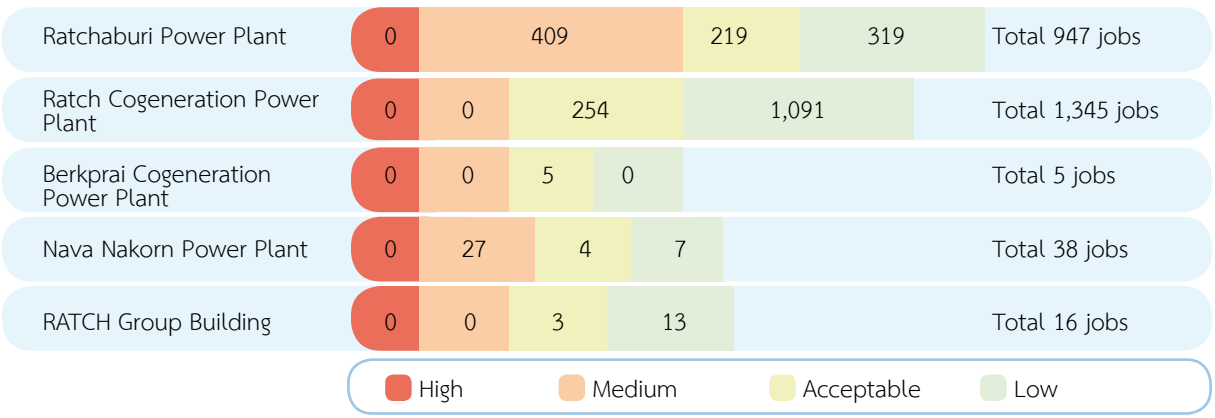
5 operational steps to achieve "Zero-Accident" target



Job risk management

Through job risk management, all workers are expected to remain safe especially when performing high-risk tasks at power plants including work in confined space, hot work that causes heat and sparks, work on high surface and work with chemicals. The risks must be assessed thoroughly and control measures must be in place prior to the start of work.

Job risk assessment in 2021



Job risk prevention guidelines

Control measures must be established to ensure the highest possible level of safety. The management of job risks will follow these guidelines.

Safety inspection measures at work areas have remained crucial and efficient in prevent work-related risks. As such, the inspection frequency and requirements were heightened for medium to high-risk jobs.

Work area inspection frequency classified by job risks

Level of risks	Inspection frequency			
	Supervisor	Safety Officer		Safety, Occupational Health and Work Environment Committee
		Supervisor Level	Professional Level	
High-risk jobs • Work in confined space • Hot work that causes heat and sparks • Work on high ground • Work with chemicals	All the time	Every day	Every day	Every month or accordingly to work schedules
Medium-risk jobs	Every hour	Every day	Every day	Every month or accordingly to work schedules

Safety supervision

Supervisors, safety officers and all relevant responsible persons have duty to ensure that the operations strictly follow prescribed measures and guidelines. They must inspect the qualification and readiness of job operators and the condition of tools and equipment; assess work environment; and clear the work areas after completion. They can immediately exercise the Stop Work Authority when seeing below-standard actions or work condition; when the scope of work or procedure is changed; or when emergency situations occur.

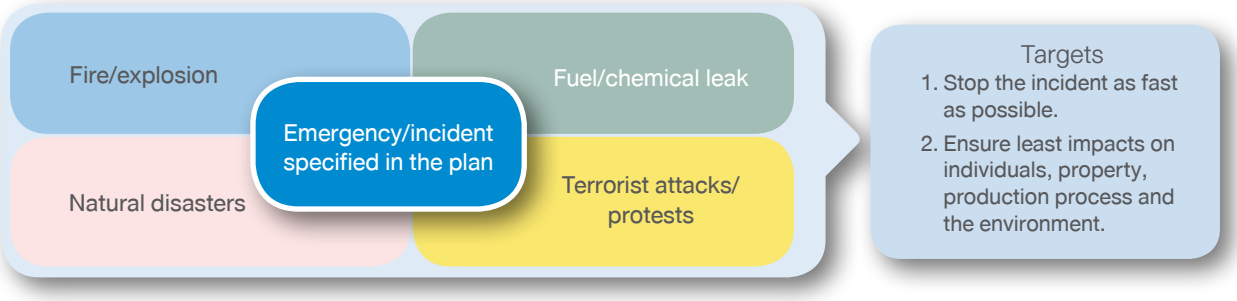
Operator	Tools/equipment	Work environment	Stop work authority
1. Identify the qualifications of operators for each task 2. Organize training and coaching on safety and the handling of particular tasks 3. Observation 4. Follow safety measures for particular tasks/ Particular areas	1. Check safety features before use or on maintenance schedule 2. Check or test safety accordingly to legislative requirements 3. Complete scheduled maintenance of tools and equipment	1. Assess/inspect work environment before the start of work 2. Assess and analyze work environment 3. Clear the work areas after work	1. When below-standard actions or conditions are seen 2. When the scope of work or work procedure is changed 3. When an emergency occurs
1. Qualified as prescribed 2. Full training and coaching on safety measures	1. Tools/equipment in ready conditions	1. Complete the required work environment inspection 2. Improve correct below-standard work environment before start of work	1. When the Stop work authority is exercised, job operators must correct work conditions before seeking approval to resume the task.

Supervision results

Job supervision	Times (total)	Times of successful inspection	Times of failed inspection	Improvement/Rectification
1. Inspection of job operators' qualification				
• Ratchaburi Power Plant	369	369	0	-
• RATCH Cogeneration Power Plant	1,345	1,345	0	-
• Nava Nakorn Power Plant	920	920	0	-
• Berkprai Cogeneration Power Plant	437	437	0	-
• RATCH Group Building	310	310	0	-
2. Inspection of safety condition of tools/equipment				
• Ratchaburi Power Plant	4,126	4,126	0	-
• RATCH Cogeneration Power Plant	323	322	1	Prohibited use of them and commanded for new equipment with required features
• Nava Nakorn Power Plant	80	80	0	-
• Berkprai Cogeneration Power Plant	437	437	0	-
• RATCH Group Building	310	310	0	-
3. Inspection of work environment				
• Ratchaburi Power Plant	3,663	3,663	0	-
• RATCH Cogeneration Power Plant	1,345	1,345	0	-
• Nava Nakorn Power Plant	80	80	0	-
• Berkprai Cogeneration Power Plant	437	437	0	-
• RATCH Group Building	310	310	0	-

Management of emergency incidents

In case of an unexpected incident or event, job operators must follow the Company and power plants' emergency/incident response plans which are based on ISO 45001 standard. The plans identify responsible persons for each task, detail controlling and corrective actions, and encompass the investigation of the causes in order to set measures or reshape work process that will prevent reoccurrence. The procedure is in place to prevent and minimize impacts on individuals, property, production process and the environment.



Emergency Response drills in 2021

Emergency situations	Number of drills					
	RGCO	NNEG	BPC	RCO	RAC	Head Office
Level 1 fire and explosion	30	4	1	-	-	1
Level 2 fire and explosion	1	1	-	-	-	-
Level 3 fire and explosion	0	-	1	1	-	-
Gas leak	4	2	-	-	-	-
Oil leak	1	2	-	-	-	-
Chemical leak	4	3	-	-	-	-
Radiation leak	1	-	-	-	-	-
Waste/Sewage transfer	1	-	-	-	-	-
Natural disasters (Storm/Flood/Earthquake/ Wildfire)	1 (flood)	-	-	1 (flood)	Collinsville = 2 (wildfire)	-
Epidemic	0	-	-	-	-	-
Snake bite	0	-	-	-	-	-
Broken lift	1	-	-	-	-	12
Bomb threat	0	-	-	-	-	-
Community protests	0	-	-	-	-	-
Others	1 (pressure pipe broken)	-	-	-	Collinsville = 4 Mt. Emerald = 1 (evacuation)	-

Emergency incidents in 2021

No. of emergency incidents	Fire	Fuel/Chemical leak	Natural disaster	Terrorist attack/ protest
Ratchaburi Power Plant	0	0	0	0
Nava Nakorn Power Plant	1	0	0	0
Berkprai Cogeneration Power Plant	0	0	0	0
RATCH Cogeneration Power Plant	0	0	0	0
Power plants in Australia • Kemerton Power Station • Townsville Power Station	0	0	0	0
Head Office	0	0	0	0

Crisis management

Driven by the COVID-19 outbreak, RATCH and its power plants raised the crisis management plan to the next level, to keep risks under control; ensure workers' safety and operational continuity particularly when it concerns power plants that must operate on customers' demand; and support the stability of the national electricity system.

Guidelines on production management in light of COVID-19

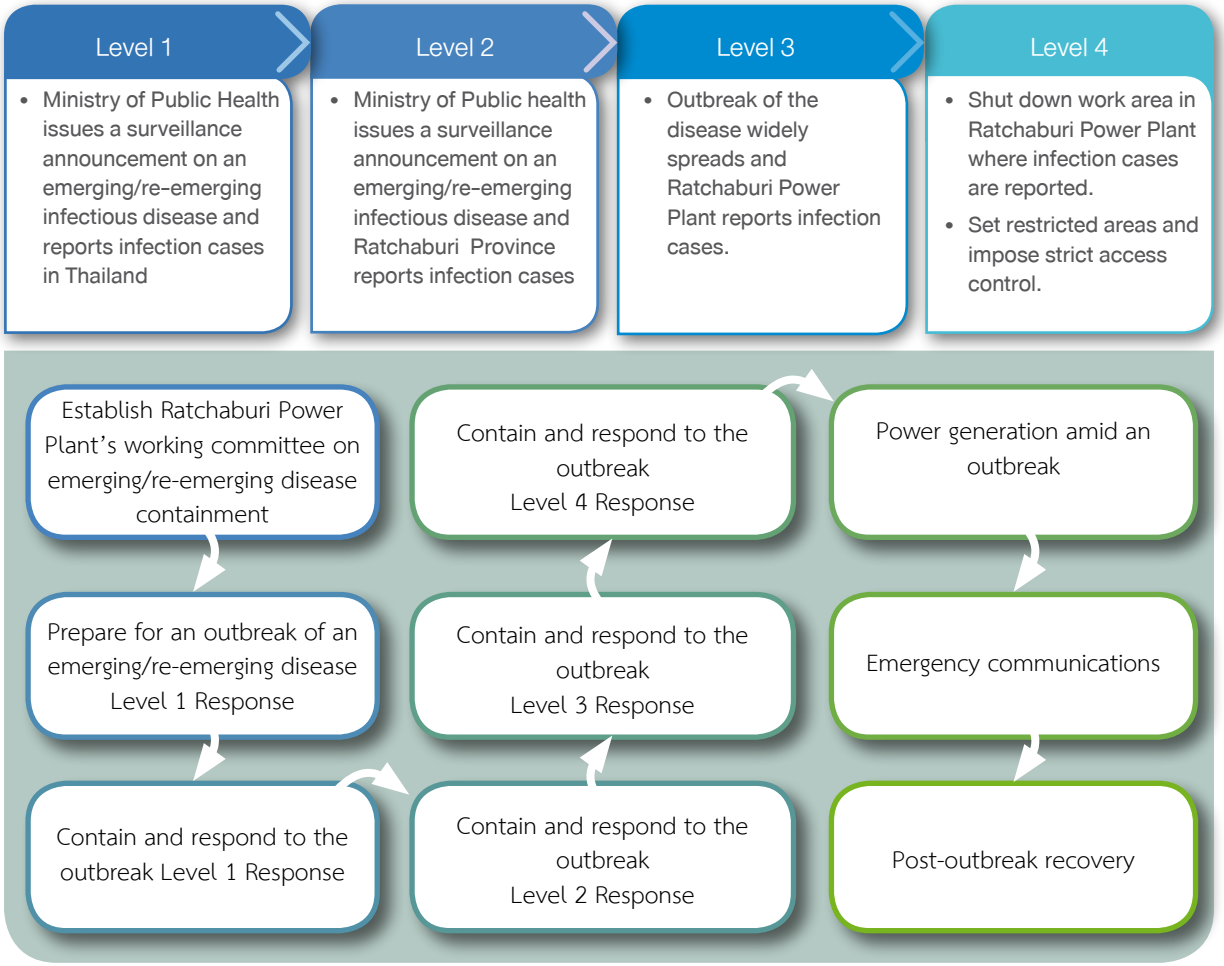
Area restriction	• Power plants were proclaimed restricted areas, with Control Room identified as Safe Zone or Green Zone where unauthorized cannot enter.
Adjustment in work shifts	• Machine operators were split to two 12-hour shifts - day shift and night shift. (Previously, they worked in three 8-hour shift - morning, afternoon and night.) Each shift was split to 2 teams, for day time work on the first 7 days and nighttime work on the last 7 days. As the 2 teams rested for 14 days, they were replaced by the other 2 teams. • Off-duty teams stayed at the arranged accommodation.
Preparation for infections	• If a member was at risk or tested positive, he could take day off without causing operational disruption, in the line with the Ministry of Public Health's prescribed health observation period. (14 days)
Preparation of back-up teams	• Consultation with O&M service providers was held to plot response measures in case that operators' illness disrupted the operations. If infection was reported, the workplace was disinfected before the arrival of another team. If both teams reported infections, outside operators would be brought in.

Management of COVID-19 situation at Ratchaburi Power Plant

Ratchaburi Power Plant is huge in size with a capacity of 3,645 MW. Being the prime assets of RATCH, it plays a key role in stabilizing the national electricity system by supplying power to the Central, Western and Southern parts of the country. To ensure operational continuity, it devised response measures as follows:

Guidelines to control emerging and re-emerging infectious dieases under ISO 45001 standard	• Action plan on emerging and re-emerging infectious disease was imposed at Ratchaburi Power Plant.
Establishment of the Power Plant's working committee on emerging and re-emerging infectious disease control	• Gather data, analyze the cause and outline work plans as well as preventive/corrective measures. • Publicize information, organize training and seminars for relevant persons, and tackle the obstacles. • Summarize and report the observation on emerging and re-emerging infectious disease to Managing Director on weekly or necessarily basis.
Establishment of the Power Plant's working committee to improve responses plan on emerging and re-emerging infectious diseases	• Improve and standardize a control and coordination procedure, and identify responsible persons. • Host meeting and consultation and coordinate with relevant persons, to improve the plan. • Provide data, knowledge and innovations of all divisions to ensure the plan efficiency. • Hold a drill after the improvement is completed. Assess and fix flaws before enforcement.
Improvement the Power Plant's emergency response plan on emerging and re-emerging infectious diseases	• Classify four emergency levels and specify clearly incident response and management steps for each level (See details in following page)

Ratchaburi Power Plant's action plan on emerging and re-emerging infectious diseases



Isolation center for COVID-19 patients at Ratchaburi Power Plant

Ratchaburi Power Plant set up five-room of Factory Accommodation Isolation (FAI) at its premise capable of accommodating 50 patients, as ordered by Ratchaburi Province. All enterprises in the province with 100 workers or more were instructed to establish an isolation center that can serve at least 10 percent of all employees who need to be isolated accordingly to the Ministry of Public Health's disease control and prevention measure.

The Factory Accommodation Isolation was inspected by government officials as well as representatives from Ratchaburi Provincial Industry Office and Ratchaburi Provincial Public Health Office, who gave recommendations on the center management.

After completion in 2021, no patient was accommodated the center.

The 5-room Isolation Center for COVID-19 patients at Ratchaburi Power Plant with 50 beds capacity.

Strengthening safety culture

"Every worker must go home safe." is RATCH's ultimate resolution. The Company has allocated budgets and resources that will help workers work safely and carry out existing and future assignments. That includes the safe use of new tools and equipment and the enhancement of knowledge about safety as well as safety-related laws, regulations and measures that demand full compliance.

RATCH believes that with the right knowledge and understanding, workers will be aware of safety and carefully carry out their tasks while watching out for their colleagues in order to avoid their working in unsafe or incorrect working environments and conditions.

Training to raise awareness on occupational health and safety in 2021

Aspect/Training topic	Organizer						No. of attendees (person)	Employees (person)	Contractors (person)
	Ratchaburi Power Plant	Nava Nakorn Power Plant	Berkprai Cogenera-tion Power Plant	RATCH Cogeneration Power Plant	RATCH - Lao service	Head Office			
New employee orientation	✓	✓	✓	✓	✓	✓	4,629	35	4,594
Safety, occupational health and work environment for workers and new hires	✓	✓	-	-	-	✓	72	60	12
Risk Assessment	-	-	-	-	✓		15	15	-
Crane controller (Immovable crane), hand signaler, and handler	✓	-	-	-	-	-	26	26	-
Crane truck driver (moveable crane) ,hand signaler, and handler	✓	-	-	-	-	-	11	11	-
Crane controller	✓	-	-	-	-	-	16	16	-
Safety of work in confined space	✓	✓	-	✓	✓	-	172	159	13
Basic fire suppression	✓	-	✓	-	✓	-	107	107	-
Fire suppression in building	✓	-	-	-	-	-	32	32	-
Safety, Occupational Health and Work Environment Committee	✓	✓	-	-	-	-	6	1	5
Safety officer – supervisor level	✓	-	-	-	-	✓	47	47	-
Safety officer – executive level	✓	-	-	✓	-	✓	30	30	-
Boiler controller	✓	-	-	✓	✓	-	37	37	-
Refresh boiler controller's knowledge	✓	✓	✓	-	✓	-	70	55	15
Hearing preservation	✓	-	-	-	-	-	40	40	-
Electrical safety practices	✓	-	-	-	-	-	17	17	0

Aspect/Training topic	Organizer						No. of attendees (person)	Employees (person)	Contractors (person)
	Ratchaburi Power Plant	Nava Nakorn Power Plant	Berkprai Cogeneration Power Plant	RATCH Cogeneration Power Plant	RATCH - Lao service	Head Office			
First-aid and resuscitation	-	-	-	✓	-	-	31	31	-
Operators of air pollution management system	✓	-	-	-	-	-	3	3	-
Operators of water pollution treatment system	✓	-	-	-	-	-	4	4	-
Controllers of industrial waste management system	✓	-	-	-	-	-	4	4	-
Radiation Protection	✓	-	-	-	-	-	15	15	-
Awareness enhancement on environment and work safety	✓	-	-	-	-	✓	143	143	-

Health promotion

All power plants provide annual medical examination for their employees and special medical examination for occupational diseases or work-related risks such as hearing ability, visual ability and other irregularities. Examination results are delivered to each of employees. Those with small irregularities will be given advice while those in need of treatment will immediately receive continuous treatment. The power plants will consider organizing health promotion activities based on major risk issues, such as the activities of the year 2021 shown below:

Organization	Project/Activity	Results
Employee health promotion		
RATCH	RATCH's body movement away from diseases and office syndromes	• 149 employees joined the activity: 93.7% said they benefited from the activity, with understanding in the causes of diseases and preventive acts against office syndromes.
	Annual medical examination	88.37% of total employees
	COVID-19 vaccination	• 2nd dose 100% of total employees • 3rd dose 72.56% of total employees • 4th dose 4.65% of total employees
Ratchaburi Power Plant	Disease-free, Drug-free: Good Health and Happy Mind Project and Safety Clinic for 2021	Work plan for 2021 was 96% complete as the massage and Happy Mind activities were cancelled due to the COVID-19 pandemic.
	• 8 Dimensions of Wellness Assessment Project	• 208 participants • Assessment results suggested the introduction of more Happy Body activities for better wellbeing in subsequent years.

Organization	Project/Activity	Results
Employee health promotion		
Ratchaburi Power Plant	Health Day Activity 2021 (Let's be happy) • Ted Talk: Happy Body by Coach Kamon (Maew) Maiyarat and a talk on Happy Society & Relax • Body massage activity: lessons on stretching at home by BY @ HOME	• 212 participants
	Safety Day 2021 • Sharing of "Safety Lesson Learned" by 5 units involved with the O&M of thermal and combined cycle power plants as well as safety unit of RGCO	• The activity attracted 187 participants whose satisfaction score was in a relatively high level.
	• Annual medical examination and examination of job-related risks	70% of total employees
	• Appointment of Volunteer Group - Safety's members	The volunteer group attracted 47 members.
	• Area inspection for job-related and drug-related risks	The inspection was carried out once a month by a working committee of each respective department
	• Urine drug test for sub-contractors, who needed the test results along with medical examination results in applying for work permits	100% complete
	COVID-19 vaccination	• 1st dose: 100% • 2nd dose: 96.4% • 3rd dose: 71.4%
Nava Nakorn Power Plant	Annual health examination	100%
	COVID-19 vaccination	• 2nd doses: 100% • 3rd doses: 57%
	Safety Day 2021	• Provide safety knowledge to employees, and encourage employee participation and awareness under the campaign of "Safety Begins with Me"
Berkprai Cogeneration Power Plant	Annual health examination	• 21.05%
	COVID-19 vaccination	• 2nd doses: 100% • 3rd doses: 89.47%
RATCH Cogeneration Power Plant	Safe Card... Safe RCO Program	• Operators submit 11 suggestions concerning on safety and workplace environment issue which are underway of improvement

Organization	Project/Activity	Results
Employee health promotion		
RATCH Cogeneration Power Plant (continued)	RCO Day 2021: a safety and energy conservation activity implemented in 2021	• Organize the 2021 activity in the way of new normal including; ◊ Online training in topic of "Understand disease and prevention for reducing COVID-19 infection" ◊ Launch RCO Day 2021's Motto Contest ◊ Arrange "RCO Safety Smart Vote" activity and select an operator who is work-safely role model
	Annual medical examination	100%
	COVID-19 vaccination	• 1st dose 100% • 2nd dose: 100% • 3rd dose 40.98%

Ratchaburi Power Plant's project to enhance community capability in disaster prevention and mitigation

Ratchaburi Power Plant in 2021 proceeded with its project to enhance the capability in disaster prevention and mitigation for the communities around the power plant. They were further trained on disaster prevention and mitigation and informed about the power plant's safety measures. The project was implemented together with Ratchaburi Provincial Disaster Prevention and Mitigation Office. The safety officers - professional level of Ratchaburi Electricity Generating Company Limited's Safety, Environment and Risk Management Department were invited to speak at the event.

The event was attended by 31 disaster prevention and mitigation officers from Phaeng Puay Sub-district, Bangpa Sub-district, Donsai Sub-district and Wat Kaew Sub-district. It was organized with full compliance with Ratchaburi Province's COVID-19 prevention measures. All attendees were properly tested.



Progress on safety operations in 2021

Key safety statistics (Target: Zero Accident)

Power plant/office	RGCO	NNGE	BPC	RCO	RAC	RATCH	Total Group
Number of employees (persons)	52	30	19	21	23	215	360
Hours worked (hour)	92,260	56,144	20,936	43,616	37,535	409,360	659,851
No. of contractors (persons)	374	78	53	336	-	59	900
Contractors' hours worked (hour)	1,781,760	176,675	129,915	154,544	-	179,876	2,422,770
Number of operators	426	108	72	357	23	274	1,260
Total hours worked (hour)	1,874,020	232,819	150,851	198,160	37,535	589,236	3,082,621
Fatal work injury rate per 200,000 hours worked	0.11	0	0	0	0	0	0.06
Lost-time injury frequency rate per 200,000 hours worked	0.21	0	0	0	0	0	0.13
Occupational illness per 200,000 hours worked	0	0	0	0	0	0	0

Year	Employees' Lost-time injury frequency rate per 200,000 hours worked (Lost Time Injury Frequency Rate: LTIFR)					Contractors' Lost-time injury frequency rate per 200,000 hours worked (Lost Time Injury Frequency Rate: LTIFR)				
	RATCH	RGCO	NNEG	BPC	RCO	RATCH	RGCO	NNEG	BPC	RCO
2018	0.36	0	0	-	-	0	0	0	-	-
2019	0	0	0	-	-	0	0	0.22	-	-
2020	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0.22	0	0	0

Year	Employees' total injury frequency rate per 200,000 hours worked (Total Injury Frequency Rate: TIFR)					Contractors' total injury frequency rate per 200,000 hours worked (Total Injury Frequency Rate: TIFR)				
	RATCH	RGCO	NNEG	BPC	RCO	RATCH	RGCO	NNEG	BPC	RCO
2018	0.36	0	0	-	-	0	0	0	-	-
2019	0	0	0	-	-	0	0.21	0	-	-
2020	0	0	0	0	0	0	0.14	0	0	2.99
2021	0	0	0	0	0	0	0.79	0	0	0

Note : *- RATCH = RATCH Group Public Company Limited - RGCO = Ratchaburi Power Plant*
- NNEG = Nava Nakorn Power Plant - BPC = Berkprai Cogeneration Power Plant
- RCO = RATCH Cogeneration Power Plant - RAC = RATCH-Australia Corporation Pty Ltd

Power plant/office	Safety targets	Results
Head Office	• Zero work-related accident	• Zero work-related accident
Ratchaburi Power Plant	• Total Injury Frequency Rate (TIFR) ≤ 1.5 (per 1,000,000 hours worked)	• Total Injury Frequency Rate (TIFR) per 1,000,000 hours worked = 3.74
	• Zero Serious Accident (Class A accident involving fire that results in the loss of life)	• 2 Class A accidents involving power plant maintenance
Nava Nakorn Power Plant	• Zero work-related accident	• Zero lost-time injury at Nava Nakorn Power Plant and its extension
Berkprai Cogeneration Power Plant	• Zero work-related accident	• Zero lost-time injury
RATCH Cogeneration Power Plant	• Zero work-related accident	• Zero lost-time injury

Ratchaburi Power Plant failed to achieve its zero-accident target in 2021, following an incident during the maintenance of Ratchaburi Thermal Power Plant that caused the life of a contractor's employee. Ratchaburi Power Plant extended condolences to the victim's family along with supports and monitored the supplier's compensation.

RATCH's investigating team together with the supplier investigated the incident and devised additional preventive measures: the equipment testing process was extended to cover the electrical system involved with the task; the warning system was extended; and comprehensive training on safety measures for contractors' employee was required. Related measures were rectified and improved to prevent reoccurrence.

Reoccurrence-prevention measures

Aspects	Rectified/added measures
1. Operators' readiness	• Review risk assessment; and train and communicate with all job operators involving all contractual parties.
2. Readiness of equipment/tools	• Prepare equipment/tools that are more appropriate for the tasks • Install additional equipment/systems like the Emergency Stop for the tube cutting machine.
3. Work environment	• Adjust work environment to fit the task before start of work • Adjust the positioning of equipment
4. Improvement in operating process	• Prepare a more detailed and comprehensive work process • Review the work processes involving the causes of all accidents/incidents

RATCH strives to improve and develop an efficient safety, occupational health and work environment system, for the best protection of job operators' life and property. The Company will learn from the incident and improve the operations accordingly. The improvements entail a more detailed risk assessment process; the screening of qualifications of contractors and sub-contractors' job operators; the examination of job operators' readiness; the issuance of work permits; as well as an increase in control and monitoring measures to ensure full compliance with safety measures and clearing after work, so that job operators are safe and no accident or work-related illness occurs.

Respect to Human Rights

RATCH realizes that respect to human rights is a crucial factor in driving business towards success and sustainability. The Company has set forth human rights principles covering the rights of employees and stakeholders in the Code of Conduct and guidelines in the Corporate Sustainability Policy.

Human rights principles
Code of Conduct

- The vow on treatment of stakeholders is based on legal requirements, honor, respects and concern about human dignity.
- Treat stakeholders with respect to their rights to freedom and equality, with none-discrimination of gender, race, language, religion, social status, economic status or educational background. Right to political freedom is included.
- Protect personal rights and keep confidential information. Access to such information, disclosure and usage is carried out as needed or when required by law.

Guidelines on human rights
Corporate Sustainability Policy

- Treat all employees and workers in a fair and equal manner, without discrimination. The work assignment must be properly given to all employees based on their ability and appropriate compensation. Child labor aged below 18 years and illegal labor is prohibited. This principle entails employees and workers of suppliers and/or stakeholders.
- Take care and protect safety of employees, workers and the company's property without infringing others' rights and safety; and protect personal rights, confidentiality, as well as disclosure and usage of personal data.
- Respect the rights of employees and workers of the Company and suppliers and treat them equitably with concern about human dignity.

Operating Guidelines on Human Rights

The following are the human rights issues considered significant to RATCH's sustainability and actions were launched accordingly in 2021 to address the issues:

Operating guidelines on significant human rights issues	Target/Result
Labor rights of employees and suppliers in the supply chain	
• Treat and protect labor accordingly to the labor laws in respective countries, with respect to their rights, equality and non-discriminatory practices on gender, age, race, nationality, religion, economic or social status, skin color and political views. The practice is part of the supplier pre-qualification conditions. • Set a recruitment rule to prohibit the employment of under-18, forced and illegal labor. The practice is part of the supplier pre-qualification criteria. • Give employees the right and freedom to assemble in the forms of a welfare committee and the Safety, Occupational Health and Work Environment Committee under a predetermined ratio of employees to represent all employees in submitting their views or demands to the employer. • Put in place safety measures, provide the work environment with focus on safety and occupational health standards, and undertake risk assessment and strict supervision. • Allow employees to express opinions through the Welfare Committee, the Safety, Occupational Health and Work Environment Committee, engagement survey, opinion box, dialogue with supervisors and exit interviews arranged for resigning employees.	Target: • 80% of surveyed employees is satisfied with the practice Result: satisfaction : 81.98% *More details appear in "Employee Stewardship Section page 123 and Safety, Occupational Health and Work Environment Section page 108".*

Operating guidelines on significant human rights issues	Target/Result
Labor rights of employees and suppliers in the supply chain (continued)	
• Establish employee complaint channels whereby employees can lodge complaints against unfair treatment according to work rule, agreements or employment contracts or difficulties regarding work conditions or relationships. The process and procedure are set covering complaint channels, filing methods, investigation, complaint review, complaint termination and protection of complainants and related persons.	
Safety of suppliers/contractors and sub-contractors	
• Set the basic labor protection rule and integrate it into the supplier and contractor pre-qualification criteria. The rule concerns labor's basic rights, equality, and non-discriminatory practices on gender, age, race and religion; prohibition of under-18 and illegal labor; and safety measures. • Demand treatment according to the labor laws, set forth in the employment contracts, which includes the provision of labor's safety and occupational health. • Require suppliers/contractors and sub-contractors to attend safety training and comply with safety and occupational measures when working at Head Office and power plants. • Demand suppliers or contractors assess job-related risks and define comprehensive protection measures as well as remediation measures in case of accidents. • Monitor contractors and sub-contractors' implementation of safety measures. • Arrange safety training for suppliers, contractors and sub-contractors focusing on general knowledge on safety and safety measures for high-risk jobs.	Target: • Suppliers' lost-time injury rate = 0:200,000 worked hours Results: • Head Office = 0 • Ratchaburi Power Plant = 0.22 • RATCH Cogeneration = 0 • Nava Nakorn Power Plant = 0 • Berkprai Cogeneration Power Plant = 0
Community's rights and protecting of safety and quality of life	
• Treat community fairly with respect to the rights and equality as well as differences in culture, beliefs and religious doctrine. • Set the levels of risk and impacts on the way of life of community or local people, safety and local environment, serving as the ground for the investment decision making. RATCH will not invest in projects that will be located in the areas where natives or minority peoples or ethnic group reside. • Give the community an opportunity to express their opinion in the study and assessment process for environmental and/or health impacts from under-development projects, and define impact-alleviating and remediation measures. • Be open for community engagement in the inspection and recommendations on power plants' operations, through a tri-partite committee. • Set communication channels through community relations units to ensure access to the Company's information and opportunity to propose recommendations; by phone, social media, email or letter. The complaint-receiving remediation process is determined. • Prepare the emergency and crisis response plans that include the community evacuation plan; and hold drills on a regular basis. • Conduct a survey on attitudes, opinions and concerns of communities near power plants on a regular basis.	Target: • Implementation of Tri-partite committee's meeting plan; 4 times a year Result: • The committees held meetings as planned and jointly monitored the power plants' environment management. Due to the outbreak of COVID-19, the meeting of new elected committees were omitted, but instead using online platform for communication among the committee's members. • Submit environmental monitoring report to relevant parties every 6 months. • In 2021, no complaint or concern was raised by community through the power plant's whistle blowing channel.

2022 Work Plan

- Develop the comprehensive human rights policy that cover all significant issues and is aligned with the business-sector human rights principles.
- Improve the human rights due diligence process and develop the risk register as well as preventive measures and action plan.
- Improve the guidelines on the Company's disclosure of human rights-related performance, to ensure the coverage of significant issues and alignment with International standards.

Employee Stewardship and Capacity Building

As human resources are the key to corporate success and sustainability, a mission of RATCH concerns human resource management. To effectively achieve growth targets and the vision of "a leading value-oriented energy and infrastructure company in Asia Pacific", RATCH needs to enhance their capabilities and preparedness.

Vision

To become a leading value-oriented energy and infrastructure company in Asia Pacific

Mission

M2 To achieve operational excellence and enhance competitiveness

M4 To raise employees' awareness and motivation of self-development for readiness competition and business changing

Code of Conduct

1. The Company prioritizes thorough and regular personnel management and development so that they have knowledge and ability.
2. The Company provides fair remuneration and welfare that is comparable to other leading companies.
3. The Company strictly complies with laws and regulations related to employees.
4. The Company provides a safe and supportive working environment in accordance with the occupational health standards.
5. The Company appoints transfers, awards and punishes, employees with equality, honesty, and justice based on each employee's knowledge, ability, and suitability.
6. The Company accepts comments and suggestions that are based on employees' professional knowledge.
7. The Company treats employees with respect to individuality and human dignity.
8. The Company avoids any unfair actions that may affect the security of the employee's work, threaten or create pressure on the mental state of the employee.
9. Employees may file a complaint in the event that they do not receive justice from the specified system and process.

Actions

- Employee protection against COVID-19
- Development of organizational capabilities
- Development of employee capabilities
- Fair compensation and welfares
- Promotion of job security
- Employee engagement
- Promotion of employee participation

Performance in 2021

1. Employee protection against COVID-19

RATCH closely monitored the COVID-19 outbreak and assessed risks of infection among employees. The following measures were launched to take care of employees, protect them against the virus, and maintain for operational continuity:

Addition in health protection	The Company provided employees additional insurance coverage against COVID-19 for, on top of general health insurance.
Preventive measures	• Procure vaccines for employees and family members • Hand out face masks and Antigen Test Kit (ATK) to employees • Find hospital beds for employees and family members tested positive for COVID-19 • Instruct them to work from home. If needing to enter the office building, they must report their timeline in the past 14 days. • Arrange a drop point for the delivery of documents and parcels, which are disinfected before entering the building. • Set up the screening point for body temperature measurement of all persons entering the premises.
Facilitation of employees working from home	• Provide necessary software, computer network, user database and guidelines to all employees working from home. • Adjust work process and procedures for greater flexibility, in support of working from home. • Relax the rules to match the situation and the new way of working

2. Development of organizational capabilities

Progress of implementation under HPO framework

Under the diagnosis of organizational performance under the High Performance Organization (HPO) Framework, RATCH resolved to improve the work process of the following two significant areas:

Work process	Performance	Result
Enhancement of corporate and employee capabilities (B: Building Future Capabilities)	Continuous improvement in work process and Work Flow Process Chart for the accounting and finance function, for systematic, continuous and efficient operations Target • 100% completion	100% completed
Communication and teamwork excellence (C: Communication and Collaboration Enhancement)	1. Internal Communication Enhancement for effective implementation of corporate strategy and targets as well as a closer bond between executives and employees that will influence employee engagement with the organization. In 2021, RATCH utilized 3 communications approaches. 1) CEO Meets Employees; two-way communications 2) CEO Messages: electronic communication medium 3) Company news updates: electronic medium Target • two-way communication meetings with employees • one-way communications via CEO Message	• Three CEO Meet Employees meetings were organized. • Four CEO messages were dispatched. • 29 releases were released as the Company News Update.

Work process	Performance	Result
Communication and teamwork excellence (cont.)	2. Implementing knowledge management through knowledge sharing activities, to improve and create a continuous and thorough learning process. Through the activities, executives in various fields passed on their experiences and lessons to job operators, serving as the case studies that will create holistic views and understanding in the work process. The lessons can be applied for job operators' routines. Four internal knowledge sharing activities were organized in 2021, attended by 21% of all employees. Target: Participants' application of knowledge and at least 70% satisfaction rate.	The opinion survey found that 99.3% of total participants was satisfied with the activities and they could apply the knowledge and lessons with their job.

Internal knowledge transfer and exchange

RATCH organized Knowledge Sharing activities where executives share their knowledge and expertise in various areas. Through the activities, employees were expected to gain new knowledge and apply it with their routines. The activities were also expected to narrow the gap between executives and employees. In 2021, four Knowledge Sharing activities were organized as follows:

Topic	Survey on job applied (%)	Benefits
Decoding RATCH business in the face of COVID-19	100	• Guidelines on problem-solving solutions that are flexible and fit the situation, allowing smooth business operations • Better knowledge of work-related obstacles and limits at each operating site, which can be integrated into routines • Awareness in the way of working in the face of COVID-19 • Knowledge of the COVID-19 response plan applicable to long-term routine adjustments should the outbreak continue
M&A and Lessons Learned from Australia, Indonesia and Thailand	97.22	• Knowledge applicable for routines and future business negotiations • Better understanding of overall project operational procedure and key points in each stage • Knowledge about M&A process and the points to be considered
RATCH Group's view on 8 Stages of Power Plant Life Cycle	100	• Knowledge about power plants' life cycle and operational procedure • Understanding the things employee should be careful of, which helps to reducing errors • Better understanding of power plants' technical aspects
Experience sharing from a power plant: a joke that is not funny	100	• Understanding in the overall picture of power plants, key issues, the process to reach solutions, and planning of operational strategy that will reduce impacts in the long term • Lessons learned and solutions that can be applied with existing and future projects

Knowledge Sharing activities at Ratchaburi Power Plant

Topic	Survey result on knowledge application (%)	Benefits
Not just any purchase	87.8	• Understanding in the Company's procurement process and accurate/full compliance with the Company's regulations
Guidance on the documentation requirements of ISO standard		• Understanding the ISO standard's documentation system
How to compensate missing revenue?		• Understanding in power plants' revenue generation • Inspiration for new business ideas as power plants' PPA are expiring
• Integrated conflict management approach • Get to know Power Development Fund • Happy work life • Experiences of changes		• Enhanced communication and conflict-management skills • Lessons on Power Development Fund's objectives and management • Learning about executives' work experiences

3. Development of employee capabilities

RATCH's development of employee capabilities has emphasized three major areas: core competency; leadership competency; and job family competencies, all of which that concern functional behavior competency and functional technical competency.

The competencies are improved through groups of training courses which are the courses for job-operator level courses, job-based courses, and the courses for individual operators.

Training courses in 2021

Type of courses	Objectives	No. of program	No. of hours	No. of attendees (persons)		Total expenses (Baht)
				Male	Female	
RATCH Group Public Company Limited						
Basic courses under Career Development Roadmap	To broaden employees' perspectives, capacity and knowledge accordingly to the personnel competency development plan	2	6	29	30	136,000
Courses in support of the Company's policy and rules	To develop the competency required by their respective assignments	6	35.5	75	81	221,650
Skill enhancement courses	To improve job-based competency	64	1,483	103	153	2,489,572
RATCH-Australia Corporation Limited						
Courses based on Career Development Roadmap	To broaden employees' perspectives, capacity and knowledge accordingly to the personnel competency development plan	18	1,070	23	10	519,667

Type of courses	Objectives	No. of program	No. of hours	No. of attendees (persons)		Total expenses (Baht)
				Male	Female	
Ratchaburi Electricity Generating Company Limited						
Courses in support of the Company's policy and rules	To develop the competency required by their respective assignments.	2	8	2	4	0
Skill enhancement courses	To develop the job-based competency required by their respective assignments.	21	419.5	34	6	146,400
Other skill enhancement courses	To develop other skills for greater job competency	20	188.5	39	41	205,000
RATCH Cogeneration Company Limited						
Courses in support of the Company's policy and rules	To develop competency required by their respective assignments.	2	4.5	18	14	1,000
Skill enhancement courses	To develop the job-based competency required by their respective assignments.	3	39	1	2	8,900
RATCH-Lao Services Company Limited						
Skill enhancement courses	To broaden employees' perspectives, capacity and knowledge with courses adjusted accordingly to corporate contexts	12	2,303	329	0	0 (Organized by Hongsa Power Plant)

Levels of employees attendance are as follows:

Level	No. of training hours		No. of training hours/person/year	
	Male	Female	Male	Female
RATCH Group	**1,874**	**2,227**	**17.4**	**20.8**
Top Management	51	22	5.7	11.0
Middle Management	337	385	14.7	29.6
Junior Management	549	656	19.6	20.5
Operator	937	1,164	19.5	19.4
Ratchaburi Electricity Generating	**3,208**	**986**	**100.3**	**41.1**
Top Management	4	0	1.0	0.0
Middle Management	333	9	41.6	1.8
Junior Management	1,647	592	1,647.0	592.0
Operator	1,224	385	64.4	24.1

Level	No. of training hours		No. of training hours/person/year	
	Male	Female	Male	Female
RATCH-Lao Services	**2,303**	**0**	**14.4**	**0.0**
Top Management	None	None	None	None
Middle Management	None	None	None	None
Junior Management	0	None	0.0	0.0
Operator	2,303	0	14.9	0.0
RATCH Cogeneration	**0**	**12**	**0.0**	**6.0**
Top Management	None	None	None	None
Middle Management	None	None	None	None
Junior Management	None	12	None	12.0
Operator	0	0	0.00	0.0
RATCH-Australia	**342**	**190**	**28.5**	**27.1**
Top Management	None	None	None	None
Middle Management	152	38	38.0	38.0
Junior Management	0	0	0.0	0.0
Operator	190	152	47.5	38.0
Average development expense per capita (Baht)	12,638			

Remark: Training hours and expenses of RATCH's secondees as top management of four subsidiaries in Rathchaburi Electricity Generating, RATCH-Lao Services, RATCH Cogeneration and RATCH-Australia and middle management in RATCH-Australia and RATCH Cogeneration are inclusive of RATCH Group.

4. Fair compensation and welfare

Activity	Objective	Result
Compensation and welfare system	• Set pay criteria accordingly to laws and rules, taking into consideration knowledge, educational background, experience, cost of living in a particular country, and fairness regardless of gender or age. • Provide employees with welfare, life insurance, health insurance, emergency assistance and safe shelters. • Cover the travel expenses for employees working in a foreign country and taking home leave	Employees received appropriate pay and welfare, compared to peer companies'
Compliance with relevant labor rules and laws	• Comply with relevant labor laws and rules • Align company rules and regulations with legal requirements in setting guidelines for employees and monitor legal amendments for continuous improvement. • Establish a complaint channel and measures to prevent retaliation and mitigate damage to complainants or collaborators who report breaches or violations of the Code of Conduct or the Company's rules.	• RATCH fully complied with relevant labor laws and rules. • Zero complaint

Activity	Objective	Result
Quality of life at workplace (read more in Safety and Occupational Health Management, Page 108)	• Ensure clean and suitable work environment in line with safety and occupational health-related laws; as well as inspect and monitor workplace environmental indicators as specified in Head Office's Environmental Impact Assessment Report every 6 months. • Apply 5S standards in achieving an orderly, safe and clean work environment.	The work environment met the requirements.

RATCH's remuneration is structured appropriately in line with employees' positions, experience and expertise and attractive enough to attract talents.

Salary	Compared to average minimum wage (times)	Compared to Nonthaburi Province's minimum wage (times)
Entry-level salary for employees with diploma degrees	1.24	1.20
Salary for employees with bachelor degrees	1.41	1.37
Salary for employees with master's degrees	2.28	2.21

Treatment of employees working in foreign countries

Following continuous expansion overseas, RATCH has adjusted the remuneration and welfare structure for employees working in foreign countries. The structure factors in risks, cost of living, inflation and economic conditions in the particular country. The employees are also entitled to emergency assistance including medical assistance, assistance where safety is concerned, and emergency information and alert in the face of outbreaks, earthquakes, and similar events. International SOS Services (Thailand) Company Limited (SOS), a specialized provider of emergency assistance for business travelers and working worldwide, is appointed to take care and assist RATCH's employees working abroad.

The prepared assistance is a means to uplift safety measures and show the employees the Company's appreciation for their dedication and sacrifice as they have to stay away from home.

Travel assistance

1) 24-hour advice before and after departure
2) Information on embassies and consulates provided
3) Help with loss of travel document or valuable items provided

Medical assistance

1) Direct consultation with physicians
2) Hospital information
3) Delivery of medical supplies, monitoring and provision of emergency transportation
4) Medical transfer and transfer to homeland
5) Relatives' visit

Safety assistance

1) Assistance in turbulent situations like political uprising or terrorist attacks
2) Advice from safety experts and assistance for travel within the country and personal safety
3) 24-hour crisis assistance and evacuation planning

5. Career stability

RATCH has specified succession plans for employees to advance to primary-level executive, mid-level executive and high-level executive positions, so that they can carry on the tasks undertaken by executives who retire or resign and hence smoothly drive the organization towards business goals.

Performance in 2021 is summarized as follows:

1. Capability building for successors to mid-level and high-level executives

Approaches	Target
• Implement Succession Management Planning Development to select high-level executive successors and provide them training • Implement Talent Planning Management Development to select middle-level executive successors and provide them training • Develop annual training plan for all levels of employees and individual training plans • Organize knowledge sharing activities of all functions • Collaborate with subsidiaries and joint ventures for on-the-job-training • Promote cross-functional teamworking • Promote employees' self-development through coaching process of supervisors	RATCH plans the succession plans for mid-level and high-level executive positions 6 years in advance, to fully cover to-be-vacated positions. The advance planning is to ensure that replacements are as capable as the retiring ones and the handover takes place at an appropriate time. Aside from this, annual development plans are in place to ensure continual knowledge exchange and knowledge development, which will lead the organization towards business goals.

In 2021, three executives under the Succession Planning Management Development scheme were appointed high-level executives, succeeding their retiring predecessors.

Item	2021	2022	2023
Retiring executives (persons)	3	1	1

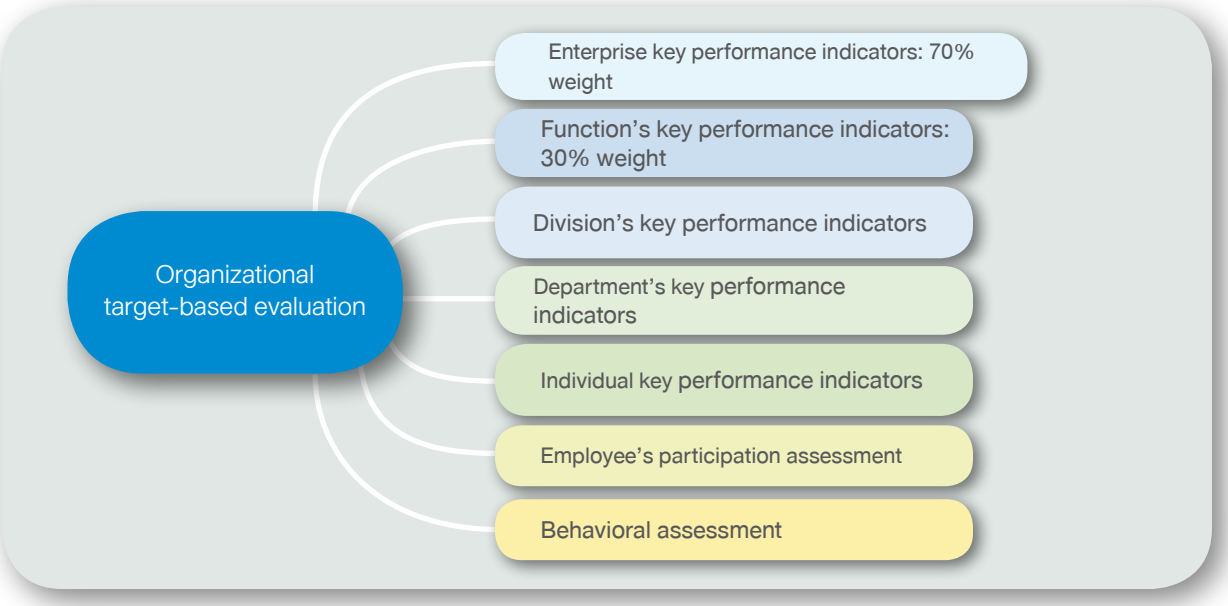
2. Career advancement, rewarding and punishment

Approaches	Target
• Apply a standardized performance evaluation system that requires the performance indicators to be mutually agreed by supervisors and subordinates in advance. • Set clear criteria on appointment, transfer and rotation • Set clear criteria on rewarding and punishment and ensure employees' acknowledgement • Plan the dialogue process for supervisors and subordinates	• 100% performance appraisal conducted target • Turnover rate below 5%

Performance evaluation

RATCH conducts the annual performance evaluation for all employees, via the Human Resources Information System (HRIS) that involves the entire line of command in each function. The evaluation covers two main aspects:

1) Performance evaluation: To evaluate the achievements in the enterprise, function, division, department and individual levels in the evaluation round, based on the quantitative and qualitative criteria benchmarked against sustainability targets in the economic, social and environmental dimensions as well as behaviors that influence job efficiency and effectiveness.
2) Competency evaluation: To evaluate employees' knowledge, skills and quality that attributed to their fulfillment of their assigned roles and responsibilities, corporate values and the Company's vision.



After the evaluation, supervisors at all levels support and assist their subordinates in completing tasks as required by performance indicators. Through the performance feedback process, they can be engaged in two-way communications through which they jointly review an individual's key performance indicators. The evaluation results are the basis of in the calculating of annual salary increases and bonuses, appointment, promotion, transfer, the designing of individual development plans and the improvement of work processes.

Performance in 2021

- 100% of employees were evaluated for their performance supportive of the organization's goals.
- The turnover rate was at 2.33%.

6. Employee engagement

Approaches	Objectives	Target	2021 Performance
Participation in organizational development and acknowledgement/ recommendation process	• Promote organizational development through their engagement in submitting opinions or recommendations through regular two-way communications channels such as employee meetings and functional meetings • Establish communications channels to receive employees' opinions or suggestions, such as opinion boxes, intranet and email, and use them as input in shaping improvement plans • Organize activities to strengthen employee relationships in functional and organizational levels as a way to communicate and promote mutual understanding.	Their recommendations are appropriately responded to.	One recommendations were addressed. In 2021, the Company implemented Work from Home to prevent COVID-19 pandemic
Treating employees with respect to individuality and human dignity	• Adopt fair and equal treatment of employees regard-less of gender, age, nationality and religion, and with respect for their basic rights and freedom as stipulated in the Constitution. • Uphold zero tolerance to child, illegal and forced labor. • Establish the Welfare Committee that comprises the employer' and employees' representatives, as a respect to employees' freedom of association.	In minimum 5 employees represented in the Welfare Committee	Five employees were elected to be member of Welfare Committee representing 4.63% of total employees.

Approaches	Objectives	Target	2021 Performance
Fair treatment of employees	• Formulate standard evaluation system, human resource development plan and career advancement plan, with continual communication with employees. • Set appeal criteria under which employees can launch appeals against unfair treatment and establish complaint-receiving channels and protection measures for complainants.	Provide a decision on complaints within 30 working days.	Zero compliant
Complaint-receiving channels for unfair treatment cases	• Clearly set complaint-receiving and whistleblowing channels and notify employees accordingly. • Define the complaint-handling protocol with protection against retaliation and remediation for complainants or collaborators who report breaches or violations of the Company's Code of Conduct/regulations.		
Employee engagement survey	• The employee engagement survey has been conducted annually since 2017 and results are the basis for the designing of engagement activities within function groups or at the organizational level.	Engagement score is maintained at 80%.	Engagement score was at 81.98%.

Results of employee engagement survey

In 2021, various engagement activities have been organized, with one organizational-level engagement activity and 50 activities at the functional level. The activities were considered successful as reflected in a continual increase in engagement level.

	2018	2019	2020	2021
Engagement level (%)	46.00	71.00	80.28	81.98
Participation in engagement survey (%)	100.00	94.00	99.51	100.00

7. Employee participation

RATCH encourages employees to give back to society, being both good and smart members of the organization. Employees are encouraged to volunteer in various social activities that concern environmental conservation and social contributions. These activities not only create bonds between employees and participating community, but also strengthen relationships with their colleagues.

Volunteering activities

179 Employees volunteered or equivalent to 328 employee-day or social contributions of Baht 984,000

Gift for Giving activity

Employees took part in the donation to Thai With Disability Foundation. The Gift for Giving Activity raised a total of Baht 69,620.

Community and Social Stewardship

Operational Framework

Code of Conduct

- Build and maintain corporate image for acceptance from community and society
- Support projects that address expectations and quality of life
- Respect local customs and traditions
- Utilize natural resources with least impacts
- Promote efficient energy utilization
- Assess risks in all dimensions before investment/ joint investment
- Participate with activities to reduce social and environmental impacts

Social and Environmental Policy

- Promote community engagement and communicate with community for peaceful coexistence
- Improve and reinforce community strengths for good quality of life
- Conserve and restore local customs and traditions
- Promote constructive activities geared for social improvement
- Conserve and rehabilitate environmental quality for community benefit

Strategy/Approach

Communications

- Build understanding and trust
- Establish complaint-receiving and information disclosure channels

Community engagement

- Inspection of power plants' operations
- Building of community strength

Promotion of quality of life

- Promote access to education
- Develop local economy
- Support environmental conservation
- Provide assistance to community

Targets

- Community has understanding and trust in the operations, files no complaint and does not oppose the Company's activities.
- Community accepts the shared values and benefits from the Company's operations.

As a holding company, RATCH outlines two-pronged approaches for community- and socially-responsible operations and sets business targets chiefly based on the approaches.

Community relations

1. Under the responsibility of subsidiaries and joint ventures
2. Targeting community in vicinity of the power plants
3. Compliance with social measures and community development plan specified in EIA
4. Emphasizing communications with community, boosting strength and improving quality of life

Social responsibility

1. Under the responsibility of RATCH Group
2. Focusing beyond target groups of subsidiaries and joint ventures
3. Emphasizing a boost in community strength and living quality development

Performance in 2021

Communications for understanding and trust in operations

The four RATCH-controlled power plants (constituting 76.2% of total revenue) have continuously communicated with community about their operations through their provided communication channels and activities. They have established accessible communications channels through which complaints can be filed as well as a systematic and efficient problem-solving process and suitable period that is integrated with the power plants' environmental quality management system.

Ratchaburi Power Plant (3,645 MW)

The power plant's target groups include communities in nine sub-districts, namely Pikunthong Sub-district, Ban Rai Sub-district, Ban Sing Sub-district, Wat Kaew Sub-district, Donsai Sub-district, Bangpa Sub-district, Samruan Sub-district, Tharap Sub-district and Paengpuay Sub-district in Ratchaburi Province

Objective	Action	Results
1. Communications via social media		
Publicize information, knowledge and activities at power plants/ neighboring communities and in Ratchaburi Province for accurate understanding of the operations and positive attitude.	• Publish information on Facebook Fan Page Our home by Ratchaburi Power Plant five times a week on, for example, preventive measures against the COVID-19 outbreak • Publish RG. Weekly News and RG. Scoop News on LINE Official Account	• The Fan Page had 31,465 followers (as of 2 December 2021), a 28.69% increase over 2020. • 42 Issues of RG. Weekly News, containing a total of 160 articles • 34 editions of RG. Weekly News
2. Relationship-building communications		
• Inform and educate community leaders in nine target sub-districts about the production process and environmental management • Boost relationship and confidence in the operations	• Organize nine activities in the nine sub-districts • Target 230 attendees	• 187 community members attended the activities, or 81.30% of target. • Survey showed 85.20% of respondents were satisfied with and acknowledged the power plant's operational information.
3. Display of environmental quality through LED screen at the power plant's entrance		
• Directly inform community of the power plant's real-time data • Demonstrate transparency in performance disclosure	• Install LED screen at the power plant's entrance	• Communities showed better understanding and acknowledgement in environmental management.
4. Information for community leaders and government offices		
• Inform community in advance of the power plant's activities that may cause impacts/concerns including fuel switch, transportation of secondary-fuel diesel or bunker oil to the power plant or transportation of limestone to the power plant, and gypsum from the power plant.	• Send 28 letters containing the power plant's activities to government offices in Ratchaburi Province • Post the letters on the LINE group chat of each sub-district	• Community showed understanding and filed no complaint.
5. Preparation of annual environmental management report		

Objective	Action	Results
• Publish the power plant's actions on environmental impact management as specified in EIA along with monitoring result of air, water, noise and waste management and community relations activities	• Prepare the annual report and distribute the report to 790 target offices in Ratchaburi Province	• Target recipients/community acknowledged the environmental management, and no complaint was received.

Nava Nakorn Power Plant

The 199.11-MW power plant targets communities in eight sub-districts, namely Khlong Nueng Sub-district, Khlong Song Sub-district, Ban Pathum Sub-district and Chiang Rak Noi Sub-district in Pathum Thani Province, as well as Bang Krasan Sub-district, Phayom Sub-district, Chiang Rak Noi Sub-district and Pra Intaracha Sub-district in Ayutthaya Province.

Objective	Action	Results
1. Communications via social media		
• Disclose the power plant's operational information to government offices, community leaders and local residents to affirm transparency and build confidence	• Use LINE application as the medium to disclose the information concerning 25 topics	• Community showed understanding and filed no complaint.
2. Relationship-building communications		
• Educate for public understanding through activities/projects that involved community leaders, local municipality and administrative offices and government offices for their engagement in the power plant's operations • Strengthen relationship and confidence in the operations	• Sixteen community visits to organize activities/projects, involving community leaders that engaged local municipality and administrative office and government offices	• Community showed understanding and acknowledged the communication relationship activities, resulting in a good relationship with the power plant and community confidence in the operations.
3. Preparation of environmental management report		
• Affirm transparency through the disclosure of environmental impact management as specified in EIA; the measurements of environmental quality – air, water, noise and waste management; and the power plant's public relations activities	• Prepare five reports and distribute the reports to the five government offices	• Target groups / community acknowledged the environment management performance and no complaint was received.

RATCH Cogeneration Power Plant

The 119.15-MW power plant targets communities in six sub-districts, namely Khlong Nueng Sub-district, Khlong Song Sub-district, Ban Pathum Sub-district Chiang Rak Yai Sub-district, Chiang Rak Noi Sub-district and Bang Pued Sub-district in Pathum Thani Province; as well as Chiang Rak Noi Sub-district in Ayutthaya Province.

Objective	Action	Results
1. Communications via online media		
Publicize the power plant's operational information to government offices/ community leaders and neighboring community for their transparency and confidence.	• Use LINE application and community broadcasting system for periodic announcements of the plant's two releases to government offices and nearby communities.	Community showed understanding and filed no complaint.
2. Preparation of environmental management report		
Affirm transparency through the disclosure of environmental impact management as specified in EIA; the measurements of environmental quality – air, water, noise and waste management; and the power plant's public relations activities.	• Prepare 45 reports and distribute the reports to 16 government offices and 29 communities within 3-5 km radius from the power plant.	Target groups/community acknowledged the environment management performance and no complaint was received.
3. Information for community leaders and regulatory units		
Inform community in advance the power plant's scheduled activities that may cause impact or concern including fire extinguisher and fire evacuation drills and the transportation of gas engine generators to the power plant	• Use community broadcasting system and a news release to announce one activity	Community showed understanding and filed no complaint.

Berkprai Cogeneration Power Plant

The 99.23-MW power plant targets communities in Berkprai Sub-district, Tha Pha Sub-district, Ban Pong Municipality, Lad Bua Khao Sub-district, Pak Rad Sub-district, Suan Kluay Sub-district, Nakornchum Sub-district and Khung Payom Sub-district in Ban Pong District, Ratchaburi Province; as well as in Don Kamin Sub-district, Lukkae Sub-district and Tha Sao Sub-district in Tha Maka District, Kanchanaburi Province.

Objective	Action	Results
1. Communications via social media		
Disclose the power plant's operational information to government offices, community leaders and local residents to affirm transparency and build confidence.	Use community broadcasting system and corporate releases for the announcements of 25 issues to nearby communities.	Community showed understanding and filed no complaint.
2. Community hearing		
Meet with community, employing the Community Relations Unit to hear its concerns and recommendations.	Meeting with communities and hearing their suggestions	The community in Suan Kluay Sub-district requested the power plant's support in the release of baby fish into a local pond. The release was completed in December 2021.

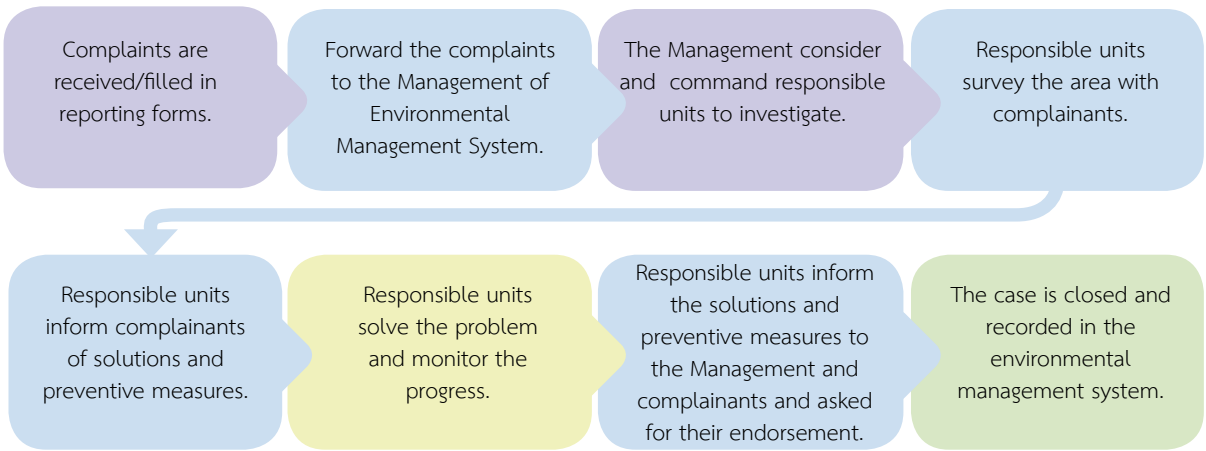
Objective	Action	Results
3. Preparation of environmental management report		
Affirm transparency through the disclosure of environmental impact management as specified in EIA; the measurements of environmental quality – air, water, noise and waste management; and the power plant's community relations activities	Prepare fifteen copies of reports and distribute them to eight government offices (Reports are completed twice a year).	Target groups/community acknowledged the environment management performance and no complaint was received.

Remediation and grievance mechanism

All the power plants have established channels through which the community can file their opinions or complaints around the clock. The channels are the Community Relations Unit and/or community leaders or the tri-partite committee as well as telephone, opinion box, email, postal mail, LINE group chat, and short messages (SMS).

The remediation and grievance mechanism has been developed in line with the ISO 14001 Environmental Management System.

Complaint-receiving channel and issue-solving procedure



Performance

Power Plant	Complaint Channels	No. of complaints/Solutions
Ratchaburi	Opinion box in front of power plants, phone, email, postal mail, electronic channels like LINE Group or SMS, community leaders, the Environmental Inspector Committee, or the Tri-Partite Committee	Zero
Nava Nakorn Cogeneration		Zero
Berkprai Cogeneration		Zero
RATCH Cogeneration		Zero

Community engagement

The Group's power plants promote community engagement to affirm transparency and raise confidence in their operations through the formation of committees represented by stakeholders. The committees inspect the operations, chiefly the environmental quality management. Aside from this, the power plants launch activities to address community needs and engage the community in management in order to bolster their strength.

Power plants' inspection activities in 2021

Ratchaburi Power Plant

The Environmental Inspectors Committee was established in 25th July 2018 (4-year term), with 25 members representing the neighboring community, government offices, civil society and the power plant.

Performance in 2021

- The committee convened 2 meetings.
- At a meeting, the committee followed up on the power plant's compliance with the environmental impact preventive and corrective measures and the power plant's action plan on environmental quality monitoring as stated in the EIA.
- The committee coordinated with the power plant for environmental operations inspection, disclosed data, information and facts, and presented its recommendations on environmental management to the community's joint committee on operational inspection and environment development.

Berkprai Cogeneration Power Plant

The Tri-Partite Committee was established on 19th August 2021, with 24 members representing the neighboring community, government offices, civil society and the power plant.

Performance in 2021

After the expiration of the old Tri-Partite Committee, the new committee was established and endorsed by Ratchaburi Provincial Governor on 19th August 2021. The committee was informed of the power plant's environmental quality monitoring results and is prepared for a meeting under COVID-19 preventive measures.

Nava Nakorn Power Plant

The joint committee on operational inspection and community development consisted of 29 members representing neighboring community, government offices, civil society and the power plant.

Performance in 2021

After the old joint committee term ended, the new committee was established and endorsed by Pathum Thani and Ayutthaya Provincial Governors on 2nd August 2021. Due to the COVID-19 outbreak, the committee has not yet convened a meeting. It plans to meet in 2022 under COVID-19 preventive measures.

RATCH Cogeneration Power Plant

The Tri-Partite Committee was established on 8th June 2021, consisting of 45 members representing neighboring community, government offices, and the power plant.

Performance in 2021

After the expiration of the old Tri-Partite Committee, the new committee was established and endorsed by Pathum Thani Provincial Governor on 8th June 2021. Joining the committee were representatives from the community in Ayutthaya Province, as specified in the EIA for the extension project. The new committee convened a meeting to inform members of 2021 progress in the implementation of measures to prevent, rectify and mitigate environmental impacts as well as monitoring results of the power plant's environmental quality.

Building community strength

In 2021, the following community activities were organized by the power plant and the Company:

Ratchaburi Power plant

Objective	Actions	Results
Ratchaburi Power Plant's project to enhance community capability in disaster prevention and mitigation		
• Prepare relevant external agencies' officers concerning operational guidelines and a channel to communicate with the power plant in case of disaster • Boost local authorities' readiness in terms of equipment and personnel to tackle possible disasters • Raise confidence in the power plant's safety • Build nurture a positive relationship with communities	• Organize a capability enhancement training session for the community disaster prevention and mitigation officers concerning the power plant's safety measures and the preparation of a community plan for disaster prevention and mitigation. • The training was attended by 30 disaster mitigation officers and representatives from local administrative offices, sub-district municipalities and local residents.	• Survey showed 95.08% of respondents were satisfied with the project.

Berkprai Cogeneration Power Plant

Objective	Actions	Results
Supporting Safety Campaign in Seven Dangerous Day for New Year 2021		
• Promote road safety during New Year holiday period to give moral support to duty officers	• Arrange food and beverages for four checkpoints in Suan Kluay Sub-district, Nakornchum Sub-district, Lad Bua Khao Sub-district, and Tha Pha Sub-district from 29th December 2021 to 3rd January 2022	• Duty officers felt motivated.

RATCH Group

Community Energy Project

Organized in collaboration with the Ratchaburi Provincial Energy office, the project implemented in Yang Hak Sub-district, Pakthor District, Ratchaburi Province, aims to raise awareness in energy optimization, promote energy saving and support the development of community energy innovation with local resources. In support of the Sustainable Development Goal 13, the project also aims to help the community strengthen resilience and adaptive capacity to climate-related disasters.

Target groups in 2021

- Energy volunteers in the Sub-district
- Residents in Yang Hak Sub-District

Goal

Reduction in fuel consumption
Reduction in GHG emission

Implementation procedure

Procedure	Actions	Results
Educate community and raise awareness in energy management	• Organize training for volunteers • Prepare the community energy plan together with volunteers and community representatives, taking into account the community context and way of life	40 energy volunteers have been appointed.
Develop community's energy innovation capability	• Support and promote the development of local energy technology in communities	Eight prototype solar-powered 3,400-watt water pumps have been employed instead of traditional gasoline-based pumps.
Assist community's self-development and replicate the results to other communities	• Support the establishment of a community learning center	Two learning centers were established in Yang Hak Sub-district to educate local residents on the application of solar energy and demonstrate the operations of solar-powered tools and equipment, which are: • Two 3,400-watt solar-powered pumps • Twenty 340-watt solar panels • Two 2,500-watt DC converters

Performance

Indicator	Social dimension	Environmental dimension	Economic dimension
Benefits from eight solar-powered pumps	1. 100 households benefit from the pumps. • For agricultural purposes, 98 households • For consumption purposes, 17 households 2. Survey shows 100% satisfaction.	• Fuel consumption was cut by 17,280 liters or 37,836.29 kgCO_2e.	• Expenses on gasoline purchases were cut by 518,400 Baht (average 30 baht per litre).

Improvement of community quality of life

Aside from the aforementioned actions, RATCH and its power plants have contributed shared values to the community via activities aimed at bolstering livelihood and quality of life.

Enhanced access to education

Ratchaburi Power Plant

Objectives	Actions	Results
1. Scholarship Project 2021		
• To offer educational opportunities to the poor youth with good academic scores • To ease poor parents' burden	• Scholarships worth 970,000 Baht were awarded to 27 schools: 1. Kindergarten Level: 93 scholarships 2. Elementary Level: 281 scholarships 3. High-school Level: 105 scholarships	• Students can pursue their studies. • Scholarships help reduce the expenses of students' families.

Objectives	Actions	Results
2. For Our Home Project (Education Sector)		
• To introduce educational personnel with creative content via communication channels in and out of schools for efficient online education • To motivate education personnel in seeking knowledge and understanding in the science of coaching and in applying the knowledge in their work	• Two training courses were organized for the administrators, teachers and other personnel of 27 networked schools. 1. Online training on mobile VDO editing 2. Online training on "Teachers' coaching skills in challenging time"	• Teachers applied the knowledge to improve their work process and create creative online teaching. Their VDO clips were publicized on various media. • Trained teachers possess coaching skills and ably apply the skills in improving themselves, subordinates and students.

Nava Nakorn Power Plant

Objectives	Actions	Results
Scholarship Program		
• To offer educational opportunities to the poor youth with good academic scores • To instill responsibility and motivate students to make full use of acquired knowledge	• Seven scholarships worth 21,000 Baht were awarded to poor students with good academic scores.	• Poor students can pursue their studies. Scholarships help reduce the expenses of students' families. • Students are responsible for their duty and benefit themselves, their families and society with the acquired knowledge.

RATCH Cogeneration Power Plant

Objectives	Actions	Results
1. Activity for National Children's Day		
• To engage with public/private agencies, community leaders and communities in children and youth development • To encourage children to think and act constructively through activities that suit their interest and ability	• Hand out 2,000 stationery sets to 16 communities for further distribution to children	• Students joined activities that supported their development. • Students gained more confidence.
2. Annual Scholarship Program for 2021		
• To provide educational opportunities to poor students with high academic scores • To ease poor parents' financial burden	• Hand out scholarships worth 10,000 Baht to Jarusorn School	• Students had the opportunity to pursue studies without putting more burden on their families.
3. School Building Maintenance		
• To ensure safety and maintain the condition of facilities in school buildings • To improve classroom atmosphere • To prevent students from possible dangers	• Donate 10,000 Baht to Thammasat Secondary School for building maintenance	• School buildings are safe and ready. • Classroom atmosphere has improved. Buildings are safe and have convenient facilities for students and teachers.

RATCH Group

Education for Career Empowerment Project in Lao PDR

Lao PDR is a major business base of RATCH. The project was initiated in 2011 as part of the Company's CSR drive in collaboration with the country's Ministry of Education and Sports. The project is up and running.

Under this project, technical knowledge improvement is provided for vocational students in response to the country's educational strategy to create skilled labor. The project also supports the Sustainable Development Goal 4: Quality Education, under Target 4.4: substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship.

Target groups
- Vocational students and teachers

Target fields
- PLC Electrical Control
- Mechanical
- General maintenance
- Welding
- Renewable power

Participating institutions
- Technical College in Vientiane Province
- Luang Prabang Technical College
- Integrated Technical and Vocational School in Xayaboury Province
- Khammouance Technical College
- Lao-German Technical College
- Polytechnic College
- PakpasakTechnical College

Goal
College graduates enjoy bright employment prospects.

Performance in 2011-2021

Workshop improvement	Training for teachers	Training for students
8 Workshops and equipment improvement at 7 colleges	Training on four disciplines for 100 teachers	Totally 1,154 students: 1. Metal Welding, 502 students 2. PLC Electrical Control, 226 students 3. General maintenance, 376 students 4. Solar power installation, 50 students

Graduates' employment rate

Based on an employment/career survey of 658 students graduating from 2011 to 2021, or 57 percent of all participating students, 589 graduates or 90 percent are employed and further study.

Kla Dee Project (Do Good Deeds Project)

RATCH supported the development of four environmental initiatives by students in Nan Province that are beneficial to the community.

Zero Burn for income initiative	High-school students, Bor Klua School

Performance

- Successful blackening of grass color by water mixed with wood ash, allowing no need for burning
- Extension of knowledge to cover grass growing with ash water and transfer of such knowledge to a 10-household handicraft group

Brown Ball Green Forest	Junior high-school and high-school students, Ban Luang School

Performance

- Successful experimentation on the production of paper seedling trays from agricultural wastes - banana trunks, coconut shells, wax paper, bio-fertilizer and rice straw
- Successful production of seedling balls from corn cobs, with 500 balls were distributed to the community

Paper Seedling Project	High-school students, Sa School

Performance

- Successful experimentation on the growing of red wood and Wild Himalayan cherry seedlings in a ball made from corn wastes mixed with soil, coco coir, rice husk, and animal dung. The balls are covered with recycled and wax paper.
- Survival rate at 85%
- A total of 250 seedlings were given to the community to increase green area
- Short VDO completed to transfer knowledge, posted online and in the community's LINE group chat

Cultural Nature Initiative	Buddhist Sunday School's youth group, Kor Temple

Performance

- Placement of five waste sorting points in and around Ban Kor community
- Construction of two check dams in Ban Kor's forest areas

Local economy development

Ratchaburi Power Plant

Objectives/Targets	Actions	Results
1. Employment of local workers		
Support income distribution to community	Set a recruitment policy that local workers are the priority	Ratchaburi Power Plant employed 368 local workers in 2021, or 72.58% of labor (40 employees and 328 contractors).
2. Strengthening development groups project		
Strengthen development groups for sustainable self-reliance	Provide financial support to ten community development groups, 10,000 Baht each	Community development groups developed a more efficient and effective management system and enjoyed more marketing channels.

Berkprai Cogeneration Power Plant

Objectives/Targets	Actions	Results
Sufficiency Economy Training Project for community in Suan Kluay Sub-district		
Promote and support community self-development according to the community's capability and context, in line with the sufficiency economy philosophy	• Provide funds and knowledge to the Sufficiency Economy Training Project conducted in 13 villages in Suan Kluay Sub-district with 100 attendees • Monitor and assess the project	• Villages have their own self-development programs in line with the sufficiency economy philosophy. • A community learning center to promote the philosophy has been established. • Surveyed recipients showed 83.5% satisfaction with the project.

Environmental conservation

Nava Nakorn Power Plant

Objectives/Targets	Actions	Results
The sixth "Returning life to water project" for 2021		
Rehabilitate the abundance and diversity of aquatic animals in natural water channels	• Provide 15,000 baby fish to neighboring communities and released to Khlong Chiang Rak Noi by the executives, employees, community members and Wat Puednimit School's teachers, numbering 57 people altogether.	The abundance and diversity of aquatic animals in the community's water channel has increased.

Berkprai Cogeneration Power Plant

Objectives/Targets	Actions	Results
Aquatic Animal Preservation Project at Berkprai and Suan Kluay sub-districts		

Preserve and increase the abundance of aquatic animals in Mae Klong River	Tambon Berkprai Municipality
	• Provide 10,000 baby fish
	• Involve 40 activity participants
	Suan Kluay Municipality
	• Provide 10,000 baby fish
	• Involve 30 activity participants
		• The amount and diversity of aquatic animals in the community's water channel increased.
		• Participant satisfaction survey results:
		  • Tambon Berkprai Municipality: 91.75%
		  • Suan Kluay Municipality: 98.5%

RATCH Group

Love the Forest and the Community Project

The project has been organized in collaboration with the Ministry of Natural Resources and Environment's Royal Forest Department since 2008. The project is aimed to engage communities in sustainably managing forests for their own benefit, create natural carbon sinks and support the Sustainable Development Goal 13 (Target 13.3): Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

Performance in 2021

Community forest competition activity	
Objectives	• Support the corporate sustainability strategy in social and environmental dimensions • Drive forward a continual increase in community forests to expand national forest areas and carbon sinks • Promote community engagement in management, development and rehabilitation so that forests can sustainably support community livelihood • Encourage the utilization of prize money in improving forest safeguarding and rehabilitation
Target group	Community forests throughout the country
Goal	Reduce greenhouse gases in the atmosphere through natural carbon sinks

Performance

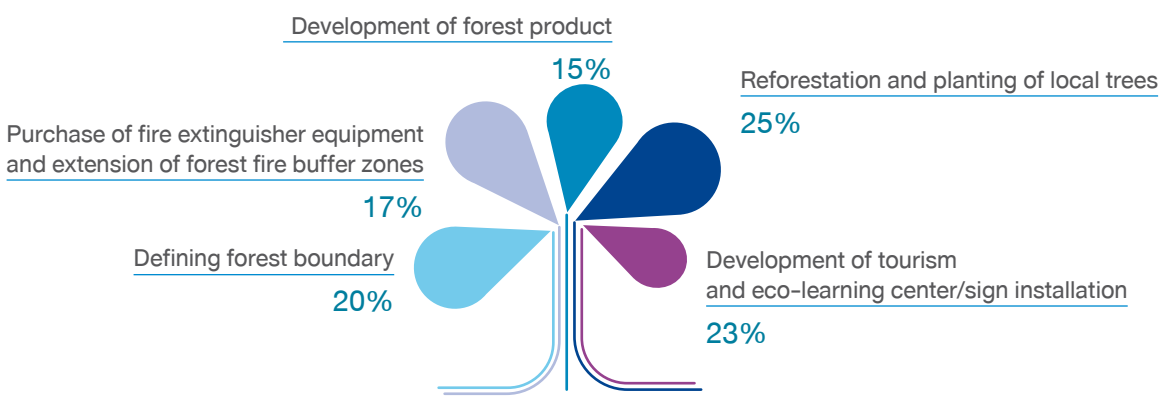
	Achievements in 2021	Accumulated achievements (2008-2021)
Number of community forests joining the contest	1,362	15,868
Number of awarded community forests	146	1,974
Area (rai)	123,979	1,276,389
Carbon capture and storage capacity (tons of carbon per year)	781,068	8,041,252
Prize money (Baht)	3,155,000	43,020,000

Note: Average of forests' carbon capture and storage capacity is 6.3 tons/rai/year.

Utilization of prize money

A survey shows that all 146 communities used the prize money awarded in 2021 for improving, rehabilitating and safeguarding their forests, thus creating positive impacts on the forest ecosystem and biodiversity and increasing carbon capture and storage capacity.

Community-run activities from project rewards in 2021 3,150,000 Baht



Assistance to community

Ratchaburi Power Plant

Objectives/Targets	Actions	Results
1. Strengthening the community's preventive measures against COVID-19		
• Prepare for the COVID-19 outbreak ahead of school reopening in mid-2021 • Reduce risks and protect students, teachers and educational personnel as well as reduce schools' expenses • Assist the residents in nine sub-districts located around the power plant • Establish a standardized field hospital and help patients waiting for hospital beds during their home isolation in order to reduce severity and death rates.	• Deliver alcohol, face masks, disinfectants and ATK test kits to 27 networked schools • Deliver foot pedal alcohol gel dispensers, contactless thermometers and PPE to sixteen Tambon Health Promotion Hospitals • Deliver "Pan Suk" (Happiness Sharing) sets to patients under home isolation and bed-ridden patients in nine neighboring communities • Provide equipment and consumption items to Ratchaburi Province's field hospital • Donate 700 boxes with primary care supplies for distribution to patients waiting for hospital beds	• The schools saved money in securing the supplies • Tambon Health Promotion Hospitals around Ratchaburi Power Plant could effectively serve residents during the COVID-19 outbreak • The field hospital was fully equipped accordingly to prescribed preventive measures • The number of COVID-19 patients in the nine neighboring sub-districts decreased along with death rates.
2. Our Neighbors Project in four districts		
Strengthen relationship and boost community confidence in Ratchaburi Power Plant through engagement	• Provide financial support and organize activities in two districts: 1. Muang Ratchaburi: purchase of portable toilet cabins for installation at checkpoints 2. Photharam District: home vegetable planting project to reduce exposure to COVID-19 infection and promote self-reliance	The relationship with communities in Ratchaburi Province was reinforced as the power plant acted as "a part of community" and "a good neighbor".

Nava Nakorn Power Plant

Objectives/Targets	Actions	Results
1. Community assistance amid the COVID-19 outbreak		
• Support health offices/Tambon Health Promotion Hospitals located around the power plant • Give moral support to medical professionals so that they can work at their full capacity • Campaign for community's awareness in disease prevention • Enable community/persons under observation to monitor their oxygen levels by themselves • Extend assistance to the communities affected by the COVID-19 outbreak	• Deliver food sets to medical and health officers at eight Tambon Health Promotion Hospitals and three health offices • Donate alcohol spray to two schools and two temples • Donate face masks and alcohol gel to fourteen neighboring communities • Donate 25 oxygen and pulse meters to Wat Puednimit Community • Donate 230 sets of rice and dried food to neighboring communities in four sub-districts	• Communities and students became aware of the necessity of preventive measures against COVID-19 to reduce infection rates in the communities and schools. • Communities could survive amid the outbreak.

2. Donation of life-support bags to flood victims		
• Support flood-affected communities	• Donate rice, dried food and drinking water to neighboring communities in four sub-districts (Ban Pathum and Chiang Rak Noi in Pathum Thani Province and Phayom and Bang Krasan's Chiang Rak Noi in Ayutthaya Province) ◊ 150 sets of rice and dried food ◊ 710 packs of drinking water	Flood-affected communities received assistance.
3. Support to Wat Puednimit School (Khamsawat Ratbamrung)'s canteen construction project		
• To return benefits to community	• Donate 10,000 Baht for the canteen construction	• The power plant took part in a social assistance project that created benefits for the school.

RATCH Cogeneration Power Plant

Objectives/Targets	Actions	Results
1. Songkran / Thai New Year Day		
• To preserve and promote Thai culture and traditions • To show gratitude to the elders and make them happy	• Provide the elders in 12 communities a number of 1,000 nano blankets	• Thai culture and traditions were preserved and promoted. • The elders were given moral support.
2. RATCH Cogen's fight against COVID-19		
• To give moral support to medical professionals • To help the elderly, people with disabilities and the poor affected by the COVID-19 outbreak • To support and improve community quality of life	• Provide PPE and CPE suits, face masks, hair caps and gloves to health volunteers at Ban Eua Arthorn Km44 • Provide medical equipment worth 1,000,000 Baht to Thammasat University Hospital • Provide food boxes to medical professionals administering COVID-19 vaccinations at Karunvej Navanakorn Hospital • Provide alcohol gel, face masks and food boxes to eight communities • Provide dried food to elderly patients in Ban Pathum Sub-district and Bang Pued Sub-district	• Community needs were addressed. • Communities were given moral support and assistance.
3. RATCH Cogen's fight against floods		
• To assist communities affected by flooding	• Provide rice and dried food to Ban Pathum Sub-district administration organization	• The community was assisted amid flood impacts.

Berkprai Cogeneration Power Plant

Objectives/Targets	Actions	Results
1. School lunch program		
• Provide nutritious lunch for students at neighboring schools	• Provide lunch for students in four schools: 1. Wat Lad Bua Khao School 2. Wat Hoopkrathing School 3. Wat Plak Rad Kindergarten School 4. Wat Lad Bua Khao Nursery	• The four schools were awarded 30,000 Baht, sufficient for their students. Project participants showed 81.53% satisfaction.
2. Donation of mobile X-Ray machine to Ban Pong Hospital to help COVID-19 patients		
• Donate medical equipment • Give moral support to medical professionals	• Donate 10,000 Baht for the purchase of mobile X-ray machine to assist Ban Pong Hospital's treatment of COVID-19 patients	Medical professionals received moral support and the hospital gained extra equipment.

Ratchaburi Power Plant's "good neighbor" aspiration

Ratchaburi Power Plant commissioned Boromarajonani College of Nursing, Ratchaburi, to conduct a public opinion survey on its image and activities in 2021.

Objectives

1. To obtain public opinion on the power plant's image and activities
2. To know public satisfaction levels for the power plant's activities
3. To compare the opinions and satisfaction level regarding the power plant's activities of local residents living within the five kilometer radius and those living outside the radius

Survey pattern

The research was carried out in two phases:

- Phase One: Quantitative research covering 120 community leaders and 710 local residents
- Phase Two: Qualitative research covering 30 community leaders and 30 local residents, with data processed under the thematic analysis method.

Survey result

1. Community leaders and local residents' opinions on Ratchaburi Power Plant's image and CSR activities	Excellent, with an average score of 91.16%
2. Level of public satisfaction with the power plant's CSR activities	Good, with an average score of 91.43%
3. Level of public opinions on Ratchaburi Power Plant's image and CSR activities and satisfaction levels of local residents living inside and outside the five-kilometer radius	The public opinions and satisfaction levels of local residents living inside and outside the five kilometer radius did not differ.

Survey result (continued)	• The qualitative analysis highlighted the power plant's strengths: 1) Social responsibility, 2) Continuous communications with communities, 3) Response to community needs, 4) Participation in community activities, and 5) Systematic work process. • The discovered approaches and issues that can maintain a positive public attitude: 1. Financial support for the improvement of community conditions and quality of life 2. As reflected by samples' pride and bond with the power plant, continuous care through community relations projects and activities have played a crucial part. As such, the power plant should proceed with projects and activities that reach out to people. 3. Improvement in communication approaches to better suit local audience, taking into consideration age, gender, educational background, careers, and so on. 4. Information distribution through village chiefs is the best channel to deliver the clearest information to local residents. Village chiefs are thus the key persons in communicating the power plant's information to villagers. 5. Samples were clearly satisfied with the budgets sufficiently allocated for community development projects.
Conclusion	Ratchaburi Power Plant has continually maintained positive relationships with neighboring communities throughout the past 20 years. Even in the pre-construction phase when public doubts and protests were rife, the power plant did not face a difficulty. In the construction phase, the power plant eased their concerns and started building a relationship with the communities. Since communities have received clear information and support, the operations have been smooth. As most local residents consider Ratchaburi Power Plant a growth-contributing member of their communities, the two parties have developed a strong bond. Such warrants smooth operations and peaceful coexistence while benefits have returned to the communities. Such reciprocal relationship should thus be nurtured.

Investment and supports to community

RATCH Group has supported the community and social development projects at all levels, from community level to provincial and national levels, directly and indirectly, in order to bolster social strength. The supports entails investment capital put into social development projects, financial supports to social activities, charitable donations and tax payments.

Investment and support to community	Amount (Baht)
Direct	
• CSR projects	36,008,472
• Power Development Fund	132,378,633
• Charitable donations	23,258,389
• Local taxes	2,664,466
Indirect	
• Taxes	526,766,949

Performance data 2021

Abbreviation

RATCH = RATCH Group PCL.
RATCHGEN = Ratchaburi Power Plant
TECO = Tri Energy Power Plant
NNEG = Nava Nakorn Electricity Power Plant
BPC = Berkprai Cogeneration Power Plant
RCO = RATCH Cogeneration Power Plant
RAC = RATCH-Australia Corporation Pty Ltd
RL = RATCH-Lao Services Company Limited

Economic

Data	Unit	2021	2020	2019
Revenues	Million THB	44,293.29	39,521.99	43,220.07
Operating costs	Million THB	33,116.50	30,228.69	33,228.03
Employee wages and benefits	Million THB	707.12	705.01	713.24
Dividend to all shareholders	Million THB	3,480.00	3,480.00	3,480.00
Payments to government	Million THB	617.70	572.45	822.43
Community investments	Million THB	179.99	185.75	181.71
Spent on local suppliers				
Company in Thailand[1]	Million THB	36,556.33	35,916.12	38,090.36
Company in Australia (RAC)	Million AUD	45.54	18.39	21.73
Spent on foreign suppliers				
Company in Thailand[1]	Million THB	926.55	1,006.59	1,067.95
Company in Australia (RAC)	Million AUD	0.04	0.02	0.09

Remark: [1] Operations in Thailand include RATCH, RATCHGEN, TECO, NNEG, BPC, and RCO, TECO included only in 2019-2020.

Health and Safety[2]

Data		Unit	2021	2020	2019
Total Number of Organization					
RATCH	Employees	person (Male : Female)	108 : 107	105 : 105	107 : 102
	Workers	person (Male : Female)	36 : 23	35 : 22	32 : 25
RATCHGEN	Employees	person (Male : Female)	28 : 24	29 : 25	32 : 25
	Workers	person (Male : Female)	296 : 77	295 : 76	299 : 76
NNEG	Employees	person (Male : Female)	15 : 15	19 : 15	19 : 14
	Workers	person (Male : Female)	69 : 9	339 : 98	411 : 71
BPC	Employees	person (Male : Female)	8 : 11	8 : 11	-
	Workers	person (Male : Female)	41 : 12	39 : 12	-
RCO	Employees	person (Male : Female)	23 : 6	2 : 1	-
	Workers	person (Male : Female)	429 : 53	30 : 9	-
RAC	Employees	person (Male : Female)	16 : 7	18 : 5	20 : 5
	Workers	person (Male : Female)	0 : 0	0 : 0	0 : 0

Data		Unit	2021	2020	2019
RL	Employees	person (Male : Female)	159 : 20	157 : 20	N/A
	Workers	person (Male : Female)	0 : 0	0 : 0	N/A
Number of Hours Worked					
RATCH		Hours worked	589,236.0	733,752.0	567,620.0
RATCHGEN		Hours worked	1,874,019.5	1,470,161.0	1,902,869.5
NNEG		Hours worked	232,818.5	950,794.0	1,517,185.0
BPC		Hours worked	150,851.0	213,170.0	-
RCO		Hours worked	430,811.0	133,643.0	-
RAC		Hours worked	37,534.9	41,814.2	40,668.0
RL		Hours worked	391,920.0	389,416.0	N/A
Total workforce represented in formal joint management-worker health and safety committees					
RATCH		persons (%)	9 (3.28%)	9 (3.37%)	9 (4.31%)
RATCHGEN		persons (%)	15 (3.52%)	15 (3.53%)	15 (3.47%)
NNEG		persons (%)	11 (10.19%)	16 (3.40%)	14 (2.72%)
BPC		persons (%)	11 (15.28%)	11 (15.71%)	-
RCO		persons (%)	5 (0.98%)	5 (11.90%)	-
RAC		persons (%)	5 (21.74%)	5 (21.74%)	5 (20.00%)
RL		persons (%)	0	0	N/A
Number of Fatalities (result of work-related injuries) by Gender					
RATCH	Employees	person (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers	person (Male : Female)	0 : 0	0 : 0	0 : 0
RATCHGEN	Employees	person (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers	person (Male : Female)	1 : 0	0 : 0	0 : 0
NNEG	Employees	person (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers	person (Male : Female)	0 : 0	0 : 0	0 : 0
BPC	Employees	person (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers	person (Male : Female)	0 : 0	0 : 0	0 : 0
RCO	Employees	person (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers	person (Male : Female)	0 : 0	0 : 0	0 : 0
RAC	Employees	person (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers	person (Male : Female)	0 : 0	0 : 0	0 : 0
RL	Employees	person (Male : Female)	0 : 0	0 : 0	N/A
	Workers	person (Male : Female)	0 : 0	0 : 0	N/A
Fatalities Rate (FR) by Gender					
RATCH	Employees	No/200,000 Hours worked (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers		0 : 0	0 : 0	0 : 0

Data		Unit	2021	2020	2019
RATCHGEN	Employees	No/200,000 Hours worked (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers		0.11 : 0	0 : 0	0 : 0
NNEG	Employees		0 : 0	0 : 0	0 : 0
	Workers		0 : 0	0 : 0	0 : 0
BPC	Employees		0 : 0	0 : 0	0 : 0
	Workers		0 : 0	0 : 0	0 : 0
RCO	Employees		0 : 0	0 : 0	0 : 0
	Workers		0 : 0	0 : 0	0 : 0
RAC	Employees		0 : 0	0 : 0	0 : 0
	Workers		0 : 0	0 : 0	0 : 0
RL	Employees		0 : 0	0 : 0	N/A
	Workers		0 : 0	0 : 0	N/A
Number of high-consequence work-related injuries					
RATCH	Employees	person (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers	person (Male : Female)	0 : 0	0 : 0	0 : 0
RATCHGEN	Employees	person (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers	person (Male : Female)	0 : 0	0 : 0	0 : 0
NNEG	Employees	person (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers	person (Male : Female)	0 : 0	0 : 0	1 : 0
BPC	Employees	person (Male : Female)	0 : 0	0 : 0	-
	Workers	person (Male : Female)	0 : 0	0 : 0	-
RCO	Employees	person (Male : Female)	0 : 0	0 : 0	-
	Workers	person (Male : Female)	0 : 0	0 : 0	-
RAC	Employees	person (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers	person (Male : Female)	0 : 0	0 : 0	0 : 0
RL	Employees	person (Male : Female)	0 : 0	0 : 0	N/A
	Workers	person (Male : Female)	0 : 0	0 : 0	N/A
Rate of high-consequence work-related injuries					
RATCH	Employees	No/200,000 Hours worked (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers		0 : 0	0 : 0	0 : 0
RATCHGEN	Employees		0 : 0	0 : 0	0 : 0
	Workers		0 : 0	0 : 0	0 : 0
NNEG	Employees		0 : 0	0 : 0	0 : 0
	Workers		0 : 0	0 : 0	0.13 : 0
BPC	Employees		0 : 0	0 : 0	-
	Workers		0 : 0	0 : 0	-

Data		Unit	2021	2020	2019
RCO	Employees	No/200,000 Hours worked (Male : Female)	0 : 0	0 : 0	-
	Workers		0 : 0	0 : 0	-
RAC	Employees		0 : 0	0 : 0	0 : 0
	Workers		0 : 0	0 : 0	0 : 0
RL	Employees		0 : 0	0 : 0	N/A
	Workers		0 : 0	0 : 0	N/A
Number of recordable work-related injuries					
RATCH	Employees	person (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers	person (Male : Female)	0 : 0	0 : 0	0 : 0
RATCHGEN	Employees	person (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers	person (Male : Female)	4 : 1	0 : 0	2 : 0
NNEG	Employees	person (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers	person (Male : Female)	0 : 0	0 : 0	0 : 0
BPC	Employees	person (Male : Female)	0 : 0	0 : 0	-
	Workers	person (Male : Female)	0 : 0	0 : 0	-
RCO	Employees	person (Male : Female)	0 : 0	0 : 0	-
	Workers	person (Male : Female)	0 : 0	0 : 0	-
RAC	Employees	person (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers	person (Male : Female)	0 : 0	0 : 0	0 : 0
RL	Employees	person (Male : Female)	0 : 0	0 : 0	N/A
	Workers	person (Male : Female)	0 : 0	0 : 0	N/A
Rate of recordable work-related injuries					
RATCH	Employees	No/200,000 Hours worked (Male : Female)	0 : 0	0 : 0	0 : 0
	Workers		0 : 0	0 : 0	0 : 0
RATCHGEN	Employees		0 : 0	0 : 0	0 : 0
	Workers		0.56 : 0.58	0 : 0	0.27 : 0
NNEG	Employees		0 : 0	0 : 0	0 : 0
	Workers		0 : 0	0 : 0	0 : 0
BPC	Employees		0 : 0	0 : 0	-
	Workers		0 : 0	0 : 0	-
RCO	Employees		0 : 0	0 : 0	-
	Workers		0 : 0	0 : 0	-
RAC	Employees		0 : 0	0 : 0	0 : 0
	Workers		0 : 0	0 : 0	0 : 0
RL	Employees		0 : 0	0 : 0	N/A
	Workers		0 : 0	0 : 0	N/A

Data		Unit	2021	2020	2019
Number of Fatalities (result of work-related ill health)					
Employees		person (Male : Female)	0 : 0	0 : 0	0 : 0
Workers		person (Male : Female)	0 : 0	0 : 0	0 : 0
Fatalities rate (result of work-related ill health)					
Employees		person (Male : Female)	0 : 0	0 : 0	0 : 0
Workers		person (Male : Female)	0 : 0	0 : 0	0 : 0
Number of cases of recordable work-related ill health)					
Employees		person (Male : Female)	0 : 0	0 : 0	0 : 0
Workers		person (Male : Female)	0 : 0	0 : 0	0 : 0
Rate of recordable work-related ill health					
Employees		person (Male : Female)	0 : 0	0 : 0	0 : 0
Workers		person (Male : Female)	0 : 0	0 : 0	0 : 0
Lost-Time Injury Frequency Rate (LTIFR)					
RATCH	Employees	No/1,000,000 Hours worked (Male : Female)	0 : 0	0 : 0	0 : 0
	Contractors		0 : 0	0 : 0	0 : 0
RATCHGEN	Employees		0 : 0	0 : 0	0 : 0
	Contractors		1.39 : 0	0 : 0	0 : 0
NNEG	Employees		0 : 0	0 : 0	0 : 0
	Contractors		0 : 0	0 : 0	1.1 : 0
BPC	Employees		0 : 0	0 : 0	-
	Contractors		0 : 0	0 : 0	-
RCO	Employees		0 : 0	0 : 0	-
	Contractors		0 : 0	0 : 0	-
RAC	Employees		0 : 0	0 : 0	0 : 0
	Contractors		0 : 0	0 : 0	0 : 0
RL	Employees		0 : 0	0 : 0	N/A
	Contractors		0 : 0	0 : 0	N/A
Total Injury Frequency Rate (TIFR)					
RATCH	Employees	No/1,000,000 Hours worked (Male : Female)	0 : 0	0 : 0	0 : 0
	Contractors		0 : 0	0 : 0	0 : 0
RATCHGEN	Employees		0 : 0	0 : 0	0 : 0
	Contractors		4.18 : 2.88	0.68 : 0	1.05 : 0
NNEG	Employees		0 : 0	0 : 0	0 : 0
	Contractors		0 : 0	0 : 0	0 : 0
BPC	Employees		0 : 0	0 : 0	-
	Contractors		0 : 0	0 : 0	-

Data		Unit	2021	2020	2019
RCO	Employees	No/1,000,000 Hours worked (Male : Female)	0 : 0	0 : 0	-
	Contractors		0 : 0	14.95 : 0	-
RAC	Employees		0 : 0	23.9 : 0	0 : 0
	Contractors		0 : 0	0 : 0	0 : 0
RL	Employees		0 : 0	0 : 0	N/A
	Contractors		0 : 0	0 : 0	N/A

Remark: [2] Presented information covers safety data of RATCH, RATCHGEN, NNEG, BPC, RCO (include expansion phase) RAC and RL. All Employees of RATCH, RATCHGEN, NNEG, BPC, and RCO are Thai, RAC's employees are Australian and Thai and RL's employees are Laotian and Thai.

People[3]

Data	Unit	2021		2020		2019	
		Male	Female	Male	Female	Male	Female
Total Employee	Persons	474		468		462	
	Persons	315	159	310	158	310	152
Employee by employment contract							
Permanent	Persons	314	159	309	158	310	152
Temporary	Persons	1	0	1	0	0	0
Employee by age group							
< 30 years	Persons	113	27	120	28	132	26
30-50 years	Persons	157	116	141	116	138	113
> 50 years	Persons	45	16	49	14	40	13
Employee by category							
Top Management	Persons	13	4	14	6	15	3
	%	2.74	0.84	2.99	1.28	3.25	0.65
Middle Management	Persons	35	19	39	19	39	13
	%	7.38	4.01	8.33	4.06	8.44	2.81
Junior Management	Persons	38	36	36	34	50	40
	%	8.02	7.59	7.69	7.26	10.82	8.66
Officer	Persons	228	100	220	99	206	96
	%	48.10	21.10	47.01	21.15	44.59	20.78
Worker	Persons	1	0	1	0	0	0
	%	0.21	0.00	0.21	0.00	0.00	0.00
Employee by Nationality							
Thai	%	58.44		58.33		59.69	
Lao	%	37.34		37.39		35.73	

Data	Unit	2021		2020		2019	
		Male	Female	Male	Female	Male	Female
Australian	%	4.22		4.27		4.58	
Other	%	0.00		0.00		0.00	
New Hires by Age Group							
< 30 years	Persons	14	7	40	5	14	9
	%	3.0	1.5	8.5	1.1	3.0	1.9
30-50 years	Persons	1	5	3	7	8	4
	%	0.2	1.1	0.6	1.5	1.7	0.9
> 50 years	Persons	1	1	1	0	1	1
	%	0.2	0.2	0.2	0.0	0.2	0.2
Total	Persons	16	13	44	12	23	14
	%	3.4	2.7	9.4	2.6	5.0	3.0
Turnover by Age Group							
< 30 years	Persons	5	2	41	2	7	6
	%	1.1	0.4	8.8	0.4	1.5	1.3
30-50 years	Persons	1	7	3	7	7	4
	%	0.2	1.5	0.6	1.5	1.5	0.9
>50 years	Persons	8	2	5	2	4	5
	%	1.7	0.4	1.1	0.4	0.9	1.1
Total	Persons	14	11	49	11	18	15
	%	3.0	2.3	10.5	2.4	3.9	3.2
Parental leave							
Parental leave	Persons	-	10	-	5	-	2
Returning to work after parental leave ended	Persons	-	6	-	4	-	0
Returning to work after parental leave ended (12 months after return to work)	Persons	-	9	-	0	-	0
Training and Development							
Top Management	hour/ person/year	4.23	5.50	26.86	16.67	44.79	35.67
Middle Management	hour/ person/year	23.49	22.71	57.95	47.49	64.65	139.33
Junior Management	hour/ person/year	61.79	36.06	44.11	40.52	52.21	66.81
Officer	hour/ person/year	20.41	17.01	24.88	24.72	41.07	29.15
Worker	hour/ person/year	0.00	0.00	0.00	0.00	0.00	0.00

Data	Unit	2021		2020		2019	
		Male	Female	Male	Female	Male	Female
Employee receiving career development review							
Top Management	%	100		100		100	
Middle Management	%	100		100		100	
Junior Management	%	100		100		100	
Officer	%	100		100		100	
Worker	%	100		100		100	
Employee receiving regular performance review							
Top Management	%	100		100		100	
Middle Management	%	100		100		100	
Junior Management	%	100		100		100	
Officer	%	100		100		100	
Worker	%	100		100		100	
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

Remark : [3] Presented employee data are of RATCH, RATCHGEN, RCO, RAC, and RL

Environment[4]

Data	Unit	2021	2020	2019
Energy[5]				
Total energy consumption	TJ	74,390	79,644	74,878
Total direct energy consumption	TJ	134,456	135,509	128,236
• Natural Gas	TJ	127,711	135,430	128,220
• Bunker Oil	TJ	6,408	0	0
• Diesel Oil	TJ	337	79	16
Total Indirect Energy Consumption	TJ	251	172	247
• Electricity purchased	TJ	251	172	247
• Heating purchased	TJ	0	0	0
• Steam purchased	TJ	0	0	0

Data	Unit	2021	2020	2019
Total energy sold	TJ	60,317	56,037	53,605
• Electricity sold	TJ	59,845	55,588	53,215
• Heating sold	TJ	0	0	0
• Steam sold	TJ	472	449	390
Net Generation (Total)	MWh	16,623,713	15,441,032	14,781,912
Net Generation (Only Fossil Fuel)	MWh	14,976,597	15,243,611	14,614,348
Total energy intensity (within organization)	GJ/MWh	8.09	8.78	8.68
Total Energy Reduction	GJ	352,852	254,091	164,387
• Fuel saving	GJ	144,003	43,376	10,124
• Electricity saving	GJ	208,850	210,715	154,263
• Steam saving	GJ	0	0	0
GHG Emission[6]				
Direct GHG emissions (Scope 1)	tCO_2e	6,437,043	6,258,865	5,875,291
Energy indirect GHG emissions (Scope 2)	tCO_2e	38,918	26,960	43,955
Total GHG emissions (Scope 1 + 2)	tCO_2e	6,475,961	6,285,826	5,919,245
GHG emission intensity (Scope 1 + 2)	tCO_2e/MWh	0.4324	0.4124	0.4050
Other indirect GHG emissions (Scope 3)[7]	tCO_2e	1,858,821	3,131	No Data
Total GHG emissions reductions	tCO_2e	48,995	35,282	22,827
Emission[8]				
NO_x emissions	Tons	2,945	3,228	2,561
	kg/MWh	0.20	0.21	0.18
SO_x emissions	Tons	1,462.2	1,057.4	32.5
	kg/MWh	0.0976	0.0694	0.0022
Opacity	%	3.21	0.69	0.61
TSP	Tons	165.2	260.8	280.4
Water[9]				
Total water withdrawal	Million m^3	16.24	16.42	15.91
• Surface water (total)	Million m^3	12.59	12.83	13.47
Freshwater (≤ 1,000 mg/L Total Dissolved Solids)	Million m^3	12.59	12.83	13.47
Other water (> 1,000 mg/L Total Dissolved Solids)	Million m^3	0	0	0
• Groundwater (total)	Million m^3	0	0	0
Freshwater (≤ 1,000 mg/L Total Dissolved Solids)	Million m^3	0	0	0
Other water (> 1,000 mg/L Total Dissolved Solids)	Million m^3	0	0	0
• Seawater (total)	Million m^3	0	0	0
Freshwater (≤ 1,000 mg/L Total Dissolved Solids)	Million m^3	0	0	0
Other water (> 1,000 mg/L Total Dissolved Solids)	Million m^3	0	0	0

Data	Unit	2021	2020	2019
• Produced water (total)	Million m^3	0.00	0.00	0.00
Freshwater (≤ 1,000 mg/L Total Dissolved Solids)	Million m^3	0	0	0
Other water (> 1,000 mg/L Total Dissolved Solids)	Million m^3	0	0	0
• Third-party water (total)	Million m^3	0.79	1.12	1.09
Freshwater (≤ 1,000 mg/L Total Dissolved Solids)	Million m^3	0.48	0.95	0.75
Other water (> 1,000 mg/L Total Dissolved Solids)	Million m^3	0.31	0.17	0.33
• Third-party water (total) in Water Stress Area	Million m^3	2.86	2.47	1.35
Freshwater (≤ 1,000 mg/L Total Dissolved Solids)	Million m^3	2.86	2.47	1.35
Other water (> 1,000 mg/L Total Dissolved Solids)	Million m^3	0	0	0
Recycled and reused water	m^3	1,535,811	1,464,838	1,509,439
	% of total water withdrawal	9.46	8.92	9.49
Water Footprint	m^3/MWh (net)	0.98	1.06	1.08
Total water discharge	Million m^3	2.21	2.69	2.89
• Surface water	Million m^3	1.99	2.48	2.82
• Ground Water	Million m^3	0	0	0
• Seawater	Million m^3	0	0	0
• Third-party water	Million m^3	0.22	0.20	0.06
Water discharge by freshwater and other water				
Freshwater (≤ 1,000 mg/L Total Dissolved Solids)	Million m^3	1.51	2.57	2.89
Other water (> 1,000 mg/L Total Dissolved Solids)	Million m^3	0.70	0.12	0.00
COD loading	Tons	81	107	150
BOD loading	Tons	10	10	12
Total water consumption	Million m^3	14.03	13.73	13.02
Waste[10]				
Total Waste	Tons	5,405	4,290	18,706
• Waste diverted from disposal by recovery operation	Tons	5,041	3,881	18,217
• Waste directed to disposal by disposal operation	Tons	364	409	489
Total hazardous waste	Tons	366	399	359
• Waste diverted from disposal by recovery operation	Tons	79	83	14
Preparation for reuse	Tons	0	0	2
Recycling	Tons	79	83	12
Other recovery operations	Tons	0	0	0
• Waste directed to disposal by disposal operation	Tons	287	316	345
Incineration (with energy recovery)	Tons	249	274	321

Data	Unit	2021	2020	2019
Incineration (without energy recovery)	Tons	13	0	0
Landfilling	Tons	5	38	24
Other disposal operations	Tons	16	0	0
Onsite Storage	Tons	3	3	0
Total non-hazardous waste	Tons	5,039	3,891	18,348
• Waste diverted from disposal by recovery operation	Tons	4,962	3,797	18,203
Preparation for reuse	Tons	0	0	0
Recycling	Tons	4,962	3,795	18,203
Other recovery operations	Tons	0	2	0
• Waste directed to disposal by disposal operation	Tons	77	93	144
Incineration (with energy recovery)	Tons	9	0	32
Incineration (without energy recovery)	Tons	0	1	0
Landfilling	Tons	54	90	113
Other disposal operations	Tons	12	0	0
Onsite Storage	Tons	2	3	0

Remark : *[4] Presented environmental data are of RATCHGEN, TECO, NNEG, BPC, RCO and RAC (TECO data reported only in 2019-2020 due to expiry in 2020)*

[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 RCO are calculated based on the assessment Methodology of Carbon Footprint for Organization developed by TGO (5th edition, January 2021) that are calculated from CO_2 / CH_4 / N_2O / R-134a / R-407c / R-410a and SF_6. Base year of GHG calculation is 2015.
GHG Emission of NNEG and BPC are calculated based on CO_2 emission factors from IPCC Volume 2 Energy. 2015.
- 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] Other Indirect GHG Scope 3 only included RATCHGEN and RCO and 2021 data is under verification process.

[8] Emission of RATCHGEN, NNEG, BPC and RCO are calculated from the Continuous Emission Monitoring Systems (CEMs) and RAC used calculation method of the Queensland Government Department of Environment and Science.

[9] The data are measured from metering.

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

GRI Content Index 2021

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		Sustainability Report	56-1 One Report		
GRI 102: General Disclosures 2016					
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GRI 102-3	Location of headquarters	7	-	-	-
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GRI 102-5	Ownership and legal form	13	-	-	-
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GRI 102-10	Significant changes to the organization and its supply chain	4-6, 15, 18, 42-46, 89-122	-	-	-
GRI 102-11	Precautionary Principle or approach	30-33, 39-41, 50-52, 62-63, 67-68, 92-93, 109-114, 121-122	-	-	-
GRI 102-12	External initiatives	19-24, 39-46, 52-53, 56-61, 89-95, 105-107, 118, 133-149	-	-	-
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GRI 102-16	Values, principles, standards, and norms of behavior	Cover inside, 25-26, 29-33, 115-118, 121-122	-	-	-
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GRI 102-20	Executive-level responsibility for economic, environmental, and social topics	2-3, 25-33, 48, 64	186-187, 385-397	-	-
GRI 102-21	Consulting stakeholders on economic, environmental, and social topics	20-22, 25-29, 106-107, 121-122, 131-132, 137-149	-	-	-
GRI 102-22	Composition of the highest governance body and its committees	25-29	176-186	-	-

Disclosure	Description	Page number(s) and/or URL(s)		Omission	External Assurance
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GRI 102-24	Nominating and selecting the highest governance body	25-29	174-182, 194-195	-	-
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GRI 102-26	Role of highest governance body in setting purpose, values, and strategy	25-29	178-186	-	-
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GRI 205: Anti-corruption 2016					
GRI 103:	Management Approach	30-33	-	-	-
GRI 205-3	Confirmed incidents of corruption and actions taken	33	-	-	-
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GRI 301: Materials 2016					
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GRI 301-2	Recycled input materials used	69, 159	-	-	-
GRI 302: Energy 2016					
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GRI 302-1	Energy consumption within the organization	66-67, 157	-	-	✓
GRI 302-3	Energy intensity	67, 158	-	-	✓
GRI 302-4	Reduction of energy consumption	55-56, 158	-	-	✓
GRI 303: Water and Effluents 2018					
GRI 103:	Management Approach	42, 64-69, 73-75	-	-	-
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GRI 303-2	Management of water discharge-related impacts	15, 73-75	-	-	-
GRI 303-3	Water withdrawal	67-68, 158-159	-	-	✓
GRI 303-4	Water discharge	68, 74, 159	-	-	✓
GRI 303-5	Water consumption	68, 159	-	-	✓
GRI 304: Biodiversity 2016					
GRI 103:	Management Approach	79-80	-	-	-
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GRI 305: Emissions 2016					
GRI 103:	Management Approach	42, 47-49, 70-71	-	-	-
GRI 305-1	Direct (Scope 1) GHG emissions	53, 158	-	-	✓
GRI 305-2	Energy indirect (Scope 2) GHG emissions	53, 158	-	-	✓
GRI 305-3	Other indirect (Scope 3) GHG emissions	53, 158	-	-	✓
GRI 305-4	GHG emissions intensity	53, 158	-	-	✓

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		Sustainability Report	56-1 One Report		
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GRI 103:	Management Approach	76-78	-	-	-
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GRI 308: Supplier Environmental Assessment 2016					
GRI 103:	Management Approach	89-95	-	-	-
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GRI 401: Employment 2016					
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GRI 403: Occupational Health and Safety 2018					
GRI 103:	Management Approach	42, 108-116, 121-122	-	-	-
GRI 403-1	Occupational health and safety management system	108-118, 120	-	-	-
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GRI 403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	108-120	-	-	-
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GRI 404: Training and Education 2016					
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GRI 404-1	Average hours of training per year per employee	127-128, 156	-	-	-
GRI 404-2	Programs for upgrading employee skills and transition assistance programs	125-127	-	-	-
GRI 404-3	Percentage of employees receiving regular performance and career development reviews	130, 157	-	-	-
GRI 406: Non-discrimination 2016					
GRI 103:	Management Approach	121-122, 128-132	-	-	-
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GRI 413: Local Communities					
GRI 103:	Management Approach	133	-	-	-
GRI 413-1	Operations with local community engagement, impact assessments, and development programs	45-46, 134-148	-	-	-
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LRQA Independent Assurance Statement

Relating to RATCH Group PCL.'s Sustainability Report for the calendar year 2021

This Assurance Statement has been prepared for RATCH Group PCL. (RATCH) in accordance with our contract but is intended for the readers of this Report.

Terms of engagement

LRQA (Thailand) Limited (LRQA) was commissioned by RATCH Group PCL. (RATCH) to provide independent assurance on its Sustainability Report 2021 "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 procedure is based on current best practice, is in accordance with ISAE 3000 and uses the following principles of - inclusivity, materiality, responsiveness and reliability of performance data.

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

- Confirming that the report is in accordance with:
  - GRI Standards (2016) and core option
  - GRI Electricity & Utilities sector disclosures
- Evaluating the accuracy and reliability of data and information for only the selected indicators listed below: [1]
  - Environmental: *GRI 301-1 Materials used by weight or volume, GRI 302-1 Energy consumption within the organization, GRI 302-3 Energy intensity, GRI 302-4 Reduction of energy consumption, GRI 303-3 to 5 Water withdraw, discharge and consumption, GRI 305-1 Direct (scope 1) GHG emissions, GRI 305-2 Energy indirect (scope 2) GHG emissions, GRI 305-3 Other indirect (Scope3) GHG emissions, GRI 305-4 GHG emissions intensity, GRI 305-5 Reduction of GHG emissions, GRI 305-7 Nitrogen Oxide (NO_x), Sulphur Oxide (SO_x), and other significant air emissions.*
  - Social: *GRI 401-1 New employee hires and employee turnover*, *GRI 403-9 Work-related injuries and GRI 403-10 Work-related ill health*

Our assurance engagement excluded the data and information of RATCH's subsidiaries where it has no operational control and all 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, in all material respects:

- Met the requirements above
- Disclosed accurate and reliable performance data and information as no errors or omissions were detected
- 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. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed.

LRQA's approach

LRQA's assurance engagements are carried out in accordance with our verification procedure. 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.

[1] *GHG quantification is subject to inherent uncertainty.*

- 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.
- Remote visiting RATCH's electricity generating units (Ratchaburi Power Plant, Navanakorn Cogeneration Power Plant and RATCH-Lao Services Co., Ltd.) and to sample performance data and information for the selected specific standard disclosures to confirm its reliability.

Observations

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

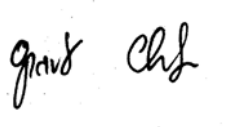
- Stakeholder inclusivity:
  We are not aware of any key stakeholder groups that have been excluded from RATCH's stakeholder engagement process. RATCH has open dialogue with all of its stakeholders to understand their growing expectations.
- Materiality:
  We are not aware of any material issues concerning RATCH's sustainability performance that have been excluded from the report. It should be noted that RATCH has established extensive criteria for determining which issue/aspect is material and that these criteria are not biased to the company's management.
- Responsiveness:
  RATCH has addressed the concerns of stakeholders in climate changes mitigation. However, we believe that future reports should discuss progress in GHG emissions reduction plan as well as reporting of significant GHG Scope 3 emissions.
- Reliability:
  Data management systems are considered to be well defined, but the implementation of these systems varies across RATCH's operational facilities. RATCH should consider interim verification to further improve the reliability and timeliness of its disclosed data and information.

LR's standards, competence and independence

LR 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 together with TGO CFO (Carbon Footprint for organization Scheme of Thailand Greenhouse Gas Management Organization (Public Organization)) are the only works undertaken by LRQA for RATCH and as such does not compromise our independence or impartiality.

Dated: 2 March 2022



Opart Charuratana
LRQA Lead Verifier

On behalf of LRQA (Thailand) Limited
22th Floor, Sirinrat Building, 3388/78 Rama IV Road
Klongton, Klongtoey, Bangkok 10110 THAILAND

LRQA reference: BGK00000700

Feedback Form:
2021 Sustainability Report
RATCH Group PCL.

Scan QR Code
for feedback

1. Please identity your stakeholder type
   - ☐ Shareholder ☐ Investor ☐ Partner/Supplier
   - ☐ Community ☐ Employee ☐ Scholar/Independent Organization
   - ☐ Customer ☐ Mass Media ☐ Other (Please specify) _____
2. Where do you receive this sustainability report?
   - ☐ Annual Shareholders General Meeting ☐ Company's website ☐ Other (Please specify) _____
3. Why do you prefer reading this sustainability report?
   - ☐ For support investment decision on RATCH's securities
   - ☐ For learning more about RATCH's business
   - ☐ Research and educational purposes
   - ☐ Other (Please specify) _____
4. Satisfactory level towards the 2021 sustainability report

☐ Attractive topics	☐ High	☐ Medium	☐ Low
☐ Information adequacy	☐ High	☐ Medium	☐ Low
☐ Reliable information	☐ High	☐ Medium	☐ Low
☐ Presentation methods	☐ High	☐ Medium	☐ Low
☐ Readability	☐ High	☐ Medium	☐ Low
☐ Design	☐ High	☐ Medium	☐ Low
☐ Overall satisfaction	☐ High	☐ Medium	☐ Low

5. After reading this sustainability report, are you confident that RATCH potentially achieves the sustainable growth?
   - ☐ Yes, because _____
   - ☐ No, because _____
   - ☐ No idea because _____
6. In your opinion, which is the most significant aspect toward the company's sustainable growth?
   - ☐ Economy (Please specify) _____
   - ☐ Environment (Please specify) _____
   - ☐ Society (Please specify) _____
7. In your opinion, what should the report be improved?
   - ☐ Design ☐ Readability
   - ☐ More information ☐ Other (Please specify) _____

Thank you for your valuable feedback
which will be useful for improvement of next issue of the report.

RATCH GROUP

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