Environmental Compliance and Performance

Ratch Pathana and Affiliates committed to full compliance with environmental regulations and legal requirements applicable to its operations. The company adheres strictly to Environmental Impact Assessment (EIA) frameworks at Rach Patana Energy Power Plant, as well as Initial Environmental Examination (IEE) and Code of Practice (CoP) guidelines at Sahacogen Green Biomass Power Plant and Sahagreen Forest Biomass Power Plant. To ensure compliance, environmental quality is continuously monitored, with biannual reports submitted to regulatory authorities.

The company has also established an Environmental Management System (EMS) to ensure operations align with legal and regulatory requirements. Recognizing the importance of sustainable environmental management, the company continuously enhances its environmental strategies to meet international standards. Between 2005 and 2024, the company underwent external audits conducted by the Management System Certification Institute (MASCI) and successfully achieved ISO 14001 : 2015 certification. Currently, 33% of Ratch Pathana's subsidiaries are ISO 45001:2018 certified, reflecting the company's unwavering commitment to environmental responsibility, operational excellence, and long-term sustainability.

This demonstrates the company's unwavering commitment to environmentally responsible operations and strict compliance with environmental regulations. It reflects the continuous development and tangible improvement of the company's environmental management system. Moving forward, the company remains dedicated to enhancing and expanding its operations in alignment with international standards, further minimizing environmental impact and creating long-term value for all stakeholders.

From 2022 to 2024, the company has maintained full compliance with environmental regulations, with no recorded complaints, violations, fines, or penalties related to environmental laws. This reflects the company's strong commitment to sustainable business

	Number of Cases (per year)		
Incident/Issue	2022	2023	2024
Complaints and environmental law violations	0	0	0
Fines for legal violations (THB)	0	0	0

practices and strict adherence to environmental standards

Water Management

Sustainable Water Management Plan

Ratch Pathana and Affiliates is places a strong emphasis on efficient water resource management across all production processes, from water intake to post-production environmental conservation. The company has established strict water management measures in full compliance with legal requirements, ensuring minimal impact on community water resources while mitigating operational risks associated with water scarcity.

Key Water Management Strategies:

- Ratch Pathana Energy and Sahacogen Green Biomass Power Plants are located within the Saha Industrial Park, utilizing water from designated industrial water sources that provide sufficient reserves for production, without affecting local community water supply.
- Process Water Treatment and Reuse:
 - o Neutralization Basin: Water from production processes undergoes quality adjustments before being transferred to the wastewater treatment system of the Saha Industrial Park.
 - o Water Reuse Initiatives: Treated water is repurposed for landscaping irrigation, with excess water discharged into external water bodies in full compliance with legal discharge standards.
 - Cooling System Compliance: Water discharged from cooling systems is regulated to not exceed 40°C, in accordance with legal temperature limits for environmental protection.

RO Rejected Water Recycle Project – Ratch Pathana Energy Power Plant

Ratch Pathana Energy has implemented the RO Rejected Water Recycle Project, a water conservation initiative designed to reclaim and reuse process water through a Reverse Osmosis (RO) Water Recycle system. This project has successfully reduced freshwater consumption in production processes while also minimizing wastewater disposal costs.

RO Rejected Water Recycle in 2022-2024

Year	2022	2023	2024
Water Saved in Production (m ³ /year)	113,556.80	89,702.60	48,350.20

Sahagreen Forest Biomass Power Plant has adopted a comprehensive water management strategy by constructing a 40-Rais water reservoir with a storage capacity of 370,000 cubic meters per year, ensuring a stable water supply for year-round power generation.

Key Features of the Water Management System:

- Sediment Separation & Main Reservoir: Designed to maintain water quality, reduce the need for chemical treatment, and minimize wastewater discharge.
- Green Belt Initiative: Windbreak trees have been planted around the reservoir to reduce water evaporation and facilitate water reuse in power generation.
- Zero Discharge Approach: All treated water is retained and reused for landscaping irrigation, with no wastewater discharge into external water bodies.

To ensure compliance and minimize environmental impact, the plant strictly monitors water quality and cooling water temperatures as per legal requirements. Additionally, regular ecological assessments are conducted to safeguard the local aquatic ecosystem.



Water Risk Management

The company recognizes the critical importance of sustainable water management to mitigate water scarcity risks and enhance water-use efficiency in its operations. To ensure a stable water supply for power generation, the company has implemented the following measures:

1. Water Management at Power Plants

- Ratch Pathana Energy Power Plant (Chonburi Province):Sources raw water from a regional water network covering three provinces: Chonburi, Rayong, and Chachoengsao.Secured a 10-year long-term water supply contract with backup reserves for emergency situations.
- Ratch Pathana Energy & Sahacogen Green Biomass Power Plants:Located within the Saha Industrial Park, utilizing dedicated industrial water sources that do not impact local community water supply.
- Sahagreen Forest Biomass Power Plant:Constructed a 40-rai water reservoir with a storage capacity of 370,000 cubic meters per year, ensuring year-round power generation.

2. Water Risk Assessment

- Water stress, flood risks, drought conditions, and water quality concerns.
- Short-term (annual) and long-term (project lifecycle) risk evaluations.
- Utilization of risk assessment results to develop and enhance preventive and mitigation plans.
- Annual risk reviews to refine strategies based on improved forecasting data.

3. Additional Measures for Efficient Water Management

- Installation of water treatment systems before water enters production processes.
- Increased water recirculation cycles in cooling systems to reduce raw water consumption.
- Reuse of treated RO wastewater for applications such as landscaping and green spaces.
- Regular inspections of water pipelines to prevent leaks and minimize water loss.

4. Optimization of Water Usage through the 3Rs Approach (Reduce-Reuse-Recycle)

- Reduce water usage in production by increasing recycling loops within cooling tower systems.
- Reuse treated wastewater as a substitute for raw water, reducing dependence on public water sources.
- Recycle and consistently monitor discharged water to ensure compliance with environmental standards and minimize community impact.

5. Collaborative Water Resource Management

- Engagement with government agencies, such as the Royal Irrigation Department and the Ministry of Natural Resources and Environment, along with local communities, to align water usage with availability.
- Monitoring water forecasts and watershed conditions to anticipate fluctuations in supply.
- Establishing agreements with water suppliers to secure emergency water reserves in case of shortages.

Water Consumption Reduction Targets and Achievements (2024)

Target	Achievement		
Ratch Pathana Energy Power Plant			
• Reduce process water consumption by reusing at least 40,000 m^3 of treated wastewater (3% of total water usage).	48,350.20 m ³ of wastewater was reused, achieving 3% of total water savings.		
• Reduce office water consumption by at least 2,593.8 \mbox{m}^3 (40% of total office water use).	2,996.17 m ³ of office water was saved, achieving 46% reduction.		
Sahacogen Green Power Plant			
• Reduce process water consumption by reusing at least 45,000 m ³ (9.74% of total water usage).	53,432 m ³ of wastewater was reused, achieving 11.36% of total water savings.		
\bullet Reduce office water consumption by 346 \textrm{m}^3 (4% from the 2023 baseline).	1,105 m ³ of office water was saved, achieving 15.96% reduction.		
Sahagreen Forest Power Plant			
• Reduce process water consumption by reusing at least 20,000 m ³ annually (5.13% of total water usage).	15,507 m ³ of wastewater was reused, achieving 4.48% reduction.		
• Reduce office water consumption by 1,000 \mbox{m}^3 (45.64% from the 2023 baseline).	1,637 m ³ of office water was saved, achieving 74.71% reduction.		

Water Consumption Statistics

Ratch Pathana Energy Power Plant	2022	2023	2024
Water Consumption (m ³)	1,824,400	1,908,007	1,698,676
Water Intensity (Withdrawal/MWh net)	1.74	1.98	2.40
Treated Wastewater (%)	100	100	100
Water Management Approach	Industrial Park Treatment System / Green Area / RO Rejected Water Recycl		
Sahacogen Green Power Plant	2022	2023	2024
Water Consumption (m ³)	311,616.00	357,221.00	355,857.01
Water Intensity (Withdrawal/MWh net)	4.96	5.36	5.34
Treated Wastewater (%)	100	100	100
Water Management Approach	Industrial Park Treatment System / Green Area		
Sahagreen Forest Power Plant	2022	2023	2024
Water Consumption (m ³)	400,671.00	448,220.00	391,445.67
Water Intensity (Withdrawal/MWh net)	7.12	7.93	4.68
Treated Wastewater (%)	-	-	-
Water Management Approach	zero discharge		

Wastewater Discharge and Quality (2022-2024) Ratch Pathana Energy Power Plant

Parameter	2022	2023	2024
Wastewater Discharge Volume (m ³ /year)	536,531.03	670,593.02	239,143.65
Water Quality			
• Temperature (°C)	31.8	31.8	32.6
• pH Level	7.7	7.6	7.6
• Biochemical Oxygen Demand (BOD) (mg/L)	2.0	2.5	2.3
• Chemical Oxygen Demand (COD) (mg/L)	50.1	48.9	40.3
• Total Dissolved Solids (mg/L)	863.6	855.4	805.5

Sahacogen Green Power Plant

Parameter	2022	2023	2024
Wastewater Discharge Volume (m ³ /year)	54,760	48,627	60,000
Water Quality			
• Temperature (°C)	32	34	33
• pH Level	8.7	8.7	8.8
• Biochemical Oxygen Demand (BOD) (mg/L)	21.1	11.6	9.0
• Chemical Oxygen Demand (COD) (mg/L)	161	80	97
• Total Dissolved Solids (mg/L)	<3.0	<3.0	<3.0

Sahagreen Forest Power Plant

Parameter	2022	2023	2024
Wastewater Discharge Volume (m ³ /year)	78,419	58,740	51,082
Water Quality			
• Temperature (°C)	31	31	31
• pH Level	7.5	7.9	8.0
• Biochemical Oxygen Demand (BOD) (mg/L)	11.6	9.3	8.7
• Chemical Oxygen Demand (COD) (mg/L)	118	87	75
• Total Dissolved Solids (mg/L)	<3.0	<3.0	<3.0

Water Usage Incident Statistics

Incident/Issue	Number of Cases (per year)		
	2022	2023	2024
Conflicts with water users/stakeholders	0	0	0
Environmental violations/legal infractions	0	0	0



114 SUSTAINABLITY REPORT 2024 www.ratchpathana.com