

Biodiversity Commitment, Biodiversity Exposure & Assessment

RATCH gives importance to the balance of business development and the conservation of existing natural resources. Where we operate, we have watched out for possible impacts on the environment. When it comes to business development or investment in electricity and related businesses, RATCH demands a thorough assessment of risks and ecological impacts. We also vow not to invest in areas of potential effects that may cause changes to historical sites, World Heritage Site or areas involving rare or near-extinction species, based on the International Union for Conservation of Nature (IUCN)'s Red Lists. Aside, RATCH follows the conservation principles to protect biodiversity in operating sites and nearby areas under the following 3 approaches:

1. Wise and optimized resource utilization
2. Rehabilitation and restoration of degraded areas
3. Conservation of valuable and rare resources



Impacts on key measures and biodiversity monitoring results in 2022

The 11 power plants under RATCH's control, in Thailand or overseas, that contributed 92.11% of total revenue in 2022, have 150,419.3 rai or 24,067.1 hectares of combined operating areas. All conducted the assessment on possible impacts on the biodiversity during the project feasibility and valuation stage. They have devised standard mitigation measures which were approved by relevant regulatory bodies.

Ratchaburi Power Plant (Area: 322.4 hectare)

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| <p>Preventive and monitoring measures</p> | <ul style="list-style-type: none"> Track the quantity and diversity of wildlife Biannually trace the species, density and biodiversity index of living organisms in wastewater pond |
| <p>Significant impacts</p> | <p>The construction and operation affect wildlife habitats, the ecosystem and living organisms in the water. That concerns all 5 groups of living beings – birds, mammals, amphibians, reptiles and plankton (phytoplankton and zooplankton) as well as benthos.</p> |
| <p>Results of 2022 biodiversity survey</p> | <p>1. <u>Wildlife numbers and diversity</u></p> <p>The survey found 108 species of wild animals around Ratchaburi Power Plant: 6 mammal species, 83 bird species, 11 reptile species and 8 amphibian species.</p> <ul style="list-style-type: none"> All 108 species, 82 species were protected under the Wildlife Reservation and Protection Act B.E. 2562 which included 79 bird species and 3 reptile species. 108 species were classified under Thailand’s bio-resources status (2017): 2 near-threatened species, 1 vulnerable species, and 105 least-concerned species. 103 species were enlisted in International Union Conservation of Nature (IUCN) (2020): 1 near-threatened species and 102 least-concerned species. <p>The number of wildlife species in 2022 increased from the previous year with 8 more bird species following seasonal migration, 2 reptile species and 1 amphibian species. On the variation of wildlife found near Ratchaburi Power Plant, the qualitative similarity index was at 65.6–76.3%, compared to 81% during the 2021–2022 period, indicating similarities of wildlife in the corresponding period.</p> <p>2. <u>Species, density and biodiversity of living beings at the discharge point</u></p> <p>Two surveys were conducted in January and July 2022 to explore the density of phytoplankton, zooplankton and benthos in Khlong Bang Pa, to which the power plant’s wastewater was discharged. Benchmarked against Wilhm and Dorris biological parameters for water quality criteria, the water quality was good enough for phytoplankton, zooplankton and benthos. The diversity index in the $1.0 \leq H' \leq 3.0$ range indicated the water source could accommodate the living beings. Though, the quality tended to move up or down on seasons change.</p> |

Berkprai Cogeneration Power Plant (Area: 8.6 hectare)

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| Preventive and monitoring measures | Tracking the sum of species, abundance, and density to calculate the biodiversity index of living organisms in water, twice a year at 4 discharge points |
| Significant impacts | Power generation creates discharge that, with sub-standard treatment, may affect the ecosystem and living organisms in water like phytoplankton, zooplankton, and benthos. |
| Results of 2022 biodiversity survey | The sum of species, density and diversity of phytoplankton, zooplankton, benthos, baby aquatic animals and fish eggs at the pumping station and discharge points - 50 meters above the pumping station and 50, 500 and 1,000 meters below the discharge point in the Mae Klong River - was conducted in May and September 2022. The survey showed that the diversity index of phytoplankton, zooplankton and benthos were similar, while the diversity index of fish eggs and baby fish indicated low diversity. |

Nava Nakorn Power Plant (Area: 6.9 hectare)

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| Preventive and monitoring measures | Tracking the sum of species, abundance, and density to calculate the biodiversity index of living organisms in water at Khlong Chiang Rak Noi, twice a year |
| Significant impacts | Power generation creates discharge that, with sub-standard treatment, may affect the ecosystem and living organisms in water like phytoplankton, zooplankton, benthos, fish eggs and baby fish in Khlong Chiang Rak Noi. |
| Results of 2022 biodiversity survey | <p>The diversity of phytoplankton, zooplankton and benthos as well as the abundance of fish eggs and baby fish at Khlong Chiang Rak Noi, where Nava Nakorn Industrial Zone's wastewater was discharged, was surveyed above, at and below the discharge point twice in 2022, in May and November. The survey showed that the diversity index of phytoplankton, zooplankton and benthos were similar as well as the abundance of fish eggs and baby fish was similar at all points, depending on the water quality in different seasons.</p> <p>Meanwhile, Nava Nakorn Power Plant launched a rehabilitation project, dredging the canal and collecting garbage to preserve aquatic animals' habitats. Baby fish was released to the canal under the "Return Life to the Water" Project for the water source's biodiversity. The project had</p> |

been organized for 7 years in a row in collaboration with community and relevant government offices.

RATCH Cogeneration Power Plant (Area 8.1 hectare)

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| Preventive and monitoring measures | No monitoring measure was set. |
| Significant impacts | The power plant's activity created no impact on the ecosystem and biodiversity as is located in a city area. Treated wastewater was reused by other organizations, instead of discharge. |

Nexif RATCH Energy Rayong Power Plant (Area: 4.6 hectare)

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| Preventive and monitoring measures | No monitoring measure was set. |
| Significant impacts | The assessment of the power plant's impacts on the environment and biodiversity found no risk or impact on living organisms. |

Sahacogen (Chonburi) Power Plant (Area 4.8 hectare)

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| Preventive and monitoring measures | No monitoring measure was set. |
| Significant impacts | The assessment of the power plant's impacts on the environment and biodiversity found no risk or impact on living organisms. |

Collinsville Solar Farm (Area: 70.9 hectare)

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| Preventive and monitoring measures | No monitoring measure was set. |
| Significant impacts | The power plant caused no risk or harm on living organisms. |

Mt. Emerald Wind Farm (Area: 2,400 hectare)

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| Preventive and monitoring measures | Tracking the sum of species and diversity of fauna at 5 sample areas (including 2 areas at the power plant's premises), once a year for birds and bats and 3 times a year for quolls. |
| Significant impacts | The power plant's construction and generation activity cause impacts on animal habitats as well as the sum and diversity of local animals. |
| Results of 2022 biodiversity survey | The surveys of the numbers and species of fauna, once a year for bird and bats and 3 times a year for quolls, were conducted. The surveys showed that the number of birds, bats and quolls was intact. |

Yandin Wind Farm (Area: 15,000 hectare)

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| Preventive and monitoring measures | Tracking the sum of species and diversity of local birds and plants every 2 years. |
| Significant impacts | The power plant's construction and generation activity cause impacts on living beings. They may harm local animal habitats or birds may collide with wind turbines, cables or maintenance vehicles. |
| Results of 2022 biodiversity survey | The wind farm conducted biannual surveys on the sum, diversity and species of local birds and plants. The surveys in 2022 found dead birds, which were not either protected or rare species, and showed no impacts on bats. |

Collector Wind Farm (Area: 6,200 hectare)

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| Preventive and monitoring measures | Tracking the sum of species of birds and bats every year and surveying animal carcasses on a monthly basis |
| Significant impacts | The power plant's construction and generation activity cause impacts on animals, plants, forests and pastures. |
| Results of 2022 biodiversity survey | The wind farm conducted an annual survey on the sum of local birds and bats and a monthly survey on carcasses, to monitor possible impacts on local animals. The surveys in 2022 found the carcasses of birds and bats which are not either protected or rare species. |

Asahan-1 Hydroelectric Power Plant (Area: 40.9 hectare)

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| Preventive and monitoring measures | Forest rehabilitation measures were set to replenish the lost forest areas. No monitoring measure was set. |
| Significant impacts | The power plant's construction and generation activity cause impacts on plants, forests and animal habitats. |
| Results of 2022 biodiversity survey | In 2022, the power plant replenished the lost forest areas by growing a total of 30,000 trees around the catchment areas of Lake Toba, North Sumatra, Indonesia. |