GPSC Group
Biodiversity Assessment Report 2024

Content: GPSC Group Biodiversity Assessment Report

GPSC Group Biodiversity Commitment

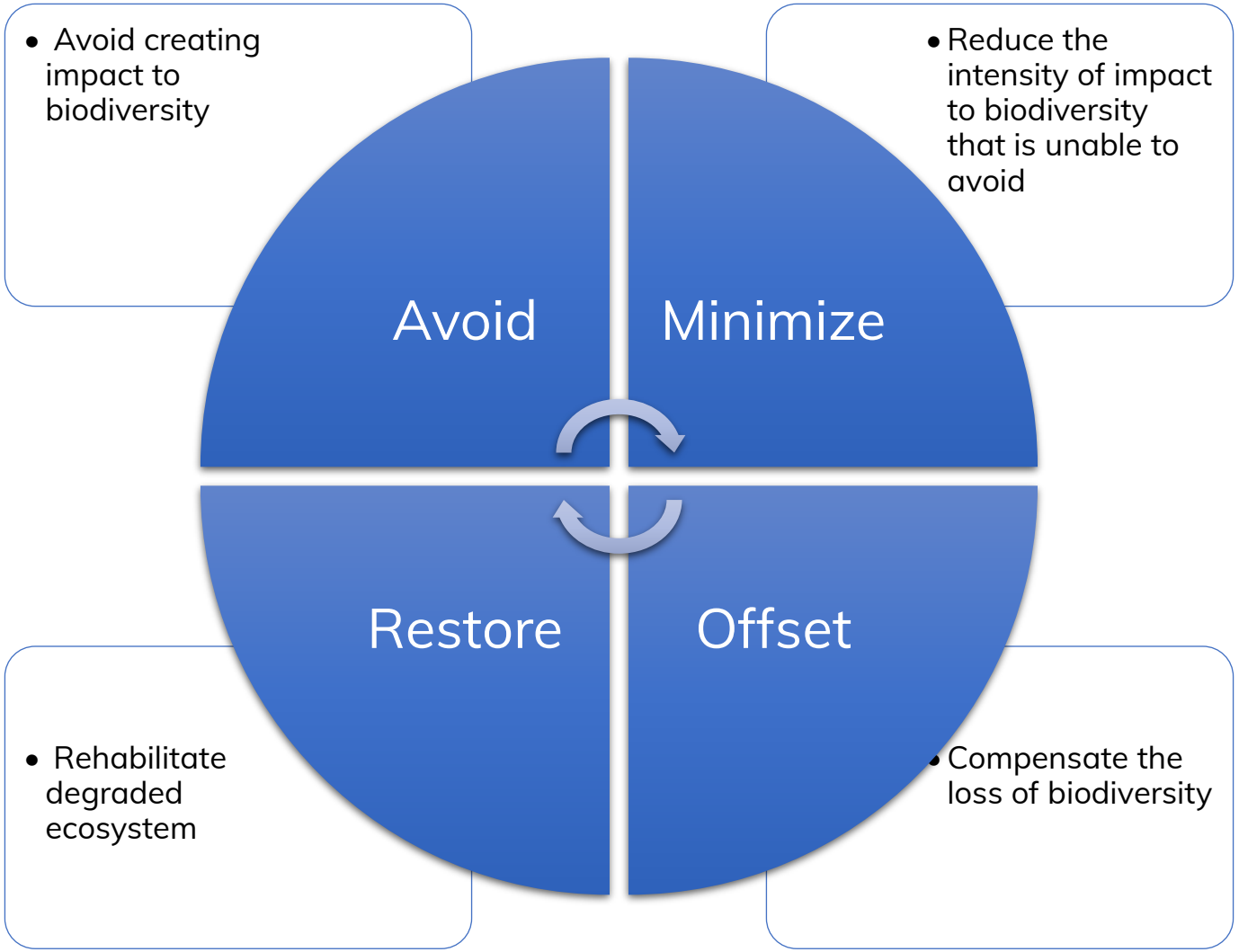
GPSC Group's main objective for biodiversity management is the protection and mitigation of negative impacts to biodiversity. GPSC has announced Biodiversity Statement to serves as operational principles for GPSC Group companies, ensuring streamlined biodiversity management across the entire organization.

Our commitments cover key stakeholders including own operations from tier-1suppliers, non-tier1 suppliers and business partners.

GPSC Group will perform its operations with efforts to manage biodiversity values and apply operating practices by setting commitment to prohibit operations where have impacts on species classified as critically endangered, endangered, or vulnerable on the IUCN Red List, endemic species, internationally recognized areas (UNESCO World Heritage sites, Ramsar Wetlands, UNESCO MAB and biosphere reserve areas), important biodiversity areas including Conservation of Nature Category or IUCN Category I-IV zones and any adjacent areas to critical biodiversity areas

Mitigation Hierarchy Principles

GPSC Group applies Mitigation Hierarchy Principles to all GPSC Group's operation sites

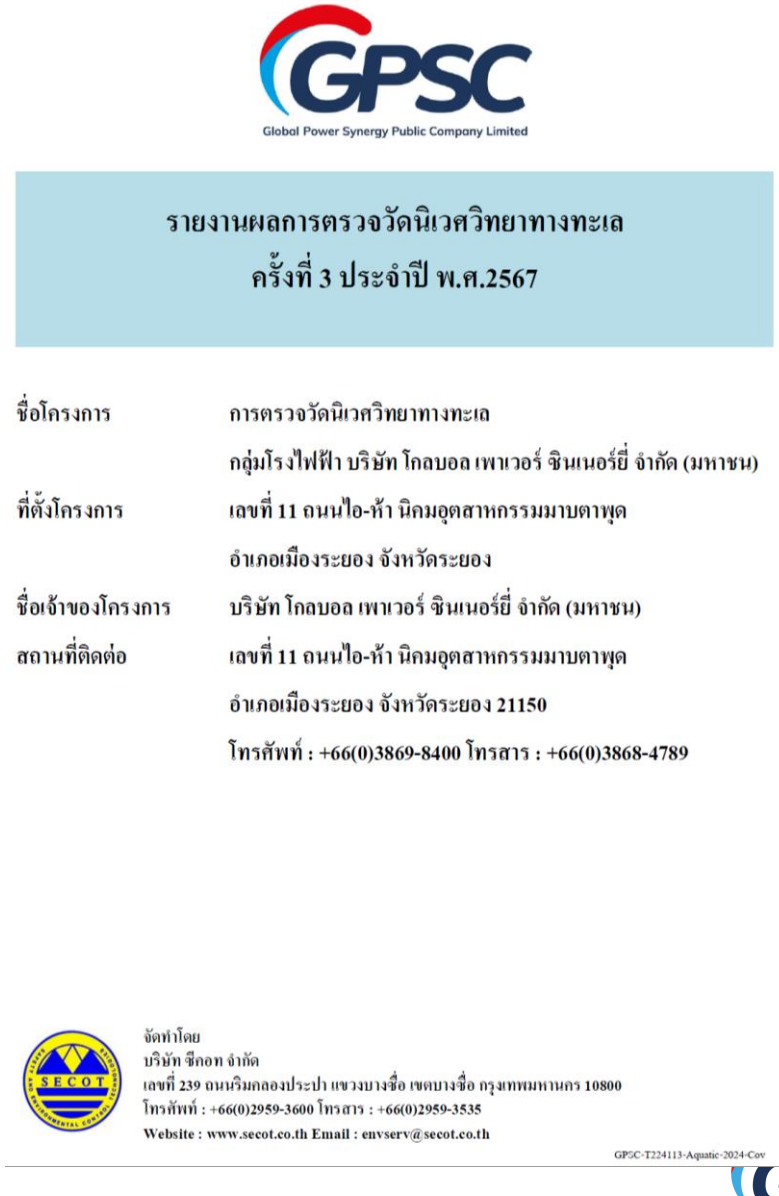


Marine Ecology and Biodiversity Monitoring Results 2024

Marine Ecology and Biodiversity Monitoring Results 2024

GPSC annually conducts marine environmental monitoring project to assess the quality of marine environmental conditions. The monitoring approach is divided into 2 indicator groups including:

1. **Heavy metal contamination** in sediments (habitat) and aquatic tissues
   - The indicator indicates ecosystem disruption, human health risks through the food chain, and long-term persistence of toxic in the environment.
2. **Species richness and density**
   - The indicators indicate biodiversity loss, environmental degradation, ecological disturbance and habitat quality.
     i. Phytoplankton
     ii. Zooplankton
     iii. Benthos
     iv. Eggs and larvae
     v. Marine organisms



GPSC
Global Power Synergy Public Company Limited

รายงานผลการตรวจวัดนิเวศวิทยาทางทะเล
ครั้งที่ 3 ประจำปี พ.ศ.2567

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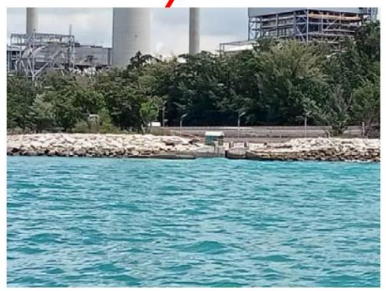
Marine Ecology and Biodiversity Monitoring Results 2024

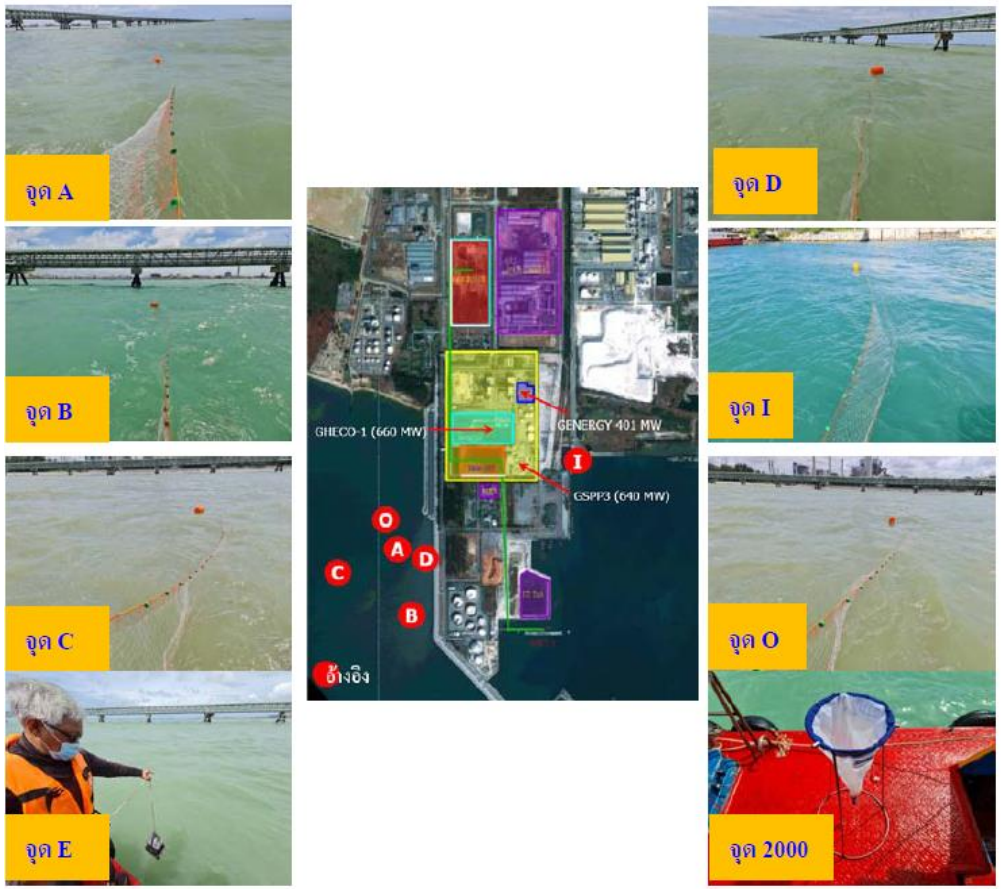
Examination point for contamination of heavy metals in soil and animal tissues



wastewater disposal point

Seawater withdrawal point

Examination point for species richness and density



Marine Ecology and Biodiversity Monitoring Results 2024

GPSC's definition of biodiversity-related targets for priority areas to work towards no net loss is set at the coastal area in Rayong province. This area is identified as a priority area based on its high materiality, both environmental and financial, and risk assessment data regarding dependencies and impacts, as follows:

- GPSC's major operational sites are located.
- Potential for the company's overall biodiversity-related risk exposure.

(Please see more information on the GPSC's biodiversity risk assessment at the GPSC Biodiversity Risk Assessment Report 2024)

This includes the target to maintain biodiversity and ecosystems at the standard levels and higher than baseline levels. The measures should be implemented to ensure No-Net-Loss within the areas. The following indicators link to the company's biodiversity commitment and strategy, and impact-related biodiversity risks mitigation for priority areas are as follows:

Indicator	Performance 2024
Heavy metal contamination in sediments (habitat) and aquatic tissues	The contamination level of heavy metals in sediments (habitat) and aquatic tissues was under the standard required by law and in the range of normal levels. The results indicate that the GPSC's wastewater management system performance is still at a high level.
Phytoplankton	The significant changes in species richness and density compared with the baseline were not found. The dominant species are the common species in the ecosystem. The results indicate that there were no impacts on the diversity from GPSC operations. However, the density and number of species of benthos found at each station were relatively low and similar across almost all stations. The reasons might be changes in marine conditions, natural seawater quality, and the adaptation of benthos to these changes.
Zooplankton	
Benthos	
Eggs and larvae	The significant changes in species richness and density compared with baseline were not found. The results indicate that there were no impacts on the diversity from GPSC operations.
Marine organisms	The significant changes in species richness and density compared with the baseline were not found. In addition, there were three dominant species of marine animals in the area that are the common species found in the general marine ecosystem. The results indicate that there were no impacts on the diversity from GPSC operations.

Marine Ecology and Biodiversity Monitoring Results 2024

Based on the species richness and biodiversity density with previous assessments as the baseline data, the current findings indicate that there is **no net loss** of biodiversity. In addition, comparing the assessment results with the relevant standard, it shows that overall, the habitat is considered to be in a normal condition, providing suitable conditions for the survival of marine organisms except benthos, due to the site conditions, including changes in marine conditions, natural seawater quality, and the adaptation of benthos to these changes.

However, the annual monitoring results show the effective implementation of conservation and enhancement measures, leading to the achievement of the targets toward no net loss. These targets are oriented towards fostering a **net positive impact on biodiversity** onwards.

Examples of marine species found in the sampling area

Biodiversity Exposure & Assessment

Terms on Biodiversity Critical Areas Used to Assess GPSC's Operational Site

Biodiversity Area	Description	Reference
Alliance for Zero Extinction (AZE)	Alliance for Zero Extinction (AZE) sites contain the entire population of one or more species listed as **Endangered or Critically Endangered** on the **IUCN Red List** of Threatened Species. The Alliance itself is formed of 93 biodiversity conservation institutions from 37 countries, and its goal is to prevent the extinction of species. Following identification, the Alliance aims to act together to eliminate threats and restore habitat at these sites to allow species populations to rebound. The focus of AZEs is on species that face extinction either because their last remaining habitat is being degraded at a local level, or because their restricted global range makes them especially vulnerable to external threats.	Source
Reserved Forest	Ministry of Natural Resources and Environment is the primary state agency being responsible for forest conservation of the country. Its main objectives are to manage the forest resources for sustainable benefits to people and communities and to maintain the balance of ecosystem and environment. Its mandates thus include establishment of protected areas for forest conservation, reforestation and rehabilitation of degraded forests, conducting research and development on forestry and related subjects, and promoting people's participation in forest conservation in harmony with the lifestyle of local communities.	Source
World Heritage UNESCO sites	A World Heritage Site is a landmark or area with legal protection by an international convention administered by the United Nations Educational, Scientific and Cultural Organization (UNESCO). **World Heritage Sites** are designated by UNESCO for having cultural, historical, scientific or other form of significance. The sites are judged to contain "cultural and natural heritage around the world considered to be of outstanding value to humanity". A World Heritage Site may signify a remarkable accomplishment of humanity, and serve as evidence of our intellectual history on the planet, or it might be a place of great natural beauty. As of June 2020, a total of 1,121 World Heritage Sites (869 cultural, 213 natural, and 39 mixed properties) exist across 167 countries. With 55 selected areas each, China and Italy are the countries with the most sites on the list	Source
National Forest Area	National forest area is a usually forested area of considerable extent that is preserved by government decree from private exploitation and is harvested only under supervision specified by Royal Thai Forest Department.	Source

Results: GPSC Own Operations

No.	Power Plant/Area	Type	Location	Exposure to Biodiversity Critical Areas				Biodiversity impact
				AZE	World Heritage Sites	National Forest	Reserved Forest	
-	GPSC Head Office *(Non-operational activities)*	Own Operations	Bangkok	No	No	No	No	No
-	Glow Head Office *(Non-operational activities)*	Own Operations	Bangkok	No	No	No	No	No
1	GPSC Warehouse	Own Operations	Rayong	No	No	No	No	No
2	GPSC CUP 1	Own Operations	Rayong	No	No	No	No	No
3	GPSC CUP 2	Own Operations	Rayong	No	No	No	No	No
4	GPSC CUP 3	Own Operations	Rayong	No	No	No	No	No
5	GPSC CUP 4	Own Operations	Rayong	No	No	No	No	No
6	Glow Energy Phase 1	Own Operations	Rayong	No	No	No	No	No
7	Glow Energy Phase 2	Own Operations	Rayong	No	No	No	No	No
8	Glow Energy Phase 4	Own Operations	Rayong	No	No	No	No	No
9	Glow Energy Phase 5	Own Operations	Rayong	No	No	No	No	No
10	Glow SPP 2	Own Operations	Rayong	No	No	No	No	No
11	Glow SPP 3 (Phase 3)	Own Operations	Rayong	No	No	No	No	No
12	Glow SPP 2 Replacement	Own Operations	Rayong	No	No	No	No	No
13	Glow Energy CFB 3	Own Operations	Rayong	No	No	No	No	No
14	Glow SPP 11 Project 1	Own Operations	Rayong	No	No	No	No	No
15	Glow SPP 11 Project 2	Own Operations	Rayong	No	No	No	No	No
16	Glow SPP 11 Project 3	Own Operations	Rayong	No	No	No	No	No
17	GHECO-One Power Plant	Own Operations	Rayong	No	No	No	No	No
18	Glow Energy Solar plant	Own Operations	Rayong	No	No	No	No	No
19	Refuse Derived Fuel (RDF) Power Plant – GPSC & Glow	Own Operations	Rayong	No	No	No	No	No
20	GPSC Sriracha (Sriracha Power Plant (SRC))	Own Operations	Chonburi	No	No	No	No	No
21	Glow IPP (GIPP)	Own Operations	Chonburi	No	No	No	No	No
22	Combined Heat and Power Producing Company Limited (CHPP)	Own Operations	Bangkok	No	No	No	No	No
23	Solar Private PPA – GPSC & Glow	Own Operations	Rayong	No	No	No	No	No

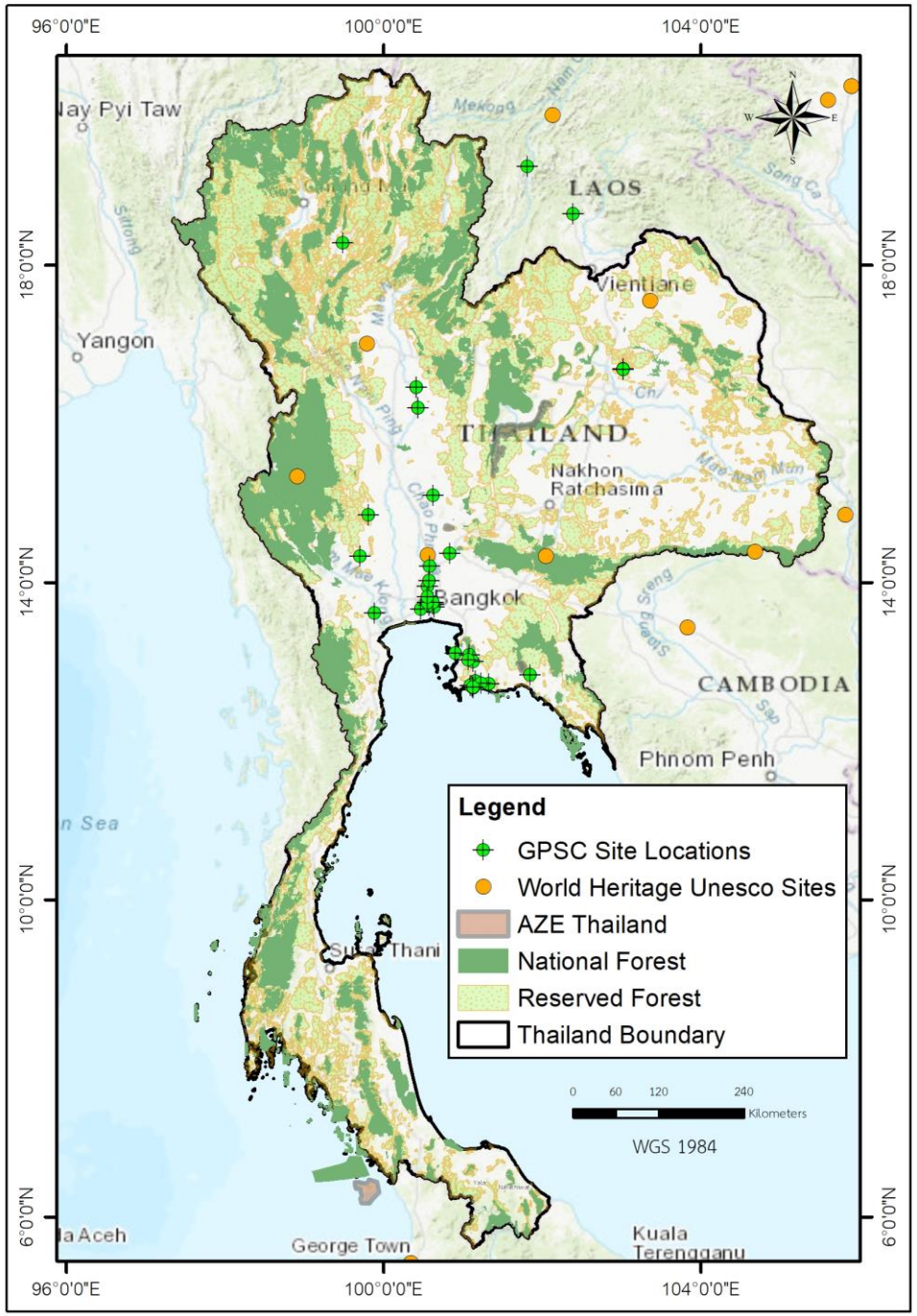
Results: GPSC Subsidiaries, and Joint Ventures

Power Plant/Area	Type	Location	Exposure to Biodiversity Critical Areas				Biodiversity impact
			AZE	World Heritage Sites	National Forest	Reserved Forest	
RPCL	Long-term Investment	Rachaburi	No	No	No	No	No
(Bangpa-in Industrial Estate) BIC (CO gen project 1,2)	Associates	Ayuthaya	No	No	No	No	No
IRCCP	Subsidiaries	Rayong	No	No	No	No	No
NPS 1	Subsidiaries	Pichit	No	No	No	No	No
NPS 2	Subsidiaries	Suphanburi	No	No	No	No	No
NPS 3	Subsidiaries	Lopburi	No	No	No	No	No
WXA 1	Subsidiaries	Pichit	No	No	No	No	No
WXA 2	Subsidiaries	Pichit	No	No	No	No	No
WXA 3	Subsidiaries	Pichit	No	No	No	No	No
PPS1	Subsidiaries	Khon kaen	No	No	No	No	No
PPS2	Subsidiaries	Khon kaen	No	No	No	No	No
PPS3	Subsidiaries	Khon kaen	No	No	No	No	No
Glow AIE	Subsidiaries	Rayong	No	No	No	No	No
TSR	Joint-Venture	Kanchanaburi	No	No	No	No	No
HHPC	Subsidiaries	Laos	No	No	No	No	No
NL1PC	Joint Venture	Laos	No	No	No	No	No
XPCL	Subsidiaries	Laos	No	No	No	No	No

Results: Critical Tier-1 Suppliers, Critical Non-Tier 1 Supplier

Suppliers	Supplier Type	Category	Exposure to Biodiversity Critical Areas				Biodiversity impact
			AZE	World Heritage Sites	National Forest	Reserved Forest	
Ansaldo Energia S.P.A.	Critical Tier-1 Supplier	Mechanical material	No	No	No	No	No
Laborelec	Critical Tier-1 Supplier	Mechanical material	No	No	No	No	No
Sahakol Trading Co., Ltd.	Critical Tier-1 Supplier	Mechanical material	No	No	No	No	No
Therec Kinematics Co.,Ltd.	Critical Tier-1 Supplier	Mechanical material	No	No	No	No	No
Benetech, Inc.	Critical Tier-1 Supplier	Mechanical material	No	No	No	No	No
De Nora Water Technologies LLC (Singapore Branch)	Critical Tier-1 Supplier	Mechanical material	No	No	No	No	No
Future Development & Construction Co., Ltd	Critical Tier-1 Supplier	Construction	No	No	No	No	No
Thai Takasago Co., Ltd	Critical Tier-1 Supplier	Construction	No	No	No	No	No
Demco Public Company Limited	Critical Tier-1 Supplier	Construction	No	No	No	No	No
Siemens Thailand Co., Ltd	Critical Tier-1 Supplier	Construction	No	No	No	No	No
The Nine Engineering And Construction Company Limited	Critical Tier-1 Supplier	Construction	No	No	No	No	No
M C S Automation Technology Co., Ltd.	Critical Tier-1 Supplier	Construction	No	No	No	No	No
PTT Public Company Limited	Critical Tier-1 Supplier	Raw materials	No	No	No	No	No
PT Kaltim Prima Coal	Critical Tier-1 Supplier	Raw materials	No	No	No	No	No
Avra Commodities Pte Ltd	Critical Tier-1 Supplier	Raw materials	No	No	No	No	No
Banpu Public Company Limited	Critical Tier-1 Supplier	Raw materials	No	No	No	No	No
Tiger Realm Coal	Critical Tier-1 Supplier	Raw materials	No	No	No	No	No
PTT Exploration and Production Co., Ltd.	Critical non-tier 1 Supplier	Raw materials	No	No	No	No	No

Note: GPSC Group initially started biodiversity assessment across critical tier 1 and critical non-tier 1 suppliers in 2020.



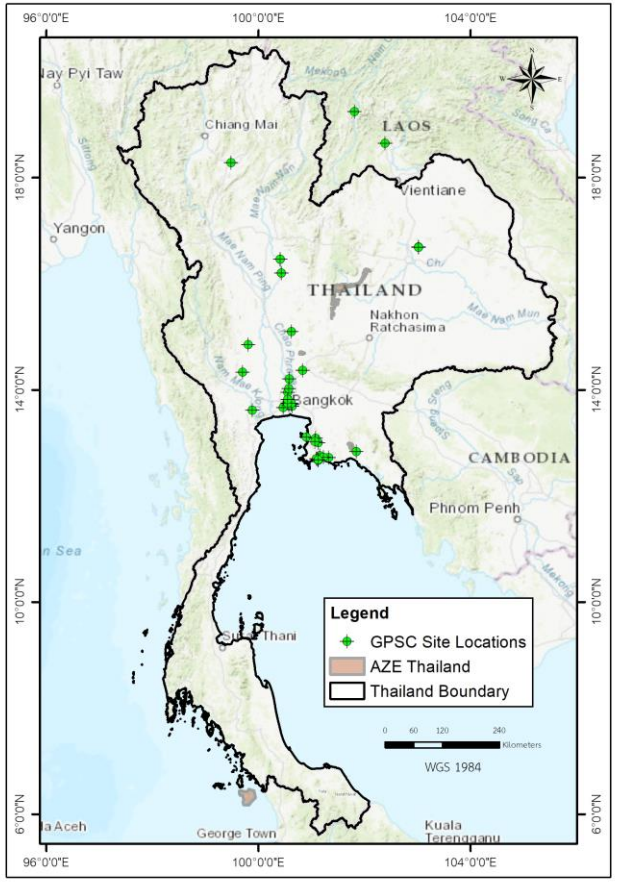
Biodiversity Assessment

GPSC Group have done biodiversity assessment by using Geographic Information System (GIS) to identify and map all GPSC operation sites and biodiversity critical areas including:

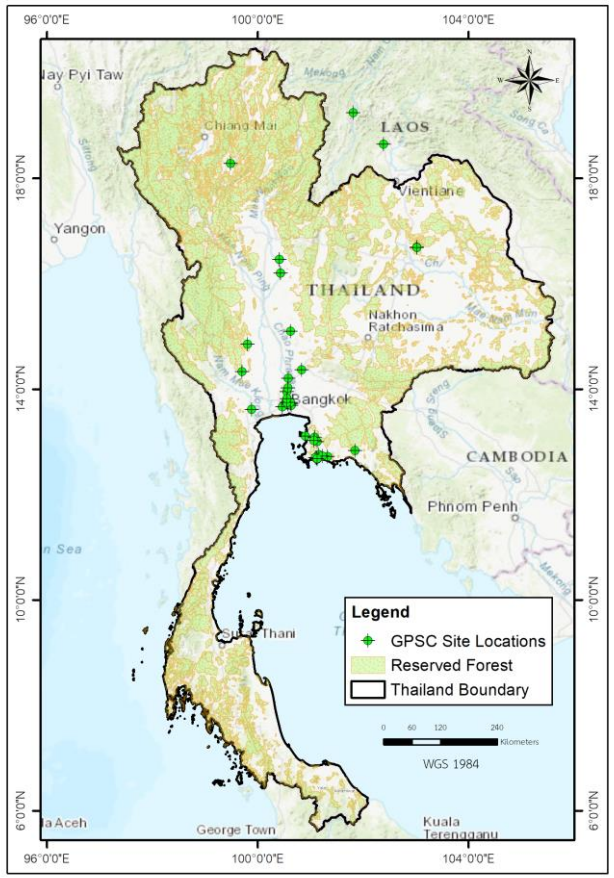
- Alliance for Zero Extinction (AZE)
- World Heritage UNESCO sites
- National Forest
- Reserved Forest areas

The results showed that **all operational sites are not located in biodiversity critical areas.** In addition, GPSC group have also initially conducted biodiversity assessment for critical tier-1 and non-tier 1 suppliers and found that none of them is located in biodiversity critical areas.

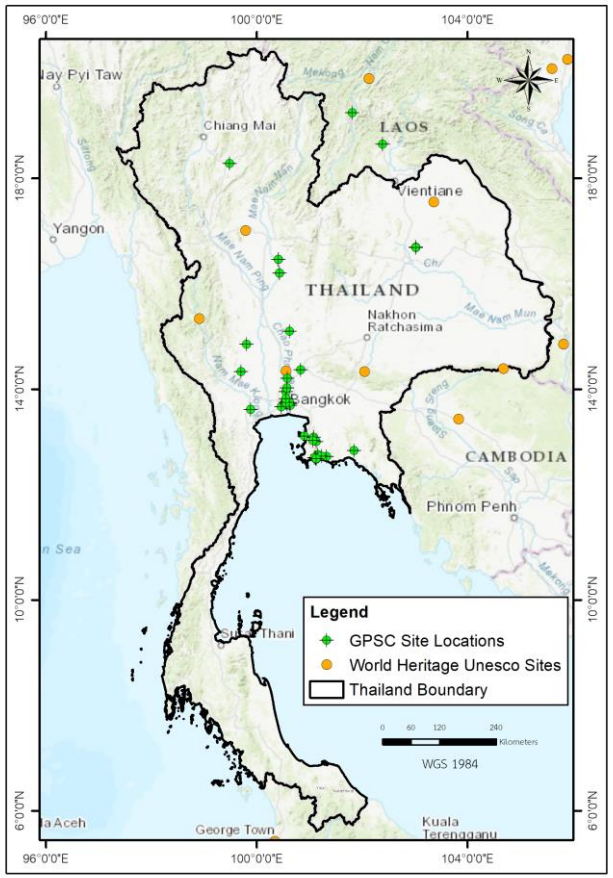
Biodiversity Assessment on the Four Biodiversity Critical Areas



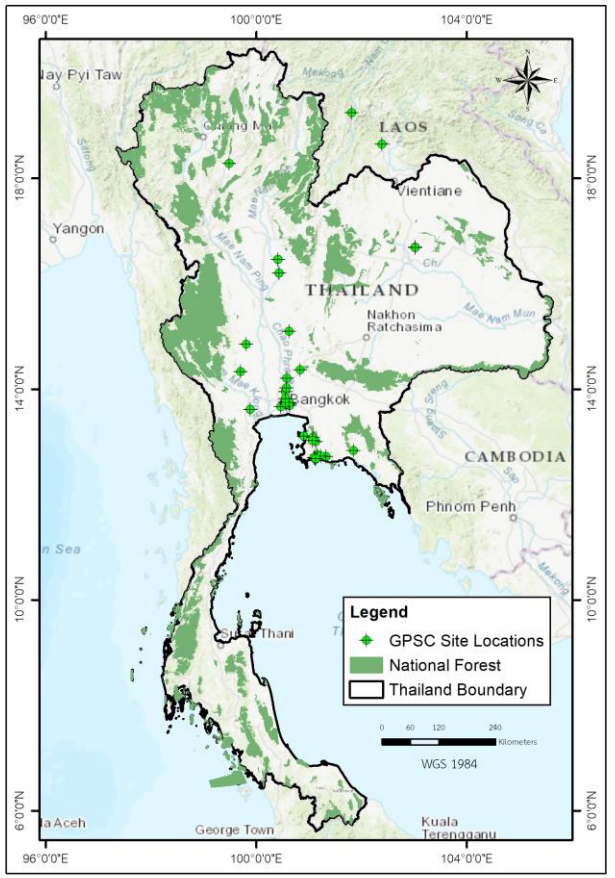
Alliance for Zero Extinction (AZE)



Reserved Forest



World Heritage UNESCO sites



National Forest Area

The results showed that all operational sites are not located in biodiversity critical areas in the four-category assessed.

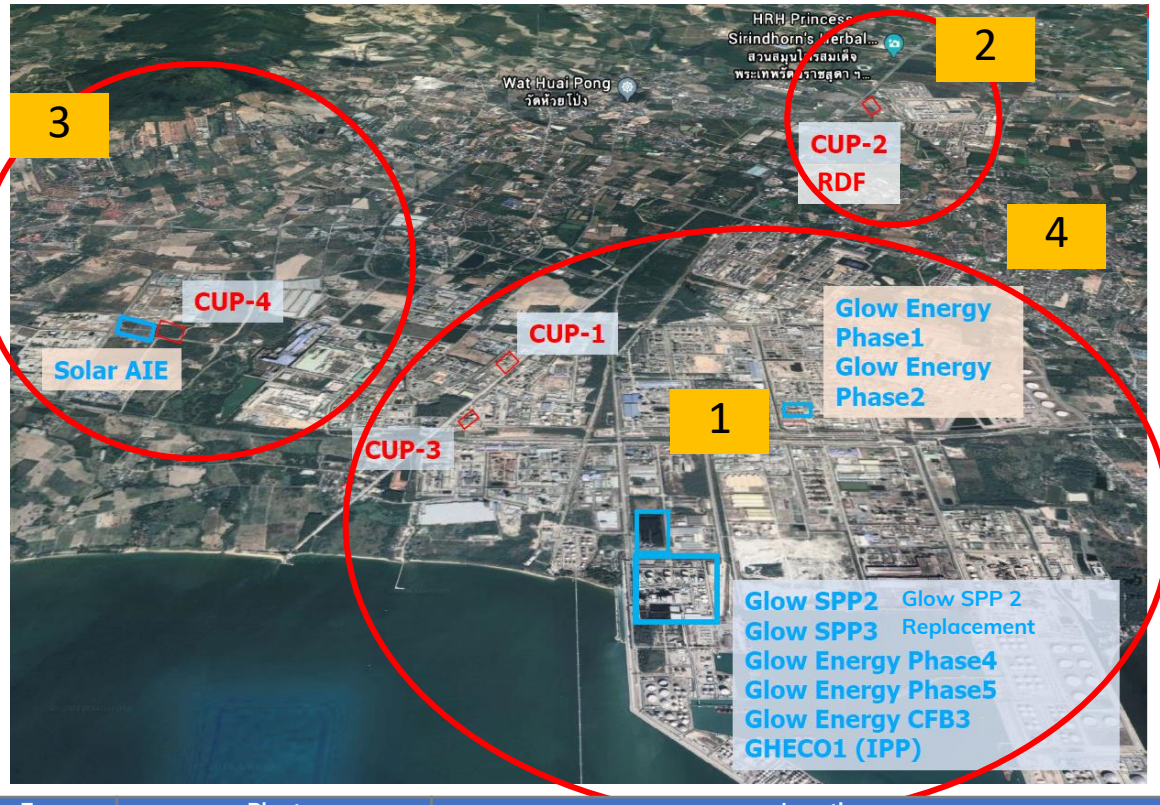
Biodiversity Assessment (EIA)

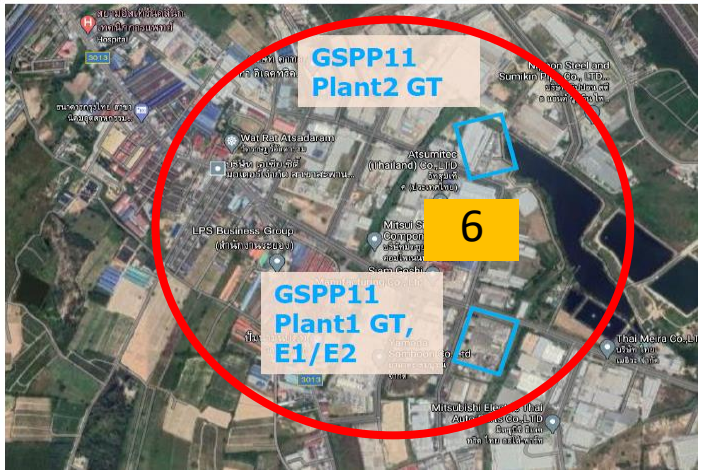
All GPSC Group's operations (100%) undergo Environmental Impact Assessment (EIA) or similar activities including Environmental and Health Impact Assessment: EHIA, and Initial Environmental Examination (IEE) as required by law prior to construction and execution of the operations to identify potential impacts to the environment including biodiversity. Accordingly, GPSC Group defines appropriate mitigation and management plan to minimize environmental impacts on biodiversity rights.

GPSC Group's operational Sites (22 plants) were arranged into 6 main operation zones (next page) based on EIA assessment boundary (within 3 km radius). The level biodiversity assessment was based on location of the site regarding to biodiversity conserved areas.

The monitoring, prevention and mitigation measures of the environmental and community impact assessment are monitored through EIA monitoring report for every 6 months.

GPSC Group Operations





Zone	Plant	Location
1	• GPSC CUP-1 • GPSC CUP-3 • Glow Energy Phase 1 • Glow Energy Phase 2 • Glow Energy Phase 4 • Glow Energy Phase 5 • Glow SPP2 • Glow SPP 2 Replacement • Glow Energy CFB • Glow SPP3 • GHECO-One	Map Ta Phut, Mueang Rayong District, Rayong Note: CUP-1 is located at Huai Pong, Mueang Rayong District, Rayong
2	• GPSC CUP 2 • Refuse Derived Fuel (RDF) Power Plant	Mueang Rayong District, Rayong
3	• GPSC CUP 4 • Glow Solar AIE	Asia industrial area Ban Chang District, Rayong

Zone	Plant	Address
4	• GPSC Sriracha	Thung Sukhla, Si Racha District, Chon Buri
5	• Glow IPP	Si Racha District, Chon Buri
6	• Glow SPP 11 plant 1 • Glow SPP 11 plant 3 • Glow SPP 11 Plant 3 expansion • Glow SPP 11 plant 2	Pluackdang District, Rayong

Biodiversity Assessment Summary

Plant	Biodiversity Assessment	Biodiversity Exposure (proximity to critical biodiversity)	Biodiversity Management Plan
Zone 1			
GPSC CUP-1 GPSC CUP-3 Glow Energy Phase 1 Glow Energy Phase 2 Glow Energy Phase 4 Glow Energy Phase 5 Glow SPP2 Glow SPP 2 Replacement Glow Energy CFB Glow SPP3 GHECO-One	The biodiversity was assessed as part of EIA assessment which was conducted on the following species: • Wild Animals such as birds, mammals, reptiles and amphibians • Aquatic species such as phytoplankton, Zooplankton, Marine Benthic animal • Egg and larvae • Coral reef The results showed that the operations of the site might cause potential impacts to biodiversity as follows: • Impact on loss of plankton, egg and larvae • Low impact on egg and larvae • Low impact on aquatic species • No impact on fresh water aquatics	The sites are not located in the proximity to critical biodiversity area.	GPSC Group placed biodiversity management plan as follows: **Coastal area** • Install a traveling screen • Control velocity of the seawater in front if the intake tunnel • Seawater intake must be at least 2 meter deep • Coordinate with local communities and related academic institutes to setup a proper procedure/plan to supplement economic marine species • Follow up the changes in number of early-stage marine animals • Revisit biodiversity plan for every 2-3 years **Terrestrial area** • Follow through EIA surface water management plan (i.e. pH = 7 and pass wastewater quality standard)

Biodiversity Assessment Summary

Plant	Biodiversity Assessment	Biodiversity Exposure (proximity to critical biodiversity)	Biodiversity Management Plan
Zone 2			
GPSC CUP 2 Refuse Derived Fuel (RDF) Power Plant	N/A. Based on EIA assessment, the plant is located in an industrial estate area which is expectedly caused no impact on land and aquatic species.	The sites are not located in the proximity to critical biodiversity area	GPSC Group placed a management plan to prevent impacts to biodiversity as follows: • Monthly monitoring wastewater quality • Waste/contaminated water must undergo wastewater treatment procedure
Zone 3			
GPSC CUP 4 Glow Solar AIE	N/A. Based on EIA assessment, the plant is located in an industrial estate area which is expectedly caused no impact on land and aquatic species.	The sites are not located in the proximity to critical biodiversity area	GPSC Group placed management plan to prevent impacts to biodiversity as follows: • Follow & implement wastewater quality standard as prescribed in EIA
Zone 4			
GPSC Sriracha	N/A.	The sites are not located in the proximity to critical biodiversity area	GPSC Group placed management plan to prevent impacts to biodiversity as follows: • Follow & implement wastewater quality standard as prescribed in EIA

Biodiversity Assessment Summary

Plant	Biodiversity Assessment	Biodiversity Exposure (proximity to critical biodiversity)	Biodiversity Management Plan
Zone 5			
Glow IPP	The biodiversity was assessed as part of EIA assessment which was conducted on the following species: • Phytoplankton • Benthic animals The results showed that the operations of the site cause Low impacts on plankton, benthic animals and fish from wastewater discharge.	The sites are not located in the proximity to critical biodiversity area	GPSC Group placed biodiversity management plan as follows: • Follow through EIA surface water management plan (i.e. pH = 7 and pass wastewater quality standard) • Monthly monitoring waste water • Monitor/evaluate biodiversity results through EIA monitoring plan for twice a year (every 6 months)
Zone 6			
Glow SPP 11 plant 1 & 3 including expansion Glow SPP 11 plant 2	N/A. Based on EIA assessment, the plant is located in an industrial estate area which is expectedly caused no impact on land and aquatic species	The sites are not located in the proximity to critical biodiversity area	GPSC Group placed biodiversity management plan as follows: • Follow & implement wastewater quality standard as prescribed in EIA • Install automatic water temperature controller for discharge water

Biodiversity Assessment Summary

For the biodiversity study of forest and wildlife resources, all GPSC projects have verified that plant and animal species comply with related laws of the particular countries in which the projects are located, such as the Wildlife Preservation and Protection Act, B.E. 2535 and the Prohibited Timber Decree, B.E. 2530 for Thailand, as well as international regulations such as the International Union for Conservation of Nature and Natural Resources (IUCN).

Even though most of our projects are operated within industrial areas, which are expected to yield minimal impact on the ecosystem, GPSC Group cares and has consistently been applying measures to prevent and minimize potential environmental impacts on every single project.

For international projects, the company has conducted biodiversity studies of surrounding areas and formulated action plans and environmental management and monitoring plans (EMMP).

The results of these studies have shown no negative impact on biodiversity. In the effort to preserve biodiversity, the company will continue to execute our high standard measures.

Biodiversity Rehabilitation Initiatives by Collaboration with External Partners

TYPE OF RESTORATIVE ACTIVITIES	NETWORK PARTNERS AND RELATED EXPERTS	ACTIVITIES	PERFORMANCE
 Terrestrial biodiversity	• Royal Forest Department • Provincial Office of Natural Resources and Environment Rayong • Maptaphut Town Municipality • Ban Chang Subdistrict Municipal • Phala Subdistrict Municipal • Ban Khao Phudon Huai Mahad Community Forest • Huai Mahat Forest Restoration Project • Schools in Muang District and Ban Chang District • Thailand Greenhouse Gas Management Organization (Public Organization) • Ban Map Chan Community Forest • Baan Siri Anusorn Community Forest • Kasetsart University • Air and Coastal Defense Command	Forestation • Huai Mahat Forest Restoration Project • Phala Canal Mangrove Reforestation Project • Khao Huai Mahad Reforestation Project • Khao Chom Hae Reforestation Project • Ban Mabchan Community Reforestation Project • Baan Siri Anusorn Community Forest Check Dam Project • Ban Phudon - Huai Mahad Check Dams Construction Project and planting additional trees • Ban Noen Kraprok Bon Community Forest Check Dam Construction Project	• Reforestation project (2013 - Current) total 20,650 trees, The planting area of the forest 1044 Rai, with 71 species of plant • Check Dam Construction Project (2015 - Current) total 142 dams

Ref: https://www.gpscgroup.com/en/sustainability/environmental/biodiversity
(section Restoration of the natural environment through partnership networks with communities and stakeholders)

Biodiversity Rehabilitation Initiatives by Collaboration with External Partners

Marine Biodiversity

TYPE OF RESTORATIVE ACTIVITIES	NETWORK PARTNERS AND RELATED EXPERTS	ACTIVITIES	PERFORMANCE
 Marine biodiversity	• Department of Marine and Coastal Resources • Department of Fisheries • Marine Department • First Naval Area Command • Industrial Estate Authority of Thailand (IEAT) • Community Enterprise, Local Small Boat Fishing Club, Muang and Ban Chang District • Nongfab Small Boat Fishing Group • Suchada Beach Small Boat Fishing Group • Ban Ta Kuan Folk Fisheries Group • Industrial factory in Map Ta Phut Complex • Marine and Coastal Resources Research and Development Center, The Eastern Gulf of Thailand • Eastern Gulf Fisheries Research and Development Center (Rayong)	• Aquatic animal release project in the coastal area near the operating area • Aquatic Animals Breeding Project • Project to build habitat for sea animals (artificial coral) • Fish habitat placement Project with Nongfab Small Boat Fishing Group and Ban Ta Kuan Folk Fisheries Group • Crab Cage Project in the middle of the sea • Seagrass Restoration Project	• Aquatic animal release project (2015 - Current) total 41,030,951 released • Aquatic Animals Breeding Project (2009 - Current) Conservation of blue crabs by hatching eggs of blue crabs without shell. Total 8,769 • Project to build habitat for sea animals (artificial coral) • Deploy 100 lumps of Concrete Dice Artificial Coral near coastal area Ban Chang district, Rayong province (2015 - 2016) • Deploy rope type and coconut leaf type Fish habitat 109 ea (2010, 2012, 2017) • Reproduction of staghorn coral Koh Kham area (year 2018) • 1 Crab cage deploy in the middle of the sea 2021 • Seagrass Restoration Project in 6 Rai with 3 species • Year 2008-2014 no data collection but has released not less than one million aquatic species per year

Ref: https://www.gpscgroup.com/en/sustainability/environmental/biodiversity
(section Restoration of the natural environment through partnership networks with communities and stakeholders)

Biodiversity Rehabilitation Initiatives by Collaboration with External Partners

Freshwater Biodiversity

TYPE OF RESTORATIVE ACTIVITIES	NETWORK PARTNERS AND RELATED EXPERTS	ACTIVITIES	PERFORMANCE
 Fresh water biodiversity	• Pluak Daeng Subdistrict Administrative Organization • Rayong Inland Fisheries Research and Development Center • Nong Pla Lai Reservoir Ecotourism Group	• Nong Pla Lai and Dok Krai Reservoir fish release project	• Nong Pla Lai and Dok Krai Reservoir fish release project (2013 - Current) total 200,000 with more than 10 fresh water species

Ref: https://www.gpscgroup.com/en/sustainability/environmental/biodiversity
(section Restoration of the natural environment through partnership networks with communities and stakeholders)

Biodiversity Management Plan:

From the results of GPSC Group's environmental impact assessment, we have only two operation site where are potential minor impacts to biodiversity in the nearby operations, GHECO-One and SPP3. GPSC Group has already developed the biodiversity management plan for avoiding, minimizing, offsetting and restoring the impacts based on the EIA results and mitigation hierarchy principle. In addition, GPSC Group also seriously aware of how important of biodiversity to ecosystem. That drives GPSC Group to develop biodiversity management plan for all the operation sites in case of the unexpected situations.

GPSC Group have studied and made operation plans in the field of marine biological resources to carry out projects appropriately and more effectively by coordinating with communities and academic agencies involved in supporting aquatic species to annually releases such as the Blue Crab / Khai Squid Bank project, the aquatic animal breeding project and artificial coral project. There was sustainability assessment of all the action plans to recommend the further study about which kind of aquatic animal will be released into the sea. To increase survival rate of animal released based on the recommendation from the external experts, GPSC Group has a plan to study more about relation between kinds of released animal and releasing sites to avoid being food for the native predators at the releasing sites. In addition, the company will conduct the survey to community fishermen to make up amounts and species of captured aquatic animal baseline for comparing natural resources trend periodically.

Biodiversity Mitigating Action

Biodiversity Mitigating Action

GPSC has implemented a comprehensive approach to biodiversity mitigating action, guided by the mitigation hierarchy. There are 5 mitigating actions to minimize negative impacts on biodiversity and contribute to No Net Loss as follows:

Taking actions to address the fundamental drivers of nature loss, rejecting the dominant beliefs and value systems. This can involve forming new partnerships, investing in landscapes and seascapes, and advocating for higher policy ambitions for nature and climate change. GPSC implements the following measures as a transformation action:

- Partnerships across supply chains and sectors
- Investment in the landscapes and seascapes
- Supporting the government to raise the policy ambition for nature and climate change

Taking steps to prevent environmental impacts by avoiding activities, which could negatively affect nature, include spatial actions (not implementing activities in certain areas), technological actions (using alternative project designs or technologies to minimize impacts), and temporal actions (avoiding activities during specific seasons or time periods). GPSC implements the following measures as an avoidance action:

- No more coal investment strategy
- EIA approval

Minimizing or reducing the impact or dependency on nature through various measures could include changes in production processes, product design, product stewardship, business models, and engagement with suppliers. GPSC implements the following measures as a reduction action:

- Product stewardship
- Sourcing/supplier engagement
- Waste-to-energy (waste collection)

Restoring areas to their original ecosystems or rehabilitate them to restore basic ecological functions and services. This may involve species recovery or ecological restoration of specific sites. GPSC implements the following measures as a restoration action:

- Reforestation
- Seagrass restoration

The company undertakes activities to increase ecological productivity in relation to nature's contribution to people. This includes practices like agriculture, aquaculture, and agroforestry that are compatible with ecosystems currently used by humans. GPSC implements the following measures as a regeneration action:

- Check dam construction
- Aquatic animal releasing

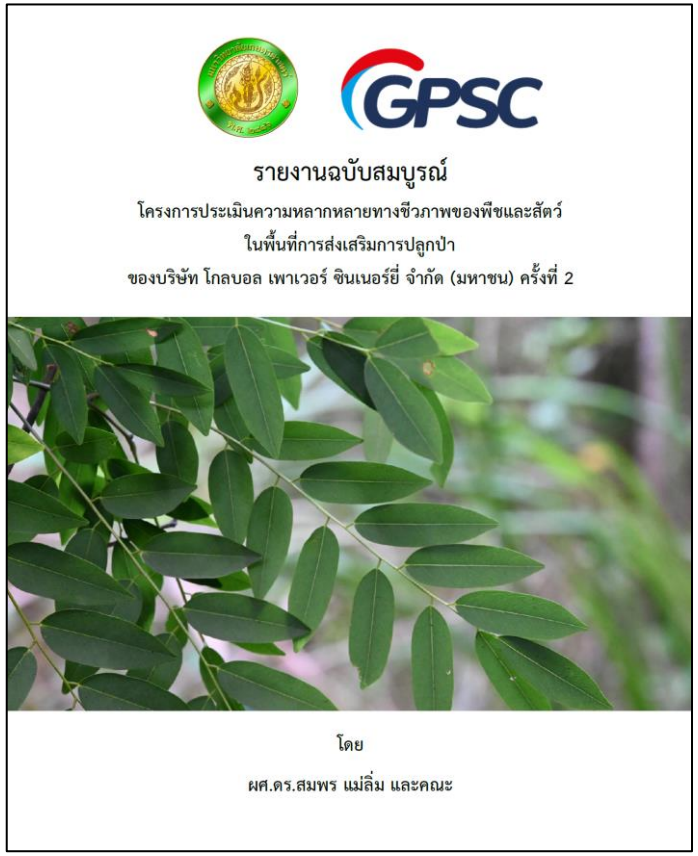
Avoidance measures (1/2)

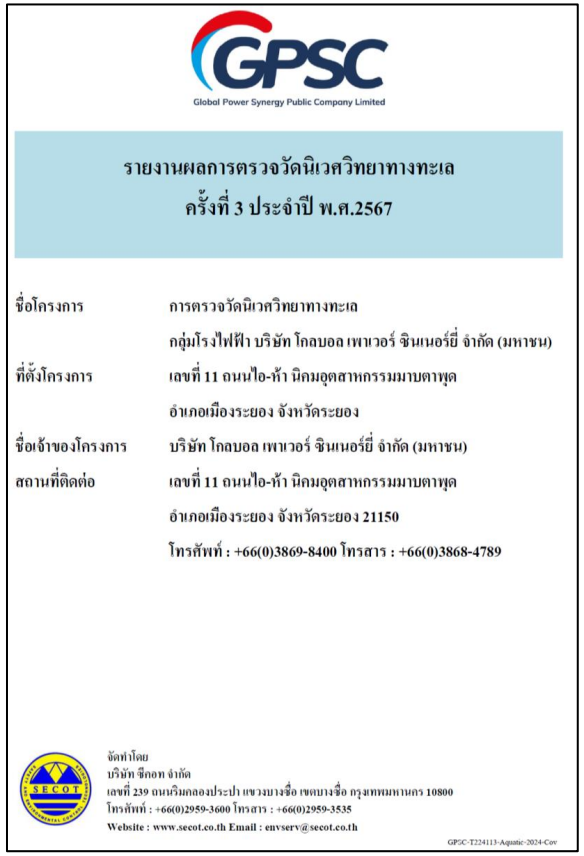
EIA REPORTS

GPSC implements the following measures as an avoidance action:
Avoidance action refers to actions taken to prevent environmental impacts either based on dependencies, impacts, or both.

- **Environmental impact assessment (EIA) approval**
  - GPSC Group conducts EIA for all facilities (100%) before starting construction and operations to identify potential impacts on biodiversity including mitigation plan for a potential risk. If a project is found to significantly impact biodiversity, such as operation in high valuable biodiversity area, it will be withdrawn.
- **Phase down & no future coal power plant investment**
  - The phase down and elimination of coal power plants aligned with GPSC's key action of reducing fossil fuel usage contribute to the preservation of biodiversity. By transitioning to cleaner energy sources and moving towards a net zero emission target, GPSC aims to mitigate the negative impacts of fossil fuel consumption on both climate change and biodiversity in term of reduction of air and water pollution, habitat destruction, and the release of greenhouse gas emissions. These efforts collectively support the company's commitment to sustainable practices and a greener future.

Avoidance measures (2/2)





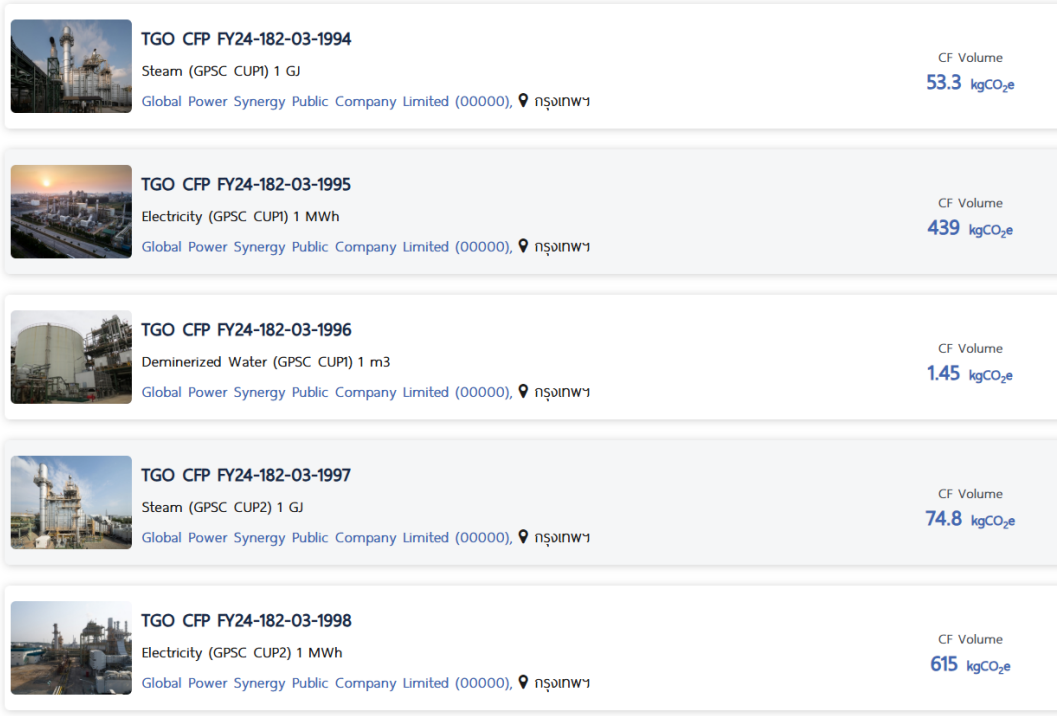
In addition to EIA reports, GPSC conducted marine and terrestrial biodiversity assessment near the Rayong area with experts, including Environmental Consultant (SECOT CO., LTD.) and Faculty of Forestry, Kasetsart University, respectively. The marine biodiversity assessment was conducted for measuring marine biodiversity with the indicators including heavy metal contamination in sediments and aquatic tissues, and species richness and density of phytoplankton, zooplankton, benthos, eggs and larvae, and marine animals. The terrestrial (plant, wildlife) biodiversity assessment was conducted to assess the species richness and density, including plants and wildlife from the project performances. Moreover, the terrestrial biodiversity assessment results were integrated with other data to prepare a geo database in the form of a Geological Information System (GIS) for monitoring natural resources periodically. Besides, the assessment can potentially build awareness of GPSC in operating the business and avoiding the significant impact on biodiversity.

Reduction measures (1/7)

GPSC implements the following measures as a reduction action:

Reduction action refers to actions taken to minimize or reduce their impact or dependency on nature.

- **Product stewardship**
  - GPSC demonstrates the sustainable product stewardship through the implementation of the Thailand Greenhouse Gas Management Organization (TGO) carbon label, which ensures that the company's products adhere to strict carbon emission standards. By obtaining the label, GPSC ensures that its products have undergone rigorous assessment and meet the criteria for carbon emissions reduction and demonstrates that GPSC's dedication to provide customers the environmentally responsible products.



Example of product stewardship measure (TGO Carbon label)

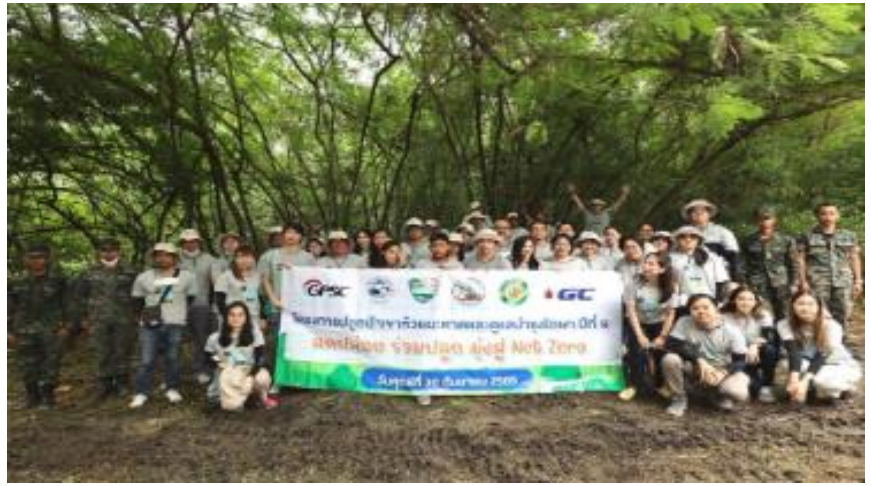
Reduction measures (2/7)

GPSC implements the following measures as a reduction action:

Reduction action refers to actions taken to minimize or reduce their impact or dependency on nature.

- **Sourcing/supplier engagement**
  - GPSC actively engages with suppliers and promotes biodiversity loss reduction across its value chain. Through sourcing and supplier engagement practices, GPSC encourages suppliers to adopt sustainable practices that minimize negative impacts on biodiversity. GPSC also adopts responsible sourcing and supports a sustainable resource management and biodiversity-friendly practices to suppliers. These efforts ensure that biodiversity considerations are integrated throughout the supply chain, contributing to the overall reduction of biodiversity loss and supporting a more sustainable and environmentally conscious business ecosystem.

Reforestation project in collaboration with suppliers



In-depth technical support programs for suppliers

Example of sourcing/supplier engagement measure

Reduction measures (3/7)

The Zero Waste Village project aims to raise awareness and promote campaigns for proper waste separation among people in the communities to create value of waste and leftovers and to help reduce environmental problems as well as protecting the natural resources in the communities. The Zero Waste Village project is meant to improve the quality of life, along with environmental conservation, in the form of social business or "social enterprise" to generate income back to the communities, while also creating sustainability within the society and communities.

In 2022, GPSC joined hands with Rayong Technical College, the Green World Foundation, and Precious Plastic Bangkok to develop plastic waste processing machines as part of the BAANPHAI Upcycling Model. With the design obtained from Precious Plastic, a world-class plastic waste management organization, the machines included shredders and extruders capable of processing plastic bottle caps into products that could generate income for communities.

Furthermore, GPSC has provided education to communities on non-recyclable waste that has a high calorific value and can be used as fuel for refuse-derived fuel (RDF) power plants. GPSC has also purchased RDFs from four waste bank community enterprises to increase income for the communities and remove waste from their work environment, thus reducing pollution and its potential impact such as **biodiversity-related impact**.

Note: Please see summary of ZWV's performance and income of the four waste bank community enterprises from selling of RDFs in 2023 on the next two slides.

Reduction measures (4/7)

Performance of BAAN PHAI Community Waste Management Learning Center in 2024

1. No. of visitors	5,022
2. Amount of waste processed into recycled or upcycled products	5,074.25 kg
3. Amount of waste sold to waste bank	3,450 kg
4. Income from selling of recycled and upcycled products	Bt 1,236,815

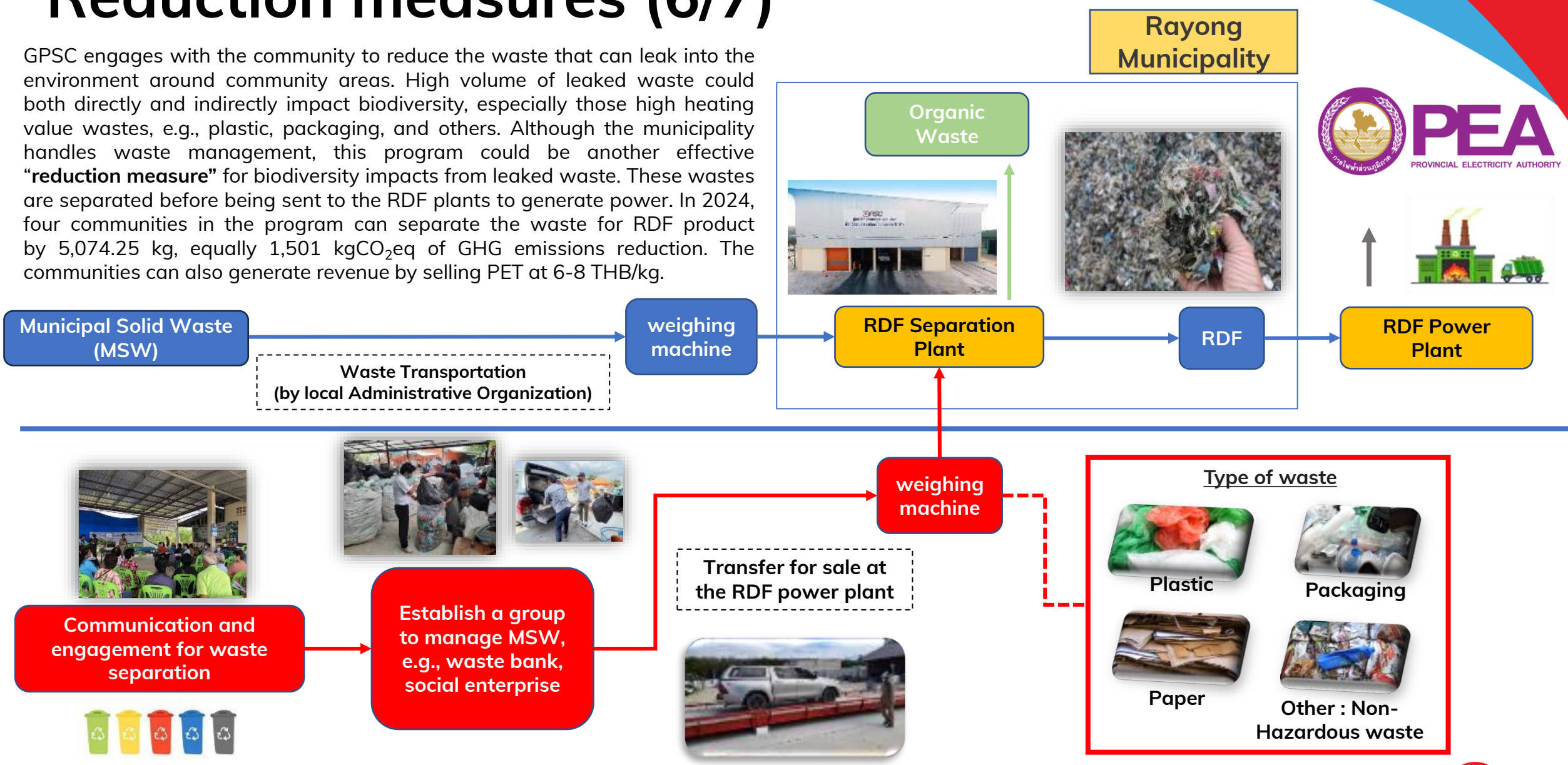
Total income THB 1,236,815

CO2 Reduction from Waste Bank activity = 1,051 $kgCO_2eq$*

* Based on TGO's LESS calculation Methodology

Reduction measures (6/7)

GPSC engages with the community to reduce the waste that can leak into the environment around community areas. High volume of leaked waste could both directly and indirectly impact biodiversity, especially those high heating value wastes, e.g., plastic, packaging, and others. Although the municipality handles waste management, this program could be another effective **"reduction measure"** for biodiversity impacts from leaked waste. These wastes are separated before being sent to the RDF plants to generate power. In 2024, four communities in the program can separate the waste for RDF product by 5,074.25 kg, equally 1,501 $kgCO_2eq$ of GHG emissions reduction. The communities can also generate revenue by selling PET at 6-8 THB/kg.



Reduction measures (7/7)

GPSC teams up with IEAT Map Ta Phut to get rid of garbage on Rayong beach, raising awareness of beach cleaning on the International Coastal Cleanup Day Year 2024 in Rayong Province

GPSC, PTT Group's power flagship, partnered with Map Ta Phut Industrial Estate and IEAT for a coastal cleanup on International Coastal Cleanup Day 2024 in Rayong.

Over 150 participants, including GPSC executives, employees, and their families, collected trash along Saeng Chan Beach to promote beach cleanliness awareness, vital for tourism in the area.

The garbage collected in this activity will be separated into three types.

1. Non-recyclable waste will be sent to Rayong Provincial Administrative Organization for sorting and conversion into RDF, which will then be delivered to GPSC's RDF power plant in Rayong Province.
2. Recyclable waste will be sent to Baan Phai Community Waste Management Learning Center, supported by GPSC for converting waste into products..
3. Hazardous waste will be assigned to the local government agencies for further disposal.

By actively engaging in waste management and supporting circular economy efforts, GPSC aims to minimize its dependency on natural resources and contribute to long-term ecological balance.

https://www.gpscgroup.com/en/news/1466/gpsc-teams-up-with-ieat-map-ta-phut-to-get-rid-of-garbage-on-rayong-beach-raising-awareness-of-beach-cleaning-on-the-international-coastal-cleanup-day-year-2024-in-rayong-province

Regeneration measures (1/6)

GPSC implements the following measures as a regeneration action:

Regeneration action refers to actions taken to increase ecological productivity in relation to nature's contribution to people which are most compatible with ecosystems currently in use by humans and do not require a reclassification.

- **Check dam construction**
  - in collaboration with Baan Chang Municipality and the community forest network of Rayong Province, organized the Check Dam Construction activity at Khao Phu Don-Huay Mahad, Rayong Province. This is an annual event, held for eight consecutive years, that aims to restore and preserve the forest, protect water resources, create a balanced ecosystem, and regenerate value for local communities' utilization. With a total of 177 dams built since 2015, this initiative contributes to GPSC's commitment to achieve Net Zero Emissions by 2060.

https://www.gpscgroup.com/en/news/1429/gpsc-launches-the-activity-check-dam-construction-year-10-at-baan-phu-don-huay-mahad-teaming-up-with-all-sectors-to-restore-the-community-forest-ecosystem

Example of regeneration measure

Regeneration measures (2/6)

GPSC implements the following measures as a regeneration action:

Regeneration action refers to actions taken to increase ecological productivity in relation to nature's contribution to people, which are most compatible with ecosystems currently in use by humans and do not require a reclassification.

- **Aquatic animal release activity**
  - In collaboration with partners and local government sectors, GPSC organized an aquatic animal release activity. This initiative, which has been ongoing for 20 years, involved the release of numerous baby crabs, lobsters, spotted Babylon, and egg-bearing blue crabs to protect the marine environment, increase the population of marine species in the coastal areas of Rayong Province, restore ecological balance, and support the income of fishery groups. This event is also related to the GPSC's commitment to conserve the environment and strengthen relationships among the government sector, private sector, and the community, with a focus on restoring the original ecosystem and promoting species recovery. The example of this measure would include:
    - Annual fish releasing activity at Nong Pla Lai Reservoir, Pluak Daeng District, Rayong Province.
    - Aquatic animal release activity
    - Marine Cage project in the Coastal area, Map Ta Phut District
    - Releasing Aquatic Animal Species to Enhance Marine and Coastal Resources of Rayong Province

* Please see the details of the example activities in the next slides

Regeneration measures (3/6)

Annual fish releasing activity year 2024 at Nong Pla Lai Reservoir, Pluak Daeng District, Rayong Province.

To promote the "**regenerative biodiversity**" of freshwater animals and promote fishing careers, amounting to 30,000 fish per year, with 2024 being the 14th consecutive year of activity. Annual fish release activity 2024 at Nong Pla Lai Reservoir in Pluak Daeng District, Rayong Province, to promote the biodiversity of freshwater animals as well as fishing careers. Up to 30,000 fish are released every year and 2024 was the 14th consecutive year of activity. The activity has been carried out at Nong Pla Lai and Dok Krai reservoirs which are key water storage areas in Rayong Province and are major sources of water for the industrial sector, agricultural sector, and water pipe system. It is also a source of freshwater fishing for surrounding communities.

Regeneration measures (5/6)

Aquatic animal releasing activity

In collaboration with partners and local government sectors, GPSC organized an aquatic animal releasing activity. This initiative, which has been ongoing for 23 years, involved the release of 1,656,200 marine animals, including sweet clams, black tiger prawns, white sea bass, baby crabs and father and mother crabs, to protect the marine environment, "**regenerate biodiversity"** through the population of marine species in the coastal areas of Rayong Province, **restore** ecological balance, and support the income of fishery groups. This event also related with the GPSC commitment to conserve environment and strengthening relationships among the government sector, private sector, and the community, with a focus on restoring the original ecosystem and promoting species recovery.

Regeneration measures (6/6)

Marine Cage project in Coastal area, Map Ta Phut District

To provide appropriate breeding condition for coastal marine animals, such as blue swimming crabs that have eggs outside their shells, by making cages in the sea to increase survival rates of the crabs and promote “**regenerative biodiversity**” together with coastal small-boat fishing groups for sustainable fishing. It is calculated that no less than 1,000 million eggs of crabs are nursed from these cages. If the survival rate is 1%, there will be approximately 10 million baby crabs returned to nature.

Regeneration measures (6/6)

GPSC proceeds the cooperation with its network partners for the year 2024, holding the activity to release aquatic animal species in order to create balance of ecosystem

Releasing Aquatic Animal Species to Enhance Marine and Coastal Resources of Rayong Province 2024

GPSC Group and GHECO-One Company Limited to join hands with the company's network partners and the government sectors to organize the activity. Thereby, the aquatic animals to be released in this activity include **250,000 sea shrimps, 3,000 white seabasses, 1,500,000 baby crabs, and 200 blue crab breeders**.

The objectives of the activity are to increase the number of young aquatic animals in the sea and **maintain balance in the natural ecosystem**, which is in line with the determination to collaboratively preserve the environment and build good relationships among the government sector, the private sector and the communities.

The event this year was organized in the area of Pak Khlong Taguan Fishing Group, Mueang Rayong District, Rayong Province.

https://www.gpscgroup.com/en/news/1403/gpsc-proceeds-the-cooperation-with-its-network-partners-for-the-year-2024-holding-the-activity-to-release-aquatic-animal-species-in-order-to-create-balance-of-ecosystem

Restoration measures (1/3)

GPSC implements the following measures as a restoration action:

Restoration action refers to actions taken to return an area to the original ecosystem in term of basic ecological functions and/or ecosystem services that were present before impacts.

- **Reforestation**
  - GPSC implements reforestation initiatives as part of the commitment to restoring terrestrial ecosystems. These efforts aim to return degraded forest areas to their original ecological state by reestablishing native vegetation, enhancing biodiversity, and reviving essential ecological functions such as carbon sequestration, water regulation, and soil stabilization.
- **Seagrass restoration**
  - GPSC implements seagrass restoration to rehabilitate coastal and marine ecosystems. This involves replanting and protecting seagrass areas to restore their role in supporting marine biodiversity, improving water quality, and providing critical ecosystem services such as carbon storage and shoreline protection.

2.3.5 Continuous Forest Planting and Maintenance Project in the Area, Fiscal Year 2025 (9th Consecutive Year)

Forest Planting, Repair, and Maintenance in the Area of Ban Matum, Chanthaburi Province, Rayong Province

Summary:

- Reforestation (2013-2024):17,000 trees, total 114 rais.
- Seagrass restoration (2021-2025): 10,000 trees, total 6 rais.

Restoration measures (2/3)

Reforestation

GPSC launched the project **"Seedlings for Reforestation and Wildlife".** In the first year, GPSC has begun the reforestation on an area of 230 rais (0.368 km^2) in the national reserved forest areas in Pak Chom District and Na Duang District, Loei Province in order to create the sources that can absorb and store approximately 114,237.5 tons of carbon dioxide equivalent, with a plan to increase the reforestation areas by approximately 1,000-1,500 rais (1.6-2.4 km^2) per year throughout the country. GPSC has planned to increase the green space, according to PTT Group's intention, to cover 10,000 rais (16 km^2) by 2030 by means of reforestation along with the forest restoration. This operation is considered one of the strategies focusing on business for sustainability of GPSC.

Restoration measures (3/3)

Seagrass restoration activity

In partnership with the Naval Area Command 1 (NAC-1) and the Marine and Coastal Resources Research Center, Eastern Gulf of Thailand (MCRC-Eastern Gulf), GPSC participated in a seagrass restoration project at Koh Kham Underwater Park in Sattahip District, Chonburi Province. The project involved **planting 10,000 clumps of seagrass over a 6-rai area**, accompanied by the release of clown fish and scaly giant clams. The handover ceremony emphasized the importance of restoration in returning the ecosystem to its original state and promoting biodiversity. Additionally, GPSC previously planted 5,000 clumps of seagrass in a 3-rai area at Naphathara Phirom Beach, equal to 10,000 clumps on a **total area of 6 rai.**

Transformation measure (1/4)

GPSC implements the following measures as a transformation action:

Transformation action refers to actions taken to address the fundamental drivers of nature loss by rejecting the dominant belief and value systems that prevail today which have led to biodiversity loss for protecting nature and human well-being and improving the functioning of real and financial economies

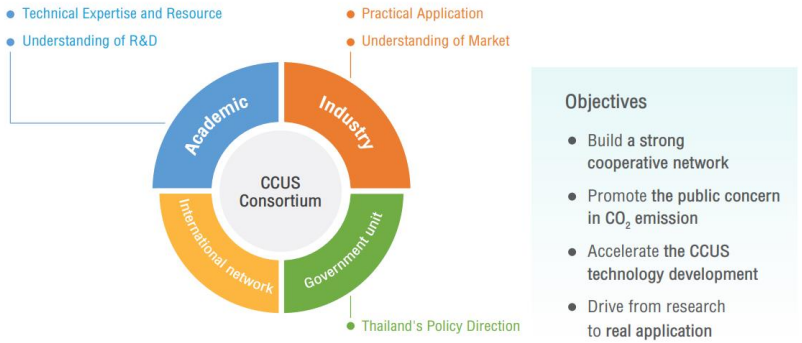
In light of clean energy trends, which have amplified the role of renewable energy in the electricity business, GPSC has established strategies in response to climate change under the concept of “Moving towards a Low-Carbon Electricity Business and Net Zero Greenhouse Gas Emissions”. It means that GPSC plans to transform the business model by reducing reliance in conventional energy, which the combustion process causes GHG emission and other pollutions impacting on climate change and biodiversity negatively, with targeting an increase in the renewable energy portfolio to be more than 50% of the total portfolio through the 4 key action plans. To successful transformation, GPSC implemented the following activities as follows:

- **Partnerships across supply chains and sectors**
- **Investment in the landscapes and seascapes**
- **Supporting the government and trade associations to raise its policy ambition for nature and climate change**

Transformation measure (2/4)

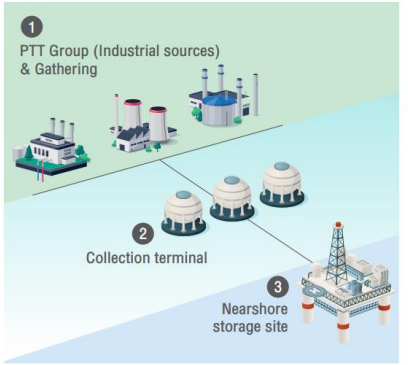
Partnerships across supply chains and sectors

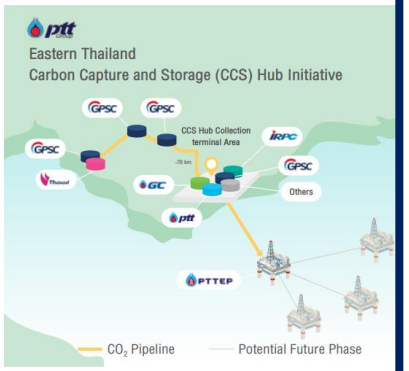
Partnerships across supply chains and sectors play a crucial role in addressing climate change and reducing greenhouse gas (GHG) emissions. Key technologies like carbon capture, utilization, and storage (CCS/CCUS) have gained significant attention from various industries to enable the reduction and storage of emissions generated by business operations.



GPSC collaborates with partners, including the Bio-Circular-Green-economy Technology & Engineering Center (BCGeTEC) of Chulalongkorn University, other companies, government agencies, and network member organizations, to establish the CCUS Consortium. This open innovation approach integrates knowledge from both internal and external sources to develop and deploy CCUS technologies.

GPSC partners with the PTT Group in the PTT Group CCS Hub Model Project to study the feasibility of CCS application, aiming to reduce GHG emissions in Chonburi and Rayong. This collaboration serves as a model for national CCS scaling and brings multiple benefits to GPSC. These benefits include valuable insights on CCS application, the establishment of Thailand's first offshore CCS project (Arthit Project), and the expansion of offshore and on/nearshore CCS opportunities.



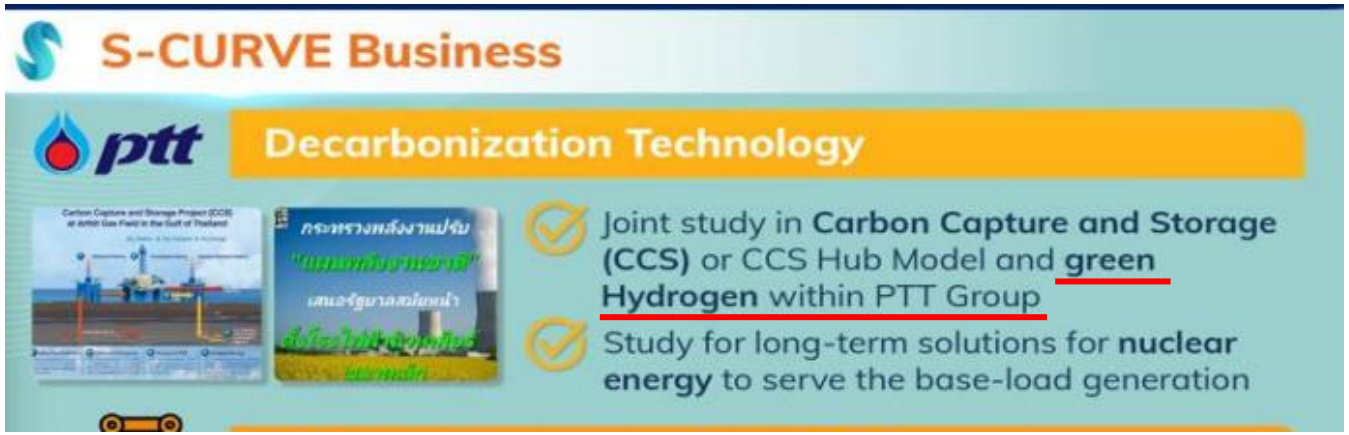


GPSC's involvement in the CCUS Consortium and PTT Group CCS Hub Model Project has been producing valuable outcomes, benefiting the company's infrastructure development in line with the S2: Scale-up Green Energy strategy. This progress helps GPSC reduce GHG emissions, achieve long-term targets, and promote sustainable practices

Transformation measure (3/4)

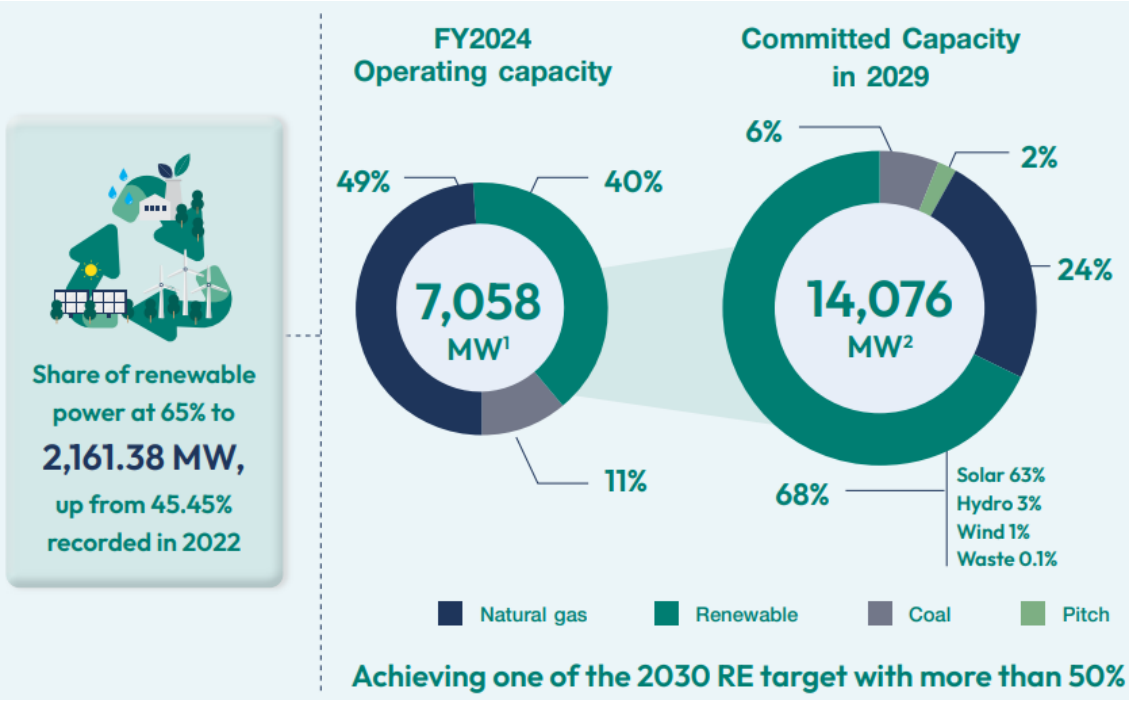
Partnerships across supply chains and other industrial sector

GPSC signed the memorandum of understanding (MOU) with Doosan Enerbility Company Limited, Korean's leading plant expert of the power and water industry, offering energy solutions for thermal power, nuclear power, renewable energy, and carbon-free solutions. The MOU aims to assess the feasibility of adopting Fuel Shifts & Hybridization, CCUS technology, and Carbon Free Energy Solutions to decarbonize electricity and steam production from existing power plants, reducing atmospheric carbon dioxide. Hence, it is considered an important milestone to produce cleaner energy for customers. The joint feasibility study is expected to take three years (2024-2026).



Green hydrogen is also one of the emerging technologies that GPSC has joined to research and develop with the PTT group for the commercial-scale implementation. This technology can drive and transform the energy utility industry toward a low-carbon economy and its related-impact such as GHG emissions, biodiversity, etc.

Transformation measure (4/4)



Investment in the landscapes and seascapes

With the S2: Scale-up Green Energy strategy, GPSC is increasing investments in renewable energy to shift away from fossil fuel reliance and transform to a renewable energy producer with reliable energy delivery. GPSC aims to have over 50% of renewable energy by 2030. One significant step in this direction is the investment in a solar power plant in India, which not only contributes to the growth of renewable energy but also helps address the underlying causes of nature loss (fossil fuel combustion). These initiatives align with GPSC's vision for global leadership in the power sector while actively promoting sustainable practices and preserving our natural environment.

Supporting the government/trade association to raise its policy ambition for nature and climate change

GPSC joins climate-change networks including Carbon-Neutral Thailand Network, Carbon Market Thailand Club, RE100 Thailand Club, and TBCSD, in order to promote national policies and measures for nature and climate change, and foster sustainability across industries and sectors for facilitating the transformation of business to renewable energy.

Thank you