CLP 中電

Shaping our future impacts, today

2023 Sustainability Report

Stock Code: 00002

Managing impacts, risks and performance

Our approach

Based on the environmental management tools and processes described in the "Strategy" section, impacts, risks and performance are managed throughout the project cycle.

The following sections provide a more detailed review of how CLP manages individual nature-related issues that are material. CLP has also developed goals and targets that go beyond compliance to drive continual improvement, and performance indicators to monitor the progress and effectiveness of its nature-related strategies, plans and programmes.

Biodiversity and ecosystem

CLP is actively contributing to nature preservation and habitat restoration activities while seeking to mitigate its impacts on biodiversity and ecosystem services in the vicinity of its operations, with the Group's goal of "no net loss of biodiversity". Based on the levels of regulatory controls on biodiversity, CLP sets site-specific targets and initiates ecological compensation programmes where necessary.

GRI reference: 304-1, 304-2, 304-4

Process and procedures

As part of the EDD, the responsible project team evaluates relevant biodiversity risks, focusing on the important biodiversity areas in the vicinity. It will be supported by a qualified consultant depending on the level of complexity.

The CLP Biodiversity Impact Assessment Guideline applies to power generation, transmission and distribution, mines and other power-related projects. It provides a framework for undertaking a systemic assessment of biodiversity impacts, and guidance on managing biodiversity risks. For example, the Guideline enables CLP to flag any new operations that could affect the IUCN Red List of Threatened Species and the relevant country's national conservation list of threatened species well ahead of any investment decision.

The biodiversity impact assessment also observes local legislative requirements and references the International Finance Corporation Sustainability Framework. It involves describing the baseline conditions, evaluating the magnitude and significance of project impacts, and investigating options for mitigation. The assessment only contemplates offsets after considering options for avoidance, minimisation and restoration or rehabilitation.

Mitigation measures will be developed based on the findings and recommendations from the EDD and EIA to address adverse impacts related to biodiversity and ecosystem identified. These adverse impacts will be monitored and controlled under the environmental management system (EMS) during the operation phase and will be reviewed on a regular basis.

Initiatives and progress

There is no one-size-fits-all approach to managing biodiversity impacts. CLP considers varying factors such as the location and the level of development in the vicinity of a project as part of its ongoing efforts in biodiversity conservation and land remediation.

GRI reference: 304-3, EU13

Biodiversity enhancement programmes in 2023 included:

- **Aquaculture and fisheries conservation**
  CLP Power supports marine conservation and fisheries enhancement projects through the Marine Conservation Enhancement Fund (MCEF) and the Fisheries Enhancement Fund (FEF) set up by the Hong Kong Offshore LNG Terminal Project in Hong Kong in 2020. To date, approximately HK$50.0 million has been granted to support 44 projects under MCEF, and HK$36.8 million to support 19 projects under FEF. Projects funded by MCEF focus on marine conservation, habitat restoration and rehabilitation, as well as education and ecotourism. The initiatives supported by FEF include fisheries education and tourism, enhancement of fisheries resources and sustainable fishery development. A sharing session was organised in 2023 for FEF at which representatives of fisheries organisations, academia and green groups shared insights into aquaculture and fisheries conservation projects. The exchange also served as a platform for exploring potential partnerships and collaborations.

- **Combatting desertification**
  Recognising the threats to wildlife caused by desertification and land degradation, CLP China has carried out annual tree planting activities at the Jinchang Solar Farm in the Gobi Desert and participated in tree planting programmes organised by the local government in order to develop windbreaks and keep the sand bed steady. In 2023, about 150 trees of various species, including Sophora japonica and Amygdalus triloba, were planted at the Xipo shelterbelt near the Jinchang Solar Power Station in support of a local government initiative. Similar tree planting activities were carried out at other Mainland China assets, such as Lingyuan.
- **Habitat restoration programme in Australia**
  As part of its Tallawarra B new gas-fired power station construction project, EnergyAustralia has established a detailed Fauna and Flora management plan for maintaining the populations of local species and enhancing local biodiversity developed with local ecologists and indigenous community groups. One outcome was an approved Vegetation Offset Plan, involving compensatory planting of about 2,000 local species for native vegetation removed for construction. The management plan has also protected a nearby nesting area for ospreys. In addition, EnergyAustralia has voluntarily continued the Swamp Oak Forest Endangered Ecological Community (EEC) bush regeneration works, which involve the removal of woody weeds and lantana. With power generation and mining set to cease at Yallourn in 2028, EnergyAustralia has begun developing rehabilitation and remediation plans for both the Yallourn Power Station and the mine. The goal is to repurpose the site to provide local amenities for community development, including conservation and recreation areas. Some 22.8 hectares of land at the mine was rehabilitated in 2023 through the sowing of native seed and pasture grass to help stabilise exposed landforms.
- **Repurposing and regeneration of nature in China**
  CLP China seeks opportunities to restore degraded landscapes when expanding its renewable portfolio. For example, at the abandoned mine site on which the Meizhou Solar Farm was built, CLP China has revegetated the photovoltaic fields with plants such as miscanthus and mountain beans to stabilise the soil and control water runoff. As the plants can grow rapidly in the rainy seasons, grass-proof cloth has been applied to keep the plants at an optimal height so that the vegetation does not cover the photovoltaic panels. CLP China's innovative efforts in transforming the mine sites have been recognised by the local Government and media.
- **Maintaining the ecological balance of the river for operation of the Hydro Power Station in China**
  To alleviate the adverse impacts of the Jiangbian Hydro Power Station on fish and other aquatic species in the Jiulong River, CLP China has invested about RMB 20 million since 2010 in building a fish stocking station, utilising technical support from Sichuan Agricultural University. Since the first stocking in 2011, 390,000 fish fry of three species have been released, helping maintain the ecological balance of the Juilong River Basin. In addition, during the construction and operation of the Jiangbian and Dali Yang'er Hydro Power Stations, the ecological discharges have been kept strictly in accordance with local environmental protection authority requirements and the mitigation measures stipulated in the EIA report, resulting in healthy growth and reproduction of aquatic organisms downstream of the power plants' dam.
- **Promotion of nature and biodiversity**
  In 2023, a Go Green Programme with the theme "Cherish Nature" was launched to enhance awareness of nature and biodiversity conservation among CLP's Hong Kong staff. The programme comprised an online educational series, with episodes introducing biodiversity concepts and the habitats of different local species in Hong Kong.

Case Study

Fishery- and agriculture-solar complementation projects in Mainland China

Fishery and solar complementation projects involve building solar generators on the surface of ponds, thus combining space for fish farming and solar power generation. The photovoltaic modules help to reduce the water surface temperature to a certain extent, preventing loss of aquaculture due to high water temperatures and improving the growth and feeding of fish. Traditional aquaculture only obtains aquaculture products and delivers a single source of income. Fishery and solar complementation projects utilise available resources more efficiently and can increase farmers' income.

CLP's Sihong Solar Power Station in Mainland China is a fishery-solar hybrid power plant which illustrates fishery and solar complementation. CLP has continued to optimise the power station's facilities for aquaculture by constructing waterproof dams, improving anti-evasion facilities, improving water diversion facilities during dry seasons, and inviting aquatic experts to conduct on-site inspections and provide guidance to contractors. Continuous development and experimentation with the help of aquaculture experts has led to the production of crabs and crayfish exceeding expectations. It is planned to launch the second phase of fish farming next year, which will involve expanding the scale of operations and improving the overall utilisation rate of the site. The result will be a sustainable operation that blends ecological aquaculture with solar power generation.

Agriculture-solar complementation projects involve carrying out agricultural activity on solar sites, a process which can rebuild biodiversity and safeguard the health of local ecosystems. CLP's Huai'an Solar Farm has continued to implement agriculture-photovoltaic complementation initiatives. These have involved creating a good growing environment for crops, increasing the number of drainage ditches and culverts in solar farm areas, and repairing some agricultural greenhouses. Agricultural experts have also been invited to provide on-site guidance. The harvest yields of grapes and snakegourd fruit have been higher than expected, a testimony to the value of making composite use of land in the Solar Farm to enhance its sustainable operation.

CLP's Xicun Solar Farm has also enhanced the sustainable operation of the land used for solar panels by planting honeysuckle under the panels. Soil erosion can occur during the rainy season in the area, and the honeysuckle helps to stabilise the soil and prevent erosion while at the same time enhancing the utilisation of land.

Crabs and crayfish being released at Sihong Solar Power Station.

Part of the fruit harvest at Huai'an Solar Farm.

Air emissions

CLP strives to reduce the air pollutants emitted from its operations while expanding its renewable and nuclear energy portfolio. Achieving further emission reductions from existing fossil fuel power stations remains a high priority.

Process and procedures

For new projects, CLP assesses risks related to air emissions through an EDD and carries out an EIA at the project design and construction stage. CLP is also conscious of the air emission level of its fossil fuel power stations in operation. The associated environmental risks and impacts are properly managed by a robust EMS.

According to the CLP Group HSEMS, the coal-fired and gas-fired power plants under CLP's operational control are required to operate within CLP's prescribed limits on SO_2, NO_x and total PM, or they must fully comply with local regulations, whichever is more stringent. The air emissions (NO_x, SO_2 and total PM) from the coal-fired and combined cycle gas turbine power stations under its operational control are monitored by continuous emissions monitoring systems. CLP is also cognisant of the increasing focus on mercury emissions from coal-fired power plants and has monitored and reported mercury quantities from its coal-fired power plants since 2021.

In addition to incorporating state-of-the-art air emissions mitigation measures into its plant management, CLP has also designed new gas-fired power stations with advanced generation technologies. These new technologies produce electricity more efficiently, thus assisting in further lowering air pollutants and GHG emissions.

Initiatives and progress

CLP is dedicated to managing its fuel mix and applying various mitigation measures to combat climate change and improve the air quality of the regions where it operates.

SASB reference: If-EU-120a.1; GRI reference: 305-7

Coal-fired power plants, such as Yallourn, Mount Piper and Castle Peak Power Stations, are the main contributors to the Group's air emissions, and the emissions metrics are heavily influenced by the performance of these plants. CLP has remained committed to improving air quality in the areas where it operates, and proceeding along the path towards decarbonisation. In 2023, CLP reviewed the target-setting process and refined its emissions targets to reflect the upcoming retirement of CLP's fossil fuel plants. CLP has set group-wide medium- and long-term emissions targets for the years 2025 and 2030 in terms of percentage reduction of emission quantities for NO_x, SO_2 and PM against the base year of 2021 with the ultimate target of zero emissions. The emission targets scope covers all power plants under operational control.

The 2023 results related to the emission targets and progress are shown in the following table:

Nature metrics	Pollution Reduction	2023 Results	2023 Progress	Target Range by end 2025	Target by end 2030
Emissions (Impact driver)	NO_x emissions	-29%	In line	-20% to -30%	-50%
	SO_2 emissions	-23%	In line	-15% to -20%	-55%
	PM emissions	-12%	In line	-10% to -15%	-90%

In 2023, CLP cut emissions of NO_x, SO_2 and PM by 29%, 23% and 12% respectively compared with the baseline year of 2021 which was in line with the emission target setting and even ahead of the target set for SO_2.

Further to the divestment of a majority stake in Fangchenggeng coal-fired Power Station in Mainland China and excluding India's assets, particularly the coal-fired plant Jhajjar, the overall emissions quantities were significantly reduced.

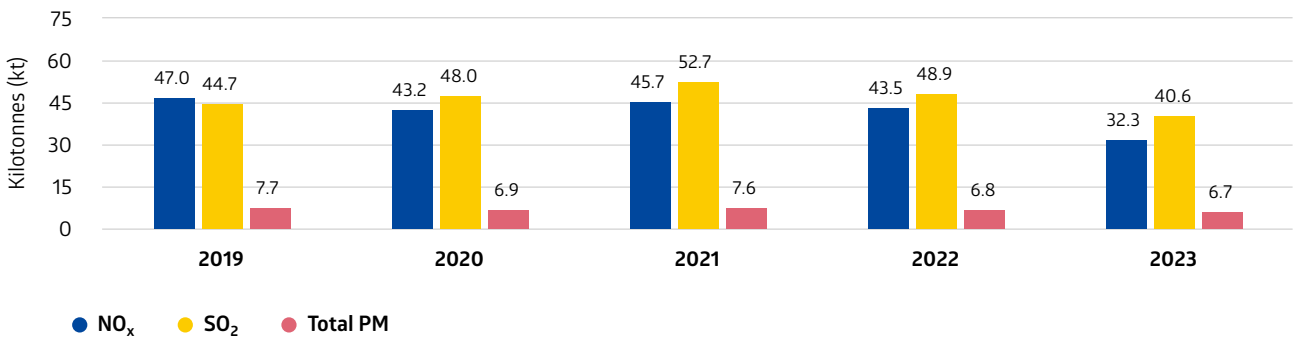
With CLP's strategy of fuel diversification and through continually maintaining the effectiveness of emission control facilities, emissions can be further reduced.

Key initiatives and programmes in 2023 included:

- **Advanced air emission control systems**
  CLP has been implementing various air emission control measures with advanced emissions reduction technology in its fossil fuel plants. In Hong Kong, CLP Power continued to optimise its fuel mix and deploy advanced technology to ensure its compliance with pollution control requirements. A second additional gas-fired generation unit, D2, is expected to go into service at Black Point Power Station in 2024, with controls in place to reduce NO_x emissions through selective catalytic reduction technology. The technology has already helped reduce emissions in the power station's D1 unit. In India, in addition to Flue Gas Desulphurisation (FGD) deployed at Jhajjar Power Station to reduce SO_2, PM and mercury (Hg) emissions, a combination of Electrostatic Precipitator (ESP) and Fabric Filter is being used to further reduce PM emissions. Furthermore, a combination of low NO_x burners and the Separated Over Fire Air System (SOFA) is being used to further reduce NO_x emissions.
- **Upgrade of emissions monitoring systems**
  CLP continuously reviews its emissions monitoring system to align with industry best practices in air emissions controls. At Yallourn Power Station, the Continuous Emissions Monitoring System (CEMS) has been upgraded to enhance emissions monitoring. Yallourn activated its upgraded CEMS in 2023, covering NO_x, SO_2 and CO. In addition, real time dust monitoring stations were installed on the perimeter at Yallourn to enhance dust monitoring and control. At Mount Piper Power Station, the introduction of the Particulate Matter Continuous Emissions Monitoring System (PM-CEMS) has enabled to the provision of real-time and accurate data for emission control and hence contributed to a reduction of dust this year.
- **Educating and empowering operators on emissions monitoring and control**
  CLP understands that its operators must have the awareness and capability to control emissions and prevent emission exceedances. Further to the development of operation procedures for responding to unusually high emissions, operators in Hong Kong will be given Air Emission Licence Training every two years, including training on procedures for corrective and preventive actions if unusually high emissions occur. In Australia, similar training will be provided regularly to operators. In 2023, specific response training for operators on reacting to emission exceedance warnings were conducted in Jeeralang Power Station.
- **Control of fugitive GHG emissions from electrical equipment**
  Electric utilities usually rely on sulphur hexafluoride gas (SF_6) for electrical insulation in high voltage equipment due to its excellent insulation properties. However, SF_6 is a potent GHG with very high global warming potential. CLP is endeavouring to reduce its SF_6 emissions by making its operations more efficient, undertaking maintenance measures on SF_6 equipment, and taking immediate corrective actions when any SF_6 leakage from equipment due to defects is noted. In 2023, CLP completed a field trial of non-SF_6 gas switchgears at the distribution level, and will review the results for the future development of non-SF_6 gas equipment at the distribution and transmission levels. CLP will continue to explore measures for reducing SF_6 emissions from electrical equipment, and introducing sustainable alternatives.

Group-level air emissions

The overall total emissions in 2023 decreased mainly due to divestment of a majority stake in Fangchenggeng coal-fired Power Station in Mainland China and excluding India's assets, particularly the coal-fired Jhajjar Power Station.



Case Study

Improving Hong Kong's Air Quality and Supporting its Long-term Decarbonisation Target through the Hong Kong Offshore Liquefied Natural Gas (LNG) Terminal Project

The Hong Kong Offshore Liquefied Natural Gas (LNG) Terminal Project commenced operation in July 2023. The project is enhancing Hong Kong's fuel supply stability by adding new supply sources for natural gas, while also reducing power generation emissions and facilitating the city's energy transition to carbon neutrality by 2050.

The project gives Hong Kong access to more diverse sources of competitively priced LNG in the global market, enhancing the city's gas supply security.

The LNG terminal, located in the southwestern waters of Hong Kong, uses Floating Storage and Regasification Unit (FSRU) technology to regasify LNG before the natural gas is delivered to power stations through undersea pipelines.

The terminal is connected to the world's largest FSRU vessel, the Bauhinia Spirit. It has an LNG storage capacity of 263,000 cubic metres, sufficient to meet the electricity needs of 1.5 million three-member households for two months based on an average usage of 275 units of electricity a month.

Natural gas is a relatively clean fossil fuel and an important bridge transition fuel for meeting the HKSAR Government's long-term decarbonisation targets as outlined in its Climate Action Plan 2050. The amount of carbon dioxide emitted by natural gas is only around half of that given off by coal, so this initiative is helping reduce emissions from power generation by increasing the percentage of natural gas used for power generation and reducing carbon intensity in the city.

The Hong Kong Offshore Liquefied Natural Gas (LNG) Terminal.

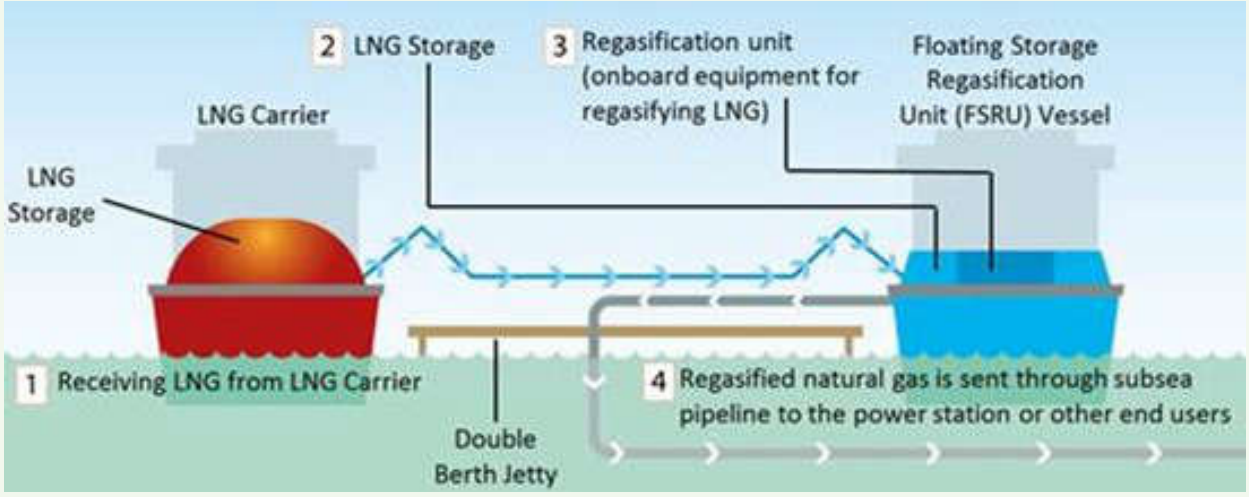


Illustration of the operation of the Hong Kong Offshore Liquefied Natural Gas (LNG) Terminal.

Waste management and material use

CLP strives to integrate circular economy principles across the project lifecycle to explore opportunities for minimising material use and waste disposal. It follows a waste management hierarchy (i.e. prevent, reduce, reuse, replace, recycle, treat and dispose) which prioritises the most preferred actions that minimise waste generation in daily operations.

SASB reference: IF-EU-150a.1 and IF-EU-150a.2; GRI reference: 301-2, 306-1, 306-2, 306-3, 306-4, 306-5

Process and procedures

Across the project lifecycle, CLP seeks to avoid using hazardous materials and replaces them with alternatives wherever possible based on the existing environmental management tools.

Through the EDD and EIA during the project design and construction stage, and the EMS during the operation stage, all hazardous and non-hazardous waste is managed properly for reducing waste and promoting recycling as well as ensuring waste disposal in accordance with local regulations. CLP prioritises waste reduction and then reuse and recycle rather than disposal following the waste management hierarchy. When hazardous waste has to be collected for recycling or disposal, it will be handled by licensed contractors in accordance with the local regulatory requirements.

The main operational by-products of CLP's coal-fired power stations are coal ash from coal combustion and gypsum from the flue gas desulphurisation process. CLP actively manages these by-products generated from coal-fired power stations according to the waste management processes and procedures outlined in the EMS. Rather than disposing of them, CLP endeavours to reuse them for construction and other applications in line with circular economy principles and in accordance with local regulations and practices.

While the quantities of solid and liquid waste generated by regular CLP operations is relatively small, projects involving demolition and construction usually increase the amount of non-hazardous solid waste which will be addressed and monitored under the EMS.

CLP is also driving behavioural changes among its employees by setting up recycling facilities at power stations and office premises, and providing e-learning courses on circular economy principles and waste management.

CLP monitors waste generation on a monthly basis by tracking the solid and liquid forms of hazardous and non-hazardous waste produced and recycled at its facilities.

All ash impoundments from CLP-owned plants (i.e. the various ash lagoons at Castle Peak Power Station in Hong Kong and Yallourn Power Station in Australia) have been reviewed and are considered as having low hazard potential and satisfactory structural integrity.

Initiatives and progress

CLP has implemented various measures to reduce waste and increase reuse and recycling during electricity generation and other operations.

It recycles its hazardous and non-hazardous solid and liquid waste where feasible, and sells by-products such as ash and gypsum for reuse in other industries.

Individual assets generate different types of waste. Coal-fired assets are the main contributors of waste, accounting for about 90% of the Group's total waste generated. The amount of waste produced and recycled is not directly related to the amount of electricity sent out, but can be affected by maintenance and construction activities as well as local waste facilities and treatment practices.

CLP set the group-wide medium- and long-term waste targets for the years 2025 and 2030 in terms of a percentage reduction of total waste produced, including by-products produced by the coal-fired power plants, against the base year of 2021. In addition, waste targets for the year 2025 of 100% were set for the recycling of Waste Electrical & Electronic Equipment (WEEE), scrap rechargeable batteries, scrap metals and inert construction waste, and for the removal of single-use plastics in catering facilities.

In 2023, total waste products from the Group's operation was reduced by 71% compared with the target-setting baseline year of 2021 which was slightly ahead of the waste target set for 2030.

The decrease was contributed by various waste management initiatives at the assets and the divestment of a majority stake in Fangchenggeng coal-fired power station in Mainland China and the exclusion of India's assets, particularly the coal-fired Jhajjar Power Station.

Coal ash from coal combustion and gypsum from the flue gas desulphurisation process are still the main waste products.

The Waste Electrical and Electronic Equipment (WEEE), scrap rechargeable batteries, scrap metal and inert construction waste were fully recycled and single-use plastics used in catering facilities were also removed in 2023, based on local regulatory policies and infrastructure available for recycling. Looking ahead, CLP will continue to refine the waste management process and look for waste reduction or recycling opportunities and initiatives from a project cycle perspective, aiming to continue improving waste recovery value and enhancing the circularity of products and materials.

The waste target scope covers all CLP's operational control assets. The 2023 results relating to the waste targets and their progress are shown in the following table:

Nature metrics	Pollution Reduction	2023 Results	2023 Progress	Target by end 2025	Target by end 2030
Waste (Impact driver)	Waste products[1]	-71%	In line	-65%	-70%
	Recycling of Waste Electrical & Electronic Equipment (WEEE)	100%	In line	100%	--
	Recycling of rechargeable batteries	100%	In line	100%	--
	Recycling of scrap metal	100%	In line	100%	--
	Recycling of inert construction waste	100%	In line	100%	--
	Removal of single-use plastics in catering facilities	100%	In line	100%	--

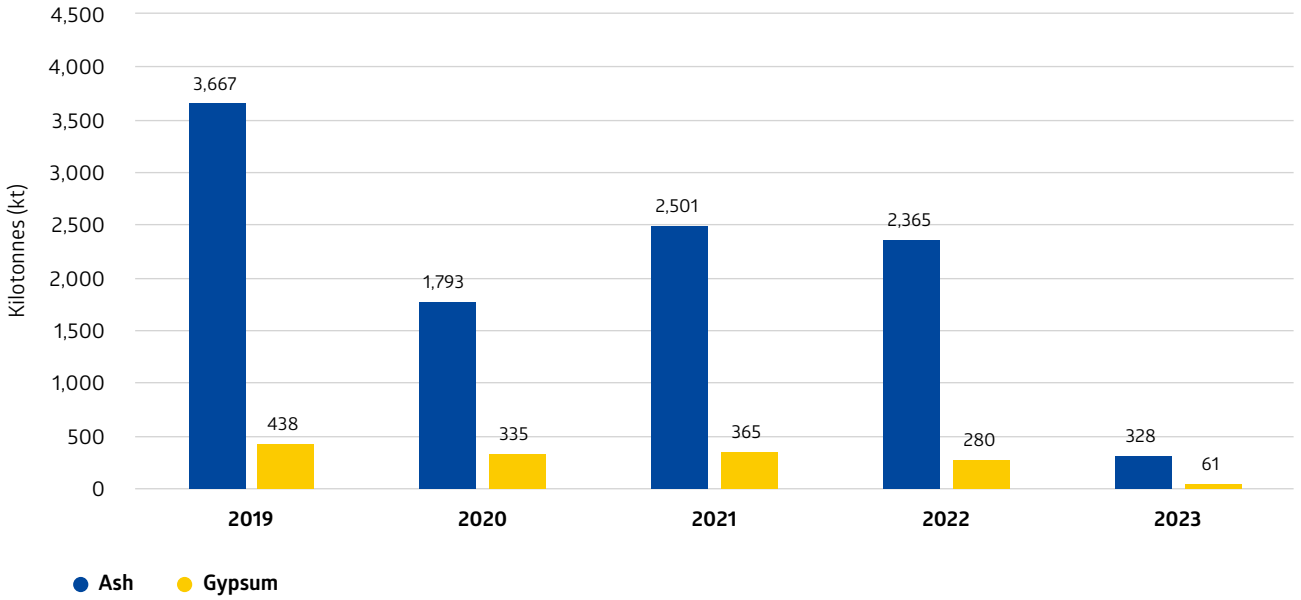
1 Waste products include total waste produced from operation and maintenance activities and by-products produced by the coal-fired power plants

Key programmes and initiatives in 2023 included:

- **Collaboration with stakeholders and partners on the initiatives to increase waste recovery in Hong Kong**
  CLP Power collaborated with local recyclers in the full recycling of scrap metal, WEEE, rechargeable industrial batteries, lubricating oil and transformer oil. It also worked with the Hong Kong government to recycle yard waste from Hong Kong's power stations, recycling about 4,000kg and 2,500kg of yard waste following the annual tree trimming exercises at Black Point Power Station and Castle Peak Power Station respectively. In addition, Castle Peak Power Station collaborated with a local chemical processing and treatment company to treat and reuse all boiler chemical cleaning solution on site in 2023. As a result, there was no disposal of any hazardous liquid waste generated from the boiler chemical clean project in 2023.
- **Beneficial Reuse of Marine Sediment in Hong Kong**
  CLP Power's Hong Kong Offshore Liquefied Natural Gas Terminal (HKOLNGT) Project collaborated with various Hong Kong government departments to reuse suitable marine sediment dredged at the project site in a soil mix suitable for mangrove planting, minimising marine sediment dumping into the sea.
- **Second Life for Used Photovoltaic Components and Batteries**
  Lingyuan Solar Farm used its spent photovoltaic modules and some spent rechargeable batteries provided by Qian'an Wind Farm to set up a power supply for lighting plant areas. This initiative gave a second life to the used equipment and reduced waste, while also reducing power consumption at the plant.
- **Promoting the circular economy and engaging staff in recycling efforts in CLP Power Hong Kong**
  CLP Power Hong Kong has developed recycling guidelines and established new waste recycling targets for its generation and power system business units, and encouraged staff engagement in these recycling efforts. Also, an online platform was created where internal colleagues could list used furniture and find potential reuse opportunities within different departments.

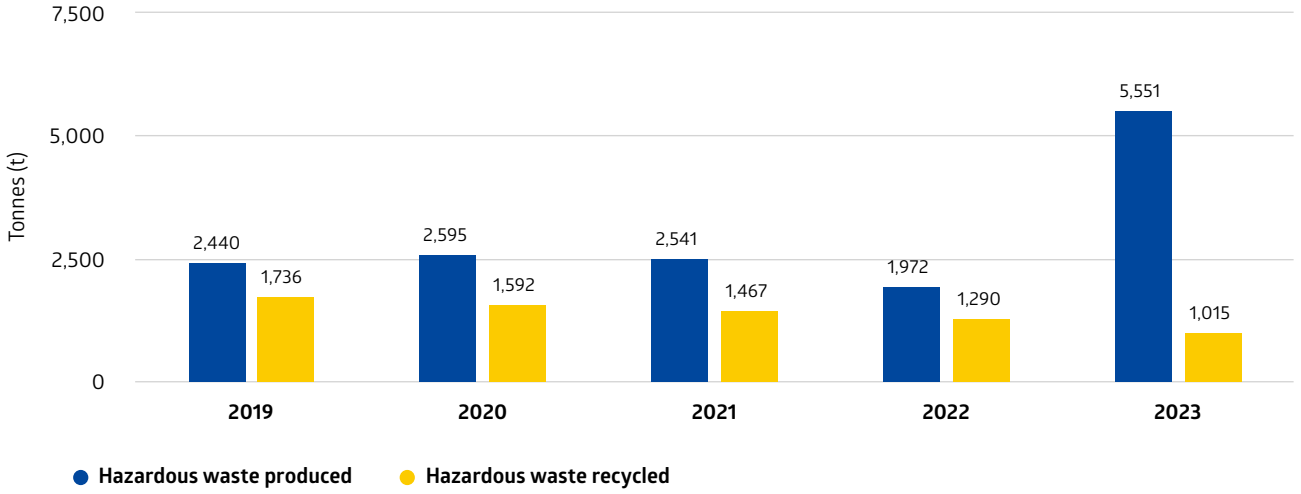
Ash and gypsum by-products recycled or sold

The total amount of ash and gypsum by-products recycled or sold decreased in 2023 due to the divestment of Fangchenggeng Power Station, while the ash and gypsum from Jhajjar Power Station were no longer included in the total as Apraava Energy is no longer a wholly-owned subsidiary.



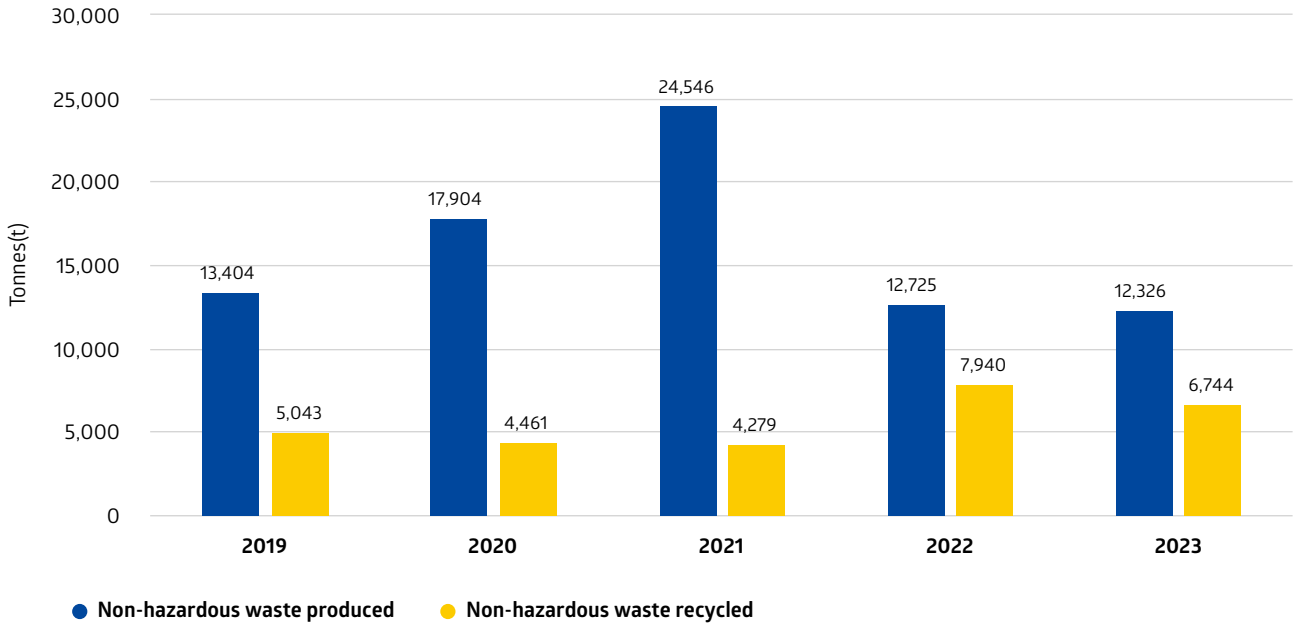
Hazardous waste produced and recycled

The total amount of hazardous waste produced increased while recycling decreased was mainly caused by the disposal of hazardous wastes from a remediation Project at Yallourn Power Station.



Non-hazardous waste produced and recycled

Compared to 2022, the variation of the non-hazardous waste produced and recycled was due to normal operational fluctuation from plant activities.



Case Study

Jhajjar introduces Waste Recovery Programmes according to Circular Economy Principles

Jhajjar Power Station strives to achieve 'Zero Waste to Landfill' by adopting circular economy principles and implementing various reuse and recycling initiatives to minimise waste.

A key measure has involved maximising the reuse of waste generated from operations (e.g. metallic waste, rubber conveyor belts, electronic cards, and actuators) for secondary purposes on site. An expert agency was engaged to implement proper waste management measures and install material recovery facilities to enhance waste recovery. These included a Vibro-feeder, which helps in sorting waste through the use of a conveyor to separate inert materials like soil or dust from dry solid waste, and a Baler machine, a hydraulic pressing machine that compresses solid waste such as PET bottles.

Vibro-Feeder used at the Material Recovery Facility at Jhajjar Power Station.

Jhajjar is working towards paperless office status through digitalisation, implementing various digital systems such as a Management of Change System, Gate Pass Processing System, Invoice Tracking System, Vehicle Booking System and others.

Jhajjar has also striven to eliminate single-use plastic in its sites, implementing initiatives such as adding water dispensers at sites, replacing plastic bottles with glass and distributing cotton bags and steel bottles to contract staff. It has been validated by the Confederation of Indian Industry and certified as a single-use plastic free site. It has also achieved Zero Waste to Landfill certification by the Confederation of Indian Industry, indicating that it has implemented waste management practises that have resulted in over 90% of waste being diverted from landfills.

Example of material reuse in Jhajjar Power Station.

Water

The CLP Group uses seawater cooling or water recirculation processes in its generation plants to minimise water consumption and related environmental impacts.

SASB reference: IF-EU-140a.3; GRI reference: 303-1, 303-2

Process and procedures

Most water withdrawal and discharge in CLP's operations is by fossil fuel plants using once-through seawater cooling. In this process, large quantities of seawater are used for cooling and then returned to the sea, with only a slight increase in water temperature. The total volume of water withdrawal and discharge is dependent on the total electricity generated.

CLP strives to reduce the amount of fresh water it uses for its operations. CLP's power stations carry out a range of water conservation initiatives depending on their site conditions, operational situation and age. The amount of water which can be recycled also depends on factors such as location, power station design and local regulatory requirements.

There are two major water concerns that affect CLP. One is that water use in its power plants may impact local water quality and contribute to local water scarcity. To address this, environmental impact assessments are carried out at the planning stage of new projects, in accordance with local requirements, to ensure that any water use impacts associated with project construction and plant operation are managed and mitigated to an acceptable level.

The second concern is water security at CLP's fossil fuel and hydropower generation assets. Four of CLP's six fossil fuel plants under operational control use seawater for cooling. Where seawater cooling is not feasible, CLP strives to minimise its freshwater use and adopt water recirculation processes. Solar farms also use water for the cleaning of solar panels, but the amount required is comparatively small. These measures help limit the risks caused by water security issues.

CLP assesses water risks for its new projects through systematic environmental due diligence, and annually using globally recognised tools such as WRI Aqueduct. Its assessments cover parameters such as water availability, water sensitivity, water stress mapping, potential competing use with other stakeholders, and the management strategies in each region. Where a water supply risk is identified, the Company engages with local stakeholders to understand their needs and with local water suppliers to mitigate or resolve the issue. The latest assessments across the Group indicate that current water supply regimes are stable and the overall risk of substantial impact is minimal.

The quality of CLP's water discharges must also meet licensing and regulatory standards. Under CLP's EMS, the adverse impacts of water discharges are identified, monitored and controlled under programmes which are reviewed on a regular basis. Specific emergency response plans have also been developed to prevent and address the spillage or leakage of pollutants. As a result of the wastewater treatment processes put in place, none of CLP's operations has material impact on the associated water bodies.

To monitor its water-use efficiency, CLP tracks its freshwater withdrawal, discharge and intensity (based on electricity sent out). Internal targets are set each year to encourage continuous improvement in water management practices. CLP also participates in the CDP water security questionnaire. By sharing water resource management data through the survey, CLP is able to benchmark its practices against industry peers.

Initiatives and progress

CLP has taken further steps to improve water management and reduce water discharge-related impacts in its daily operations.

In 2023, CLP reviewed its environmental target-setting process and refined its water targets to reflect the upcoming retirement of CLP's fossil fuel plants. CLP has set group-wide medium- and long-term freshwater consumption targets for the years 2025 and 2030 in terms of a percentage reduction of freshwater consumption quantities against the base year of 2021. It has set an ambitious freshwater consumption target comprising an absolute reduction of 45% to 55% by 2025, using 2021 as the baseline.

The freshwater consumption target covers all CLP's operational control assets. The 2023 results related to the water target and the progress made are shown in the following table:

Nature metrics	Pollution Reduction	2023 Results	2023 Progress	Target Range by end 2025	Target by end 2030
Water (Dependencies)	Freshwater consumption	-71%	In line	-45 to -55%	-85%

SASB reference: IF-EU-140a.1; GRI reference: 303-3, 303-4, 303-5

In 2023, CLP reduced the freshwater consumption by 71% compared with the baseline year of 2021 which was ahead of the target set for 2025.

The decrease was contributed by various water conservation initiatives from the assets and the divestment of a majority stake in Fangchenggeng coal-fired Power Station in Mainland China and the exclusion of India's assets, particularly the coal-fired Jhajjar Power Station.

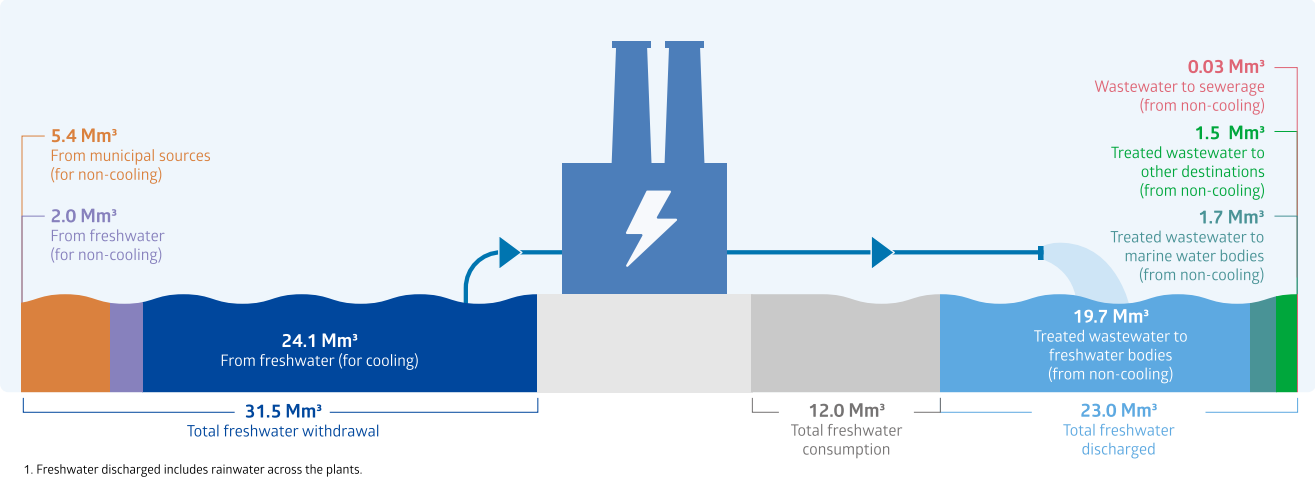
CLP will continue to track the volume of water recycling in its power stations for continual improvement and share good practices across the Group to maximise the benefit of individual power stations' efforts.

Best practice examples of CLP's water management are summarised below:

- **Rainwater harvest system at Hong Kong substations**
  In new electricity substations in Hong Kong, rainwater harvest systems including water recycling tanks and automatic drip irrigation systems will be installed to reduce freshwater consumption where feasible.
- **Upgrading the water treatment plant on circular economy principles at Black Point Power Station**
  A project to expand the capacity of the water treatment plant at Hong Kong's Black Point Power Station (BPPS) was completed in 2023. The project has increased the capacity of the water treatment plant through Reserve Osmosis (RO) technology, which reduces the amount of wastewater compared to that of traditional water treatment plants that utilise chemical processes. This reduction in wastewater is not only reducing the use of chemicals but also enhancing the overall water processing efficiency of the system.
- **Reduction of water wastage through innovative technology in India and Mainland China's solar farms**
  Robotic cleaning systems have been deployed in CLP China's solar farms to reduce water consumption, and a robotic solar panel dry cleaning system has also been utilised at Apraava's solar farms in India to minimise water use and improve the energy yield of the solar panels. In 2023, field trials were conducted involving a combination of robotic dry cleaning and current wet cleaning of solar panels to validate water savings and measure improvements in energy yield. The trial result was encouraging, with the performance improvement in terms of energy gain measured at about 1.2 %, in line with market experience when achieving water savings. Going forward, dry cleaning of solar panels will be used at Apraava's solar farms if feasible. Water recharging pits have also been constructed at all Apraava's solar farms, for rainwater harvesting.
- **Initiatives to prevent wastewater spillage and reduce freshwater consumption in Australia**
  In Australia, EnergyAustralia completed extensive repair and maintenance works to the Morwell River Diversion in Victoria state, which was damaged by heightened water flows following exceptionally heavy rainfall in June 2021. This greatly prevents the overflow of the Morwell River which could flood the mine of Yallourn Power Station and contaminate the water bodies nearby. In addition, Jeeralang Power Station installed an oil detection system in the stormwater outlet to prevent oil spillages.

  The Springvale Water Treatment Plant continued to meet about 80% of the daily water needs at Mount Piper Power Station, significantly reducing the need to source freshwater and hence reducing freshwater consumption.
- **Increase of water use efficiency in India**
  Jhajjar Power Station has been progressively improving water use efficiency at its site through continual improvement measures involving enhancements to the cycles of concentration with advanced chemical treatment in its cooling water system. In March 2023, Jhajjar Power Station won an award for excellence in water use efficiency in a programme organised by the Energy and Resources Institute, the International Water Association and the United Nations Development Programme.

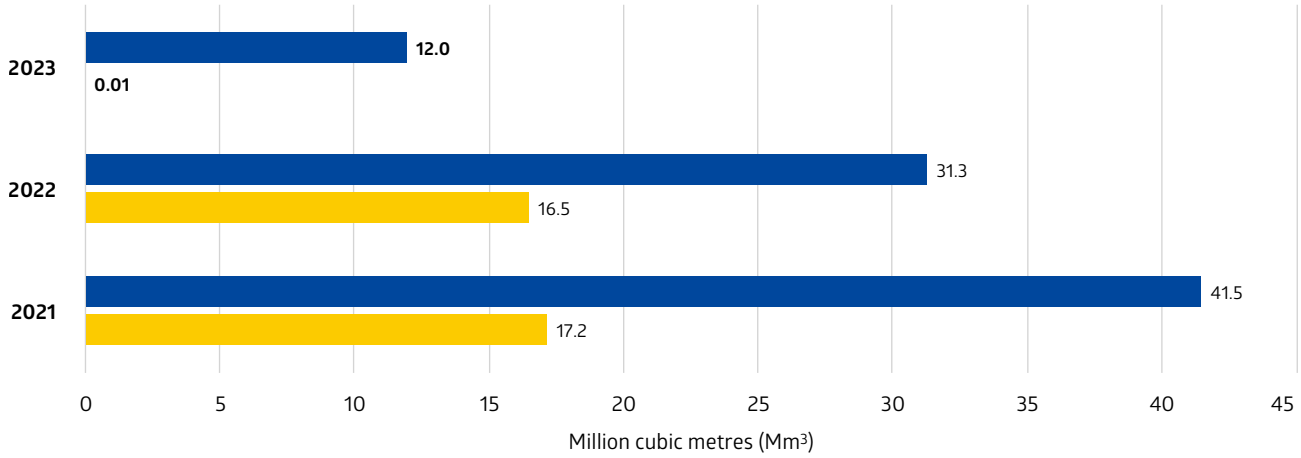
Freshwater Balance



1. Freshwater discharged includes rainwater across the plants.

Freshwater consumption and consumption from water stressed areas

The total amount of freshwater consumption decreased in 2023 mainly due to the divestment of Fangchenggeng Power Station, while water consumption for Apraava Energy's operations, particularly Jhajjar Power Station, was no longer included in the total as it is no longer a wholly-owned subsidiary.



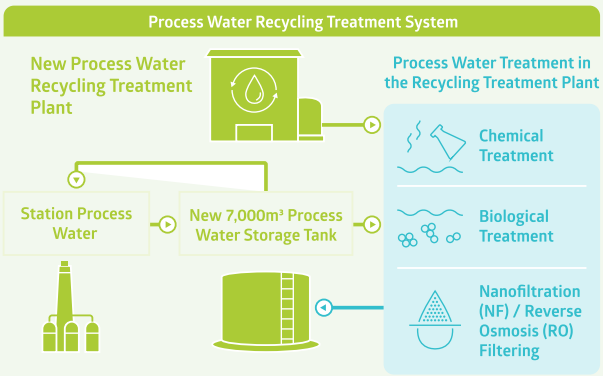
- **Total freshwater consumption of CLP Group's power generation**
- **Total freshwater consumption under water stressed areas**

Case Study

Reducing water consumption through the Castle Peak Power Station (CPPS)'s Process Water Treatment Project

Power generation involves the use of large volumes of water, so improving water management is a key way to reduce water consumption. A project to enhance the existing process water management facilities at CPPS was begun in 2020 and completed in 2023.

The process water recycling treatment system was installed to treat process water and enable recycling in CPPS following the surrender of the Tsang Tsui Ash Lagoon (TTAL) to the government. Wastewater treated by this system will be suitable for reuse at the plant. In addition, with this new system, the water management process at CPPS no longer depends on the TTAL. The land will be released for alternative land for the benefit of the community.



Serving Our Stakeholders

Customers	87
Our people	116
Partners	133
Community	150