CLP Power's New Gas-Fired Generation Units

Fact Sheet

CLP Power has served Hong Kong for more than 120 years and is committed to providing a safe, reliable, and environmentally-friendly electricity supply at a reasonable cost. It is innovatively adopting low-carbon fuels for power generation with a goal of achieving net-zero carbon emissions and helping Hong Kong move forward on its energy transition journey.

In 1996, CLP Power became the first power company in Hong Kong to use natural gas for power generation when Black Point Power Station began operations. Since then, it has continued to improve its emissions performance by optimising its fuel mix, installing emission-reduction facilities, and enhancing plant efficiency. Remarkably, CLP Power's emissions have fallen by more than 90% since 1990, while electricity demand over the same period has grown by over 80%.

A bird's eye view of Black Point Power Station.

CLP Power planned to build two additional gas-fired generation units at Black Point Power Station to meet the demands of continuing social and economic development, while reaching the Government's target of increasing gas-fired generation to around half of the total fuel mix. The first new unit D1 went into service in 2020. A total of nine gas-fired units are now in operation at Black Point Power Station, bringing the station's total generation capacity to 3,225 megawatts.

CLP Power's first new generation unit at Black Point went into operation in 2020.

Combined Cycle Gas Turbine (CCGT) technology is used in all the gas-fired units at Black Point Power Station. However, the new unit deploys the CCGT technology with more advanced design and is capable of achieving an efficiency rate of around 60%, far higher than the remaining eight units. In terms of environmental performance, it reduces annual carbon dioxide emissions by around one million tonnes, equivalent to the planting of more than 42 million trees.

CLP Power is currently building a second new gas-fired generation unit D2, which is expected to go into operation by the end of 2023 as part of an ongoing programme to phase out the remaining coal-fired capacity at Castle Peak A Power Station.

The Role of Gas-Fired Generation in the Energy Transition

Natural gas is a relatively clean fossil fuel. It emits far less sulphur dioxide, nitrogen oxides and fewer respirable suspended particulates during power generation than other fossil fuels. Carbon dioxide emitted by natural gas is nearly half of that by coal. Over the years, the use of natural gas has helped CLP Power reduce emissions from its operations.

The proportion of natural gas in CLP Power's fuel mix increased substantially from below 30% in 2019 to around 50% in 2020, the year the first new gas-fired generation unit went into operation. CLP Power's carbon intensity has also been reduced to about 0.37 kg per unit of electricity consumption, outperforming the carbon reduction levels of developed countries such as Japan and South Korea, and on par with the performance of Germany and the United States.

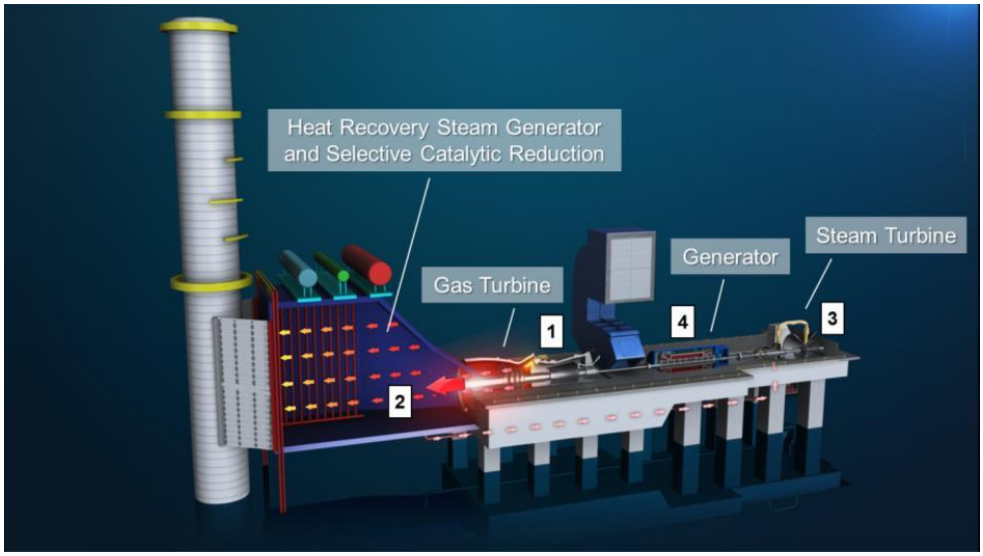
Construction of CLP Power's second new gas-fired generation unit at Black Point Power Station is under way.

As Hong Kong works towards a target of becoming carbon neutral by 2050, CLP Power is increasing its low-carbon electricity supply and helping customers reduce their carbon footprint. Raising the ratio of gas-fired generation is an important near-term measure in CLP Power's energy transition journey. It also aligns with the CLP Group's updated Climate Vision 2050, in which CLP commits to achieving net-zero greenhouse gas emissions across its value chain by 2050.

Combined Cycle Gas Turbine (CCGT) Technology

The most significant feature of a CCGT is its dual turbine design, comprising a gas turbine and a steam turbine. Natural gas is first burned in the gas turbine to generate electricity. During the process, the heat from the gas turbine is captured and transported to heat up water in a boiler. Steam is then produced to drive the steam turbine for power generation. The combined cycle design allows for greater output without the use of additional fuel.

CCGT Power Generation Process



1. The burned natural gas turns the gas turbine, which then drives the generator.
2. The used gas, which is still very hot, is captured in a Heat Recovery Steam Generator to turn water into steam.
3. The steam turbine then generates power.
4. The two turbines drive the generator together, resulting in a greater level of efficiency.

Key Features of the New Gas-Fired Generation Unit

Commissioning Year	2020
Generation Capacity	About 550 megawatts, enough to meet the electricity demand of around 900,000 homes
Generation Technology	State-of-the-art Combined Cycle Gas Turbine technology
Operational Efficiency	Up to 60%, among the world's highest efficiency levels

Other Environmental Elements and Features	Leads to a reduction in annual carbon dioxide emissions of around one million tonnes, equivalent to the planting of more than 42 million trees. The turbine hall incorporates numerous green building features in its architectural design and was awarded a Provisional Platinum BEAM-Plus rating. Key features include: • Effective insulation in the building housing the generation unit • Energy-efficient lighting, lifts, and air conditioning • Natural lighting to reduce reliance on artificial lighting • More than 140 rooftop solar panels, providing more than 1.5% of the electricity needed for the building • Greenery area covering more than 3,300 square metres • Tanks to collect rainwater for irrigation, reducing water use

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