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CLP Power and PolyU Co-develop Smart "Generator Inspection Robot" Spearheading Innovative Solutions through Academia-industry Synergy to Drive Research Translation and Talent Development

CLP Power Hong Kong Limited (CLP Power) and The Hong Kong Polytechnic University (PolyU) have jointly developed a smart "Generator Inspection Robot". By integrating robotics with fibre-optic sensing technology for generator inspections, the project overcomes traditional manual inspection limitations, significantly enhancing the efficiency of inspections and operational safety. The project won a Gold Medal and a special prize—Best International Invention & Innovation, from the National Research Council of Thailand—at the 51st International Exhibition of Inventions Geneva. This international recognition testifies to the achievements of CLP Power and PolyU in fostering industry-academia-research collaboration, injecting momentum into Hong Kong's development in innovative technology and research talent.

A highly reliable electricity supply is vital to the city's social and economic development. As a core facility of the power system, generator inspection and maintenance always require a high level of technical expertise and stringent safety standards. A generator primarily comprises the stationary outer component "stator" and the internal rotating component "rotor". Traditional inspections require the removal of the rotor that weighs approximately 50 tonnes, a complex process involving heavy lifting operations and extensive logistical arrangements.

In light of the unique design of some gas-fired generators at CLP Power's Black Point Power Station, which incorporate internal ventilation baffles, no suitable robotic inspection solutions had previously been available on the market. In response to this operational need, CLP Power's Generation Business Group collaborated with a team of researchers and undergraduates led by Prof. TAM Hwa-yaw, Chair Professor of Photonics of the Department of Electrical and Electronic Engineering at PolyU, to develop a 36-millimetre-thick "Generator Inspection Robot" specifically designed to suit the structural characteristics of the generators concerned.

The robot can flexibly navigate the narrow air gaps between the rotor and the stator, and cross the ventilation baffles inside to automatically complete major inspection

tasks without removing the rotor. These inspections include visual checks of ventilation ducts, assessing the insulation condition of stator core laminations and conducting wedge tightness inspections through tapping. Compared to manual inspection, the robot helps enhance inspection efficiency while optimising long-term maintenance arrangements.

The robot is also equipped with a fibre-optic sensing network to monitor the operational status of its own key components. This ensures its operational stability while navigating the generator's air gaps, ensuring smooth progression of inspection tasks.

CLP Power Senior Director of Generation Mr Kevin Lau said, "CLP Power actively integrates innovative technologies into the daily operations of power stations and encourages our engineering teams to adopt innovative approaches to enhance operational practices. The Generator Inspection Robot jointly developed with PolyU helps enhance inspection efficiency and operational safety while supporting the development of more forward-looking maintenance strategies. In the long run, this strengthens the reliable operation of power generation facilities and supports the delivery of a safe and reliable electricity supply to the community. The project has also enabled CLP Power's engineering teams to participate in the research, development and application of innovative solutions, further deepening collaboration with academia and nurturing Hong Kong's innovation and technology talent."

Prof. Tam Hwa-yaw said, "PolyU is committed to promoting knowledge transfer and driving the translation of the University's research outcomes into solid benefits for society. To enhance interdisciplinary learning, I founded the Engineering Entrepreneurship Club, offering undergraduate students the opportunity to participate in cutting-edge robotics research and the development of design solutions for industry, thereby cultivating their entrepreneurial spirit. Spanning approximately five years, this project combines PolyU's research strength with CLP Power's engineering expertise. Some team members have been involved since their freshman year, fully demonstrating the fruits of PolyU's commitment to industry-academia-research collaboration and contributing to Hong Kong's development into an international innovation and technology hub."

Appendix: Facts about the Generator Inspection Robot

About CLP Power Hong Kong Limited

CLP Power Hong Kong Limited (CLP Power) is the Hong Kong utility subsidiary wholly owned by CLP Holdings Limited, a company listed on the Hong Kong Stock Exchange and one of the largest investor-owned power businesses in Asia. CLP Power operates a vertically integrated electricity supply business in Hong Kong, and provides a highly reliable supply of electricity and excellent customer services to more than six million people in its supply area.

About The Hong Kong Polytechnic University

The Hong Kong Polytechnic University (PolyU) aspires to be an innovative world-class university that pursues excellence in education, research and knowledge transfer for the benefit of Hong Kong, the Nation, and the world. Driven by its motto, "To learn and to apply, for the benefit of mankind", the University nurtures socially responsible professionals and leaders with a strong sense of national pride and a global perspective, and pursues world-leading research and innovation for societal benefits. The University's unwavering commitment to excellence has garnered international acclaim, with PolyU ranking 54th in the QS World University Rankings 2026. Five subjects were placed within the top 30 in the QS World University Rankings by Subject 2026. Furthermore, Hospitality & Leisure Management, Civil & Structural Engineering, Art & Design and Environmental Sciences were ranked first in Hong Kong. PolyU also strives to foster a University community in which all members are united with a strong sense of belonging and pride, empowering the University to scale new heights.

Photo Captions:

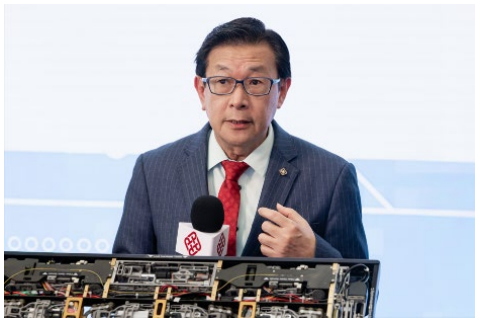
Photo 1

CLP Power Senior Director of Generation Mr Kevin Lau (right); Prof. Tam Hwa-yaw, Chair Professor of Photonics of the Department of Electrical and Electronic Engineering at PolyU (middle); and Mr Victor Leung, Research Assistant at PolyU (left), introduce the "Generator Inspection Robot" jointly developed by CLP Power and PolyU, spearheading automated inspection solutions through innovative technology.

Photo 2

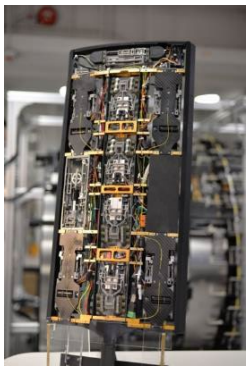
CLP Power Senior Director of Generation Mr Kevin Lau says that the "Generator Inspection Robot" enhances inspection efficiency and operational safety, while supporting the development of more forward-looking maintenance strategies.

Photo 3



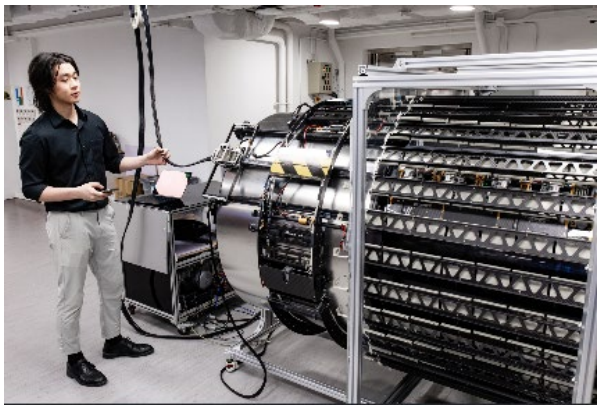
Prof. Tam Hwa-yaw, Chair Professor of Photonics of the Department of Electrical and Electronic Engineering at PolyU says that the project combined PolyU's research strength with CLP Power's engineering expertise, fully demonstrating the fruits of PolyU's commitment to industry-academia-research collaboration and contributing to Hong Kong's development into an international innovation and technology hub.

Photo 4, Photo 5



The CLP Power engineering team and the PolyU research team jointly develop a 36-millimetre-thick "Generator Inspection Robot", which is specifically designed to suit the structural characteristics of the generators concerned, effectively enhancing inspection efficiency while optimising long-term maintenance arrangements.

Photo 6



The robot can cross the ventilation baffles inside air gaps to conduct three major inspection tasks—visual checks of ventilation ducts, assessing the insulation condition of stator core laminations, and conducting wedge tightness inspections through tapping.

Photo 7

The CLP Power engineering team and the PolyU research team test the application of the “Generator Inspection Robot” at the Black Point Power Station.

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