COMPANY
CLP Power Hong Kong Limited

PROJECT
CLP Power's Yuen Long Industrial Estate Substation Project

LOCATION
Wang Lok Street, Yuen Long Industrial Estate, N.T. - Y.L.T.L 537

TYPE
Transmission Substation

SCHEDULED TIME OF COMPLETION
June 2025

Unleash Your Potential - One Step, Infinite Power

"CLP Power is dedicated to introducing new technologies to enhance its operational efficiency and performance. One such technology is the application of Building Information Modelling (BIM), which has transformed the approach to our infrastructure projects. By leveraging BIM, our project teams were capable to ensure enhanced precision in every aspect of design and construction. Winning the award highlights CLP Power's commitment to innovation and excellence in providing sustainable and efficient power infrastructure solutions."

—**Chung, Jackson Sai Kit**
Manager - Building Information Modelling, CLP Power Hong Kong Limited

BIM PARTNERS
Andrew Lee King Fun & Associates Architects Limited

WSP Asia Limited

Hip Hing Construction Company Limited

Wings & Associates Consulting Engineers Limited

AUTODESK PRODUCTS USED
Autodesk Construction Cloud®
Autodesk® Navisworks®
Autodesk® ReCap® Pro
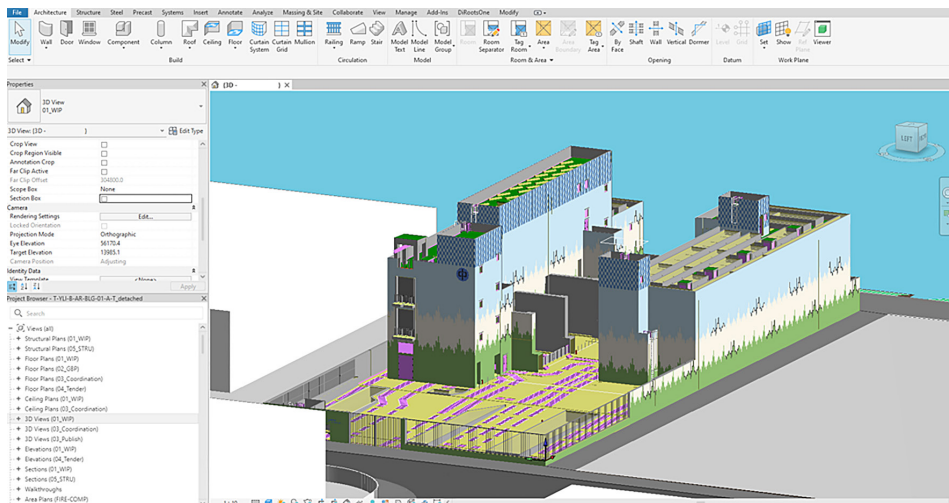**Autodesk® Revit®**
Autodesk® Tandem™

CLP Power's Yuen Long Industrial Estate Substation
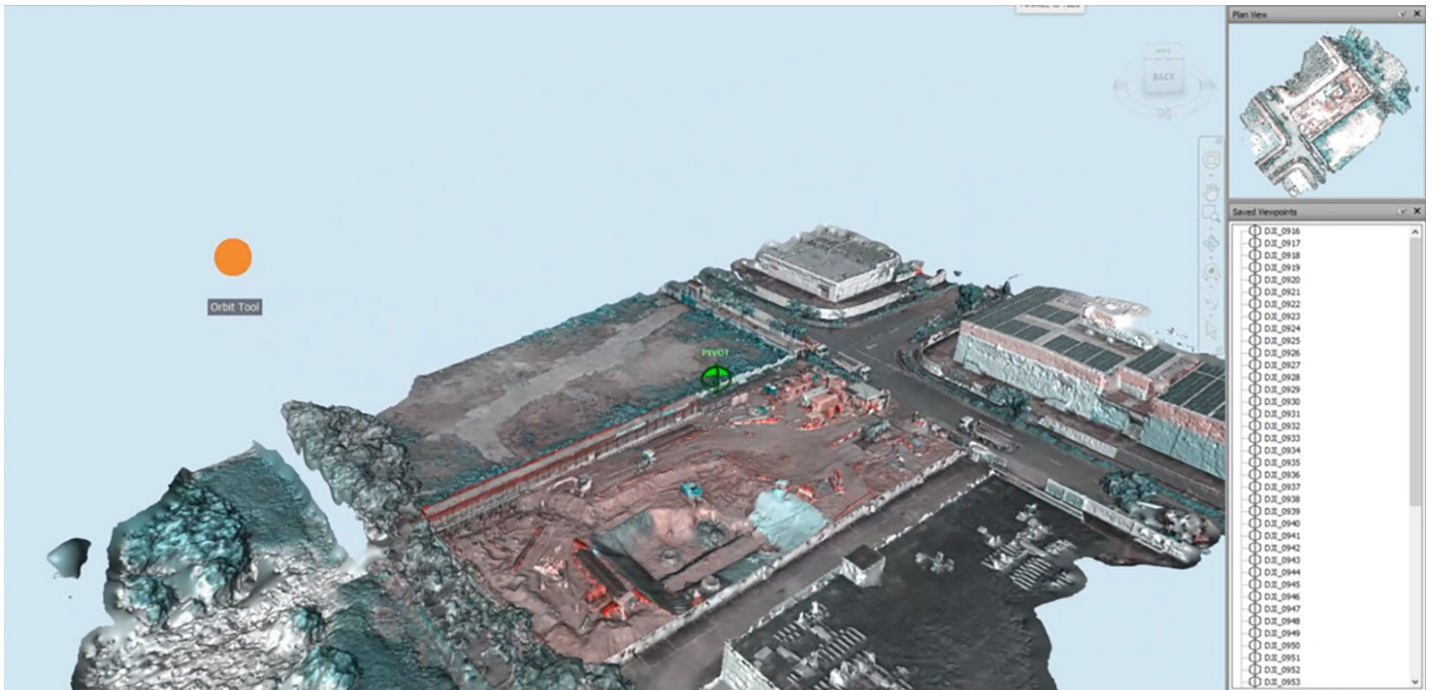Image Courtesy of CLP Power Hong Kong Limited

CLP Power's Yuen Long Industrial Estate 132kV Substation is located between Nam Sang Wai and Yuen Long Industrial Estate. This project was initiated to cater for the growing electricity demand arose from nearby urban development and industrial activities. BIM was applied throughout the whole project cycle, including design, coordination, drawing generation, design verification, construction planning, data input and operation.

BIM Application in CLP Power

Since 2014, CLP Power has applied BIM to enhance the operational efficiency and performance throughout the project life cycle, aiming to elevate both current and future endeavours. Our BIM journey began with the foundational pillars of Autodesk Revit and Navisworks, quickly progressing to 3D scanning and 4D animation for more realistic visuals.

Combined revit model of Yuen Long Industrial Estate Substation
Image Courtesy of CLP Power Hong Kong Limited

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Point cloud image of Yuen Long Industrial Estate Substation construction site and nearby buildings
Image Courtesy of CLP Power Hong Kong Limited

To meet rising quality standards, we later incorporated automation software like Dynamo, improving both accuracy and efficiency. The adoption of a digital twin platform marked a new chapter in CLP Power's asset management, significantly enhancing data accessibility. We will continue to work on unleashing the full potential of BIM applications.

Project Goal

CLP Power cares about its customers and the community, and is committed to minimising environmental impact in its daily operations. Our vision for this development project is to cultivate a sustainable community that blends natural rhythms with modern innovation. By utilising BIM technologies, we enhanced the substation design by integrating the natural landscape of Nam Sang Wai and the industrial aesthetics of the Yuen Long Industrial Estate. We incorporate sustainable development principles and design thinking into both the functional and aesthetic aspects of substation design.

Substation Design Features

In this project, we utilised a range of tools and methodologies to enhance the efficiency and sustainability of the substation design. Our focus was on maximising the utilisation of renewable energy, natural sunlight, and urban greening.

Using the solar study tool in Autodesk Revit, the project team conducted precise sun path simulations to analyse sunlight and shading in relation to surrounding structures and landscapes. This enabled the strategic placement of photovoltaic (PV) panels at optimal angles, maximising solar exposure and resulting in a notable reduction in the

Natural landscape of Nam Sang Wai and the industrial building in Yuen Long Industrial Estate
Image Courtesy of CLP Power Hong Kong Limited

Sapium Discolor (山烏桕)

Millettia Pinnata (水黃皮)

Sapium Discolor and Millettia Pinnata were selected for their climate capability and aesthetic appeal
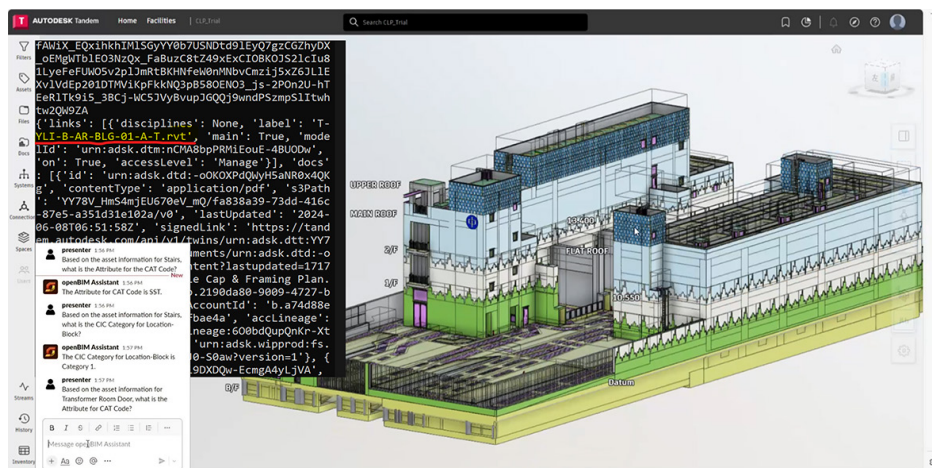Image Courtesy of CLP Power Hong Kong Limited
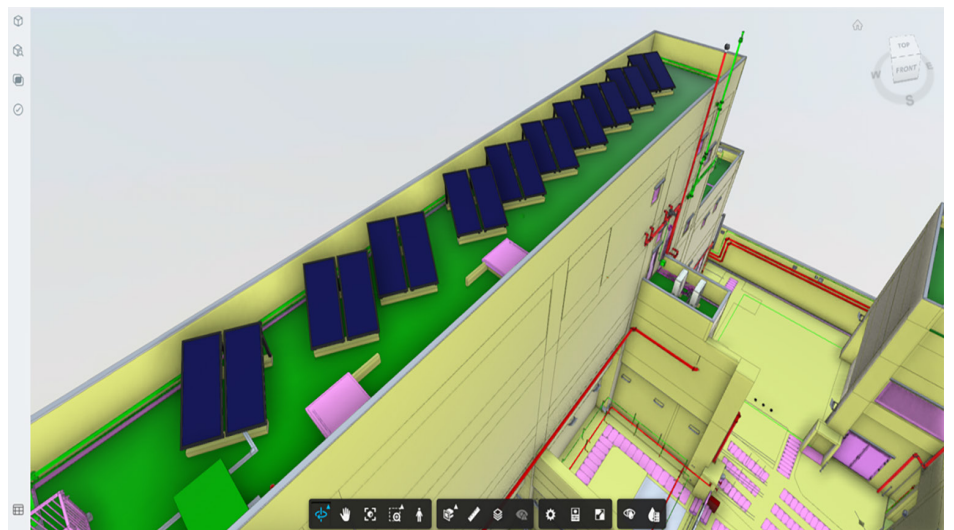
Sun path analysis was performed to maximise solar exposure of PV panels
Image Courtesy of CLP Power Hong Kong Limited

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substation's energy usage. Additionally, this approach enhances natural lighting and temperature control, promoting the building's energy efficiency.

Besides, over 20% of the building area will be covered by greenery. Plant species such as Sapium discolor (山烏柏) and Millettia pinnata (水黃皮) were specifically selected for their compatibility with Hong Kong's climate, resistance to common pests, and aesthetic appeal. The selection and arrangement of colour tiles were also meticulously planned to complement the scenic natural surroundings of the industrial building. This project has been awarded a Provisional Platinum Rating in BEAM Plus New Buildings Version 2.0 certification.

The Yuen Long Industrial Estate Substation not only sets the standard for CLP Power's new substation design, but also serves as a showcase of the company's efforts in technology application and environmental care.

openBIM Model Checker automatically detects missing attributes
Image Courtesy of CLP Power Hong Kong Limited

Design verification can be performed by comparing 360 degrees image of actual site and BIM model
Image Courtesy of CLP Power Hong Kong Limited

Smart and Innovative use of BIM

Innovation is often considered vital for addressing future demands in the construction industry. CLP Power is committed to continuous improvement, striving for excellence, and continuously exploring different innovative applications.

A descriptive twin for smart data and document management was created in Autodesk Tandem. It contains construction data that are invaluable for operation and facility management. To facilitate the access to these data for engineers and other professionals, a Tandem-based AI chatbot was created to answer users queries about asset information which extracted from Tandem. The AI chatbot understands natural human language and generates context-aware responses according to the users' search history, preferences and environmental context.

Tandem-based AI Chat Bot answer users queries and generate context-aware responses
Image Courtesy of CLP Power Hong Kong Limited

Furthermore, the manual input of BIM information was susceptible to human errors, potentially compromising the quality of our BIM assets. The team has implemented various Dynamo scripts for automating Revit model processes, as well as data import and export. Additionally, an automatic openBIM model checker has been incorporated to verify the completeness of LOD-I (Level of Development - Information) for individual elements and categories.
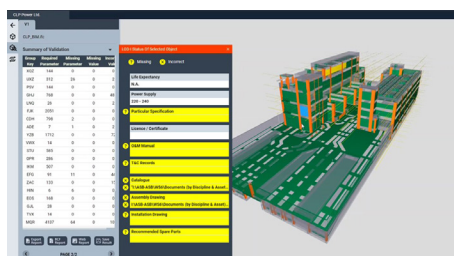
Online AR technology, such as OpenSpace was also utilised in this project to overlay virtual BIM elements onto the actual site images, verifying the designs and construction status which enables easy tracking and recording of the site progress.

These innovations have reduced the time required for retrieval of information that is passed from one project phase to another. All project data is defined at a level of granularity that allows flexible tracking and retrieval of information throughout the project lifecycle, eliminating the need to regenerate the information.

A Greener Future

Care for the environment has always been one of the core values of CLP Power and it was fully demonstrated in the substation project. The Yuen Long Industrial Estate Substation achieves our aim of minimising environmental impact by integrating sustainable development principles and design thinking through the use of BIM technologies. CLP Power will accelerate our efforts to digitalise and decarbonise our operations to promote a greener future.

Over 20% greenery at Yuen Long Industrial Estate Substation
Image Courtesy of CLP Power Hong Kong Limited

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CLP Power's Yuen Long Industrial Estate Substation achieved our aim to integrating sustainable development principles and design thinking through BIM technologies
Image Courtesy of CLP Power Hong Kong Limited

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 6 million people in its supply area.

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