

“Smart BIM. Bold Future.” An Illustration of CLP Power’s BIM Journey

COMPANY

CLP Power Hong Kong Limited
Hip Hing Construction Company Limited
Andrew Lee King Fun & Associates
Architects Limited

PROJECT

Kam Tin South Substation
“Smart BIM. Bold Future.”

LOCATION

Kam Tin South, LOT NO.2324 IN D.D. 106

TYPE

Electrical Transmission Substation

SCHEDULED TIME OF COMPLETION

Feb 2027



“At CLP Power, our “BIM for Everyone” initiative unites project teams to enhance collaboration and clarity. We leverage Autodesk Construction Cloud (ACC) as our Common Data Environment (CDE) and integrate emerging technologies such as Augmented Reality (AR) and Mixed Reality (MR) to connect people, data, and decision-making.

ACC enhances coordination, communication, and compliance with international standards, transforming our vision into value through smarter designs, safer construction, operational excellence, and sustainability initiatives. We are committed to delivering innovative and impactful outcomes in electrical transmission substations, ensuring a sustainable and efficient future.”

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

AUTODESK PRODUCTS USED
Autodesk® Civil 3D®
Autodesk Construction Cloud®
Autodesk® Dynamo
Autodesk® Navisworks®
Autodesk Platform Services
Autodesk® ReCap® Pro
Autodesk® Revit®
Autodesk® Vehicle Tracking
Data Exchange Connector



CLP Power’s Kam Tin South Substation
Image Courtesy of CLP Power Hong Kong Limited and Hip Hing Construction Company Limited and Andrew Lee King Fun & Associates Architects Limited

CLP Power has been a pioneer in adopting Building Information Modelling (BIM) in electrical transmission substation projects to enhance project delivery and operational efficiency. The Kam Tin South Substation (KNS) project exemplifies our commitment to innovation, sustainability, and collaboration through BIM.

This project demonstrates the application of BIM throughout its entire lifecycle - from design and planning to construction and operations - utilising advanced technologies such as automation, data analytics, augmented reality (AR), mixed reality (MR), and cloud-based collaboration. By embracing a “BIM for Everyone” approach, CLP Power empowers all stakeholders to engage with BIM, contributing to smarter, leaner, and more impactful outcomes.

BIM Journey at CLP Power

CLP Power began its BIM journey in 2014, recognising its transformative potential across the planning, design, construction, and operation of electrical transmission substations. Over the years, BIM has evolved from a design tool into a strategic asset and is now fully integrated into all CLP Power’s new transmission substation projects.

Today, BIM supports every stage of the project lifecycle - from early planning to long-term operations. CLP Power enhances usual 3D modelling and 4D construction planning by incorporating emerging technologies such as automation software, artificial intelligence (AI) chatbots, AR, and MR. These innovative technologies improve efficiency and accuracy while making BIM more accessible to all stakeholders, aligning with our commitment to achieving “BIM for Everyone.”

Project Overview: Kam Tin South Substation (KNS)

The KNS is a crucial project aimed at supporting the growing electricity demand in the rapidly developing Kam Sheung Road area in the New Territories, Hong Kong. This development area encompasses new residential projects, associated facilities, and existing transport infrastructure.

CLP Power initiated the construction of KNS to ensure a reliable power supply for the expanding community. The substation was designed with mindful consideration of the natural landscape and surrounding neighbourhood. Throughout the project lifecycle, BIM technology is utilised to enhance project coordination, safety, and operational efficiency.

Design Integration with Nature

The KNS was designed with a strong emphasis on environmental sensitivity. To maintain the area's natural wind flow and green corridor, there is a height restriction for the substation building. The façade design is inspired by the surrounding hills, enabling the substation to integrate harmoniously into the nearby environment.

To optimise natural lighting and facilitate thermal comfort, a sunlight analysis was conducted. It simulated the sun's path throughout the year and assessed shading impacts from nearby structures. The results also informed temperature control strategies for rooms housing temperature-sensitive equipment.

Collaborative BIM Environment

To ensure effective collaboration and compliance with ISO 19650 standard, the project team extensively utilised the Autodesk Construction Cloud (ACC) ecosystem:

- ACC Docs served as the central repository, providing a single source of truth with version control and traceability, structured in accordance with ISO standards.
- ACC Design Collaboration facilitated the controlled sharing of design data across disciplines, streamlining workflows and enhancing teamwork.
- ACC Model Coordination created a unified space for uploading, reviewing, and identifying any potential clashes in 3D models, enabling real-time interdisciplinary coordination.

- ACC Insight delivered data-driven dashboards featuring project metrics, weather updates, and 360° site captures from various applications, transforming raw data into actionable intelligence.

By leveraging ACC, the team ensured ISO-compliant BIM practices while making BIM more controllable, accessible, and engaging for all stakeholders.

Data-Driven Decision Making

To enhance decision-making and performance tracking, the team employed the Data Exchange Connector to integrate Revit, Navisworks, and Power BI - without exporting entire models. This allowed efficient extraction and analysis of specific 3D model data, such as room geometry, equipment details, and project metrics.

Power BI transformed this data into interactive dashboards and comprehensive reports, enabling stakeholders to monitor progress and make informed decisions throughout the project lifecycle.

BIM Applications for Site Planning

BIM played a critical role in addressing site-specific challenges and enhancing planning efficiency. A key example involved mitigating traffic congestion resulting from concurrent construction activities at nearby sites.

To tackle this issue, the team conducted a swept-path analysis to simulate vehicle movements and identify potential bottlenecks along the main access route. This analysis facilitated optimised space utilisation and improved logistics planning, ensuring smoother site operations.

Enhanced MEP Coordination for Long-Term Value

Mechanical, Electrical, and Plumbing (MEP) coordination can be complex and fragmented. In this project, CLP Power successfully implemented a comprehensive BIM workflow across architecture, structure, and MEP disciplines. All teams collaborated within a shared 3D environment, establishing a single source of truth that resulted in both aesthetic and functional outcomes.

The approach of concealed conduit modelling provided valuable information for our facilities management team, facilitating more efficient planning for future maintenance work. This strategy ensures long-term value and maintainability of the systems.

Innovative Technologies for Site Monitoring

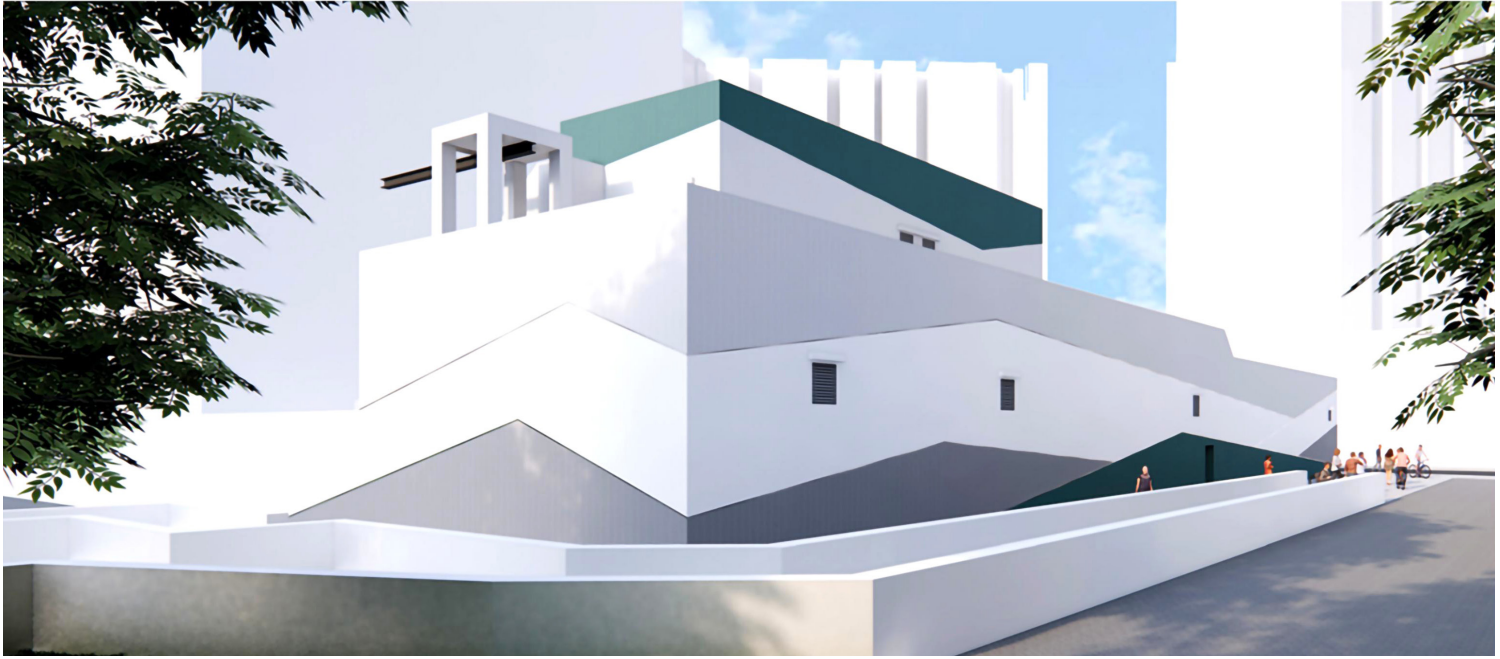
To enhance site progress tracking and facilitate real-time collaboration, CLP Power integrated AR and MR technologies with BIM. The site team member conducted weekly site walkthroughs, capturing 360° images of the construction site. These images were then uploaded to a cloud platform for processing and analysis. BIM models were regularly updated on the platform, facilitating direct comparisons between actual site progress and planned construction. This integration enabled the project team to effectively monitor progress and ensure that the substation was built according to the design.

Smart BIM, Bold Future

The KNS project demonstrates CLP Power's proactive approach to digital transformation through the adoption of BIM. By embracing BIM early in the project, we have realised significant benefits in design coordination, construction efficiency, stakeholder engagement, and long-term asset management.

With BIM submission becoming mandatory by private sector in Hong Kong by 2029, early adoption positions CLP Power for operational excellence. It enables us to build internal capabilities, streamline workflows, and foster a collaborative culture among the company and contractors. Now is the time to engage all project members, ensuring they are familiar with and empowered to utilise BIM effectively.

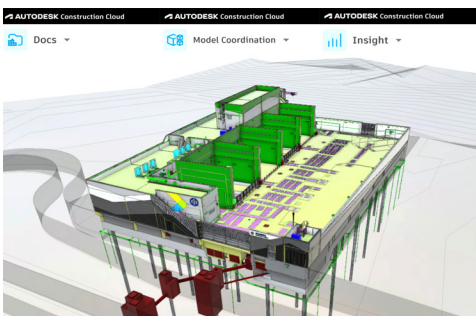
At CLP Power, we are dedicated to a "BIM for Everyone" approach. This commitment enables all project team members to contribute to the development of smarter and more sustainable solutions.



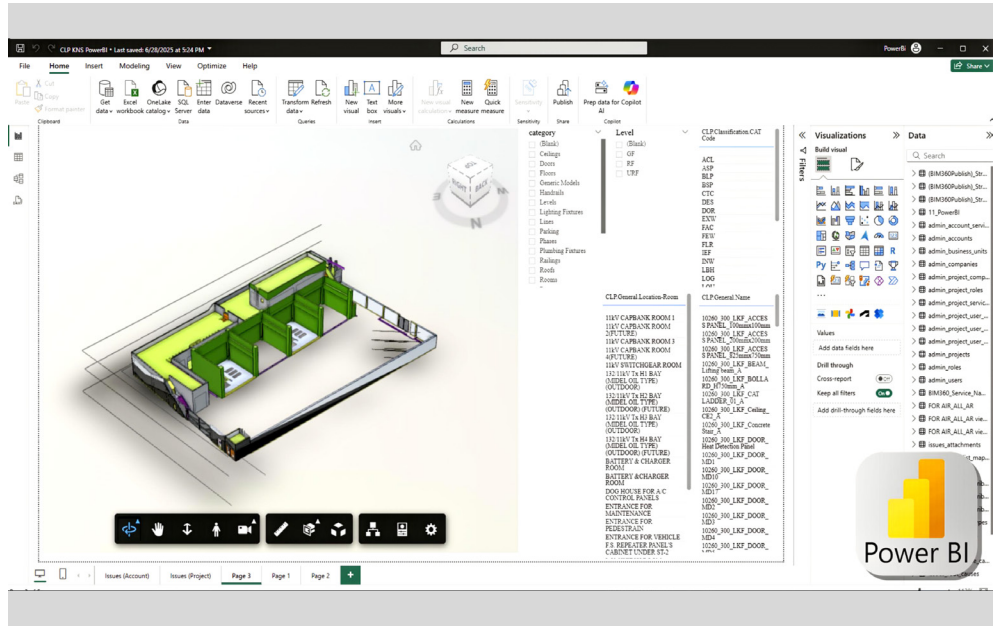
Low-rise design and mountain-patterned façade blend with nature and nearby communities
Image Courtesy of CLP Power Hong Kong Limited and Hip Hing Construction Company Limited and Andrew Lee King Fun & Associates Architects Limited



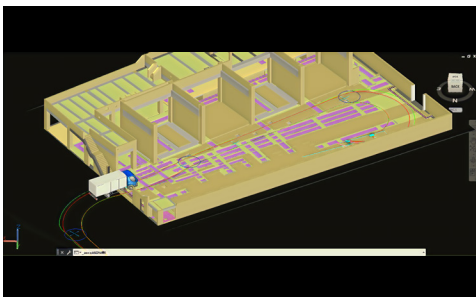
Sunlight analysis guides lighting design
Image Courtesy of CLP Power Hong Kong Limited and Hip Hing Construction Company Limited and Andrew Lee King Fun & Associates Architects Limited



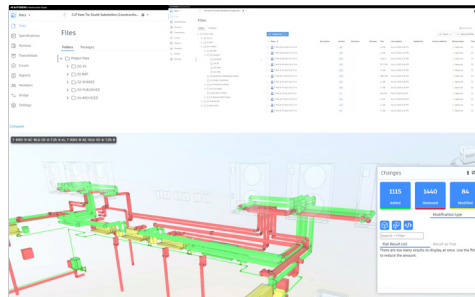
Collaborative BIM Environment - Autodesk Construction Cloud (ACC)
Image Courtesy of CLP Power Hong Kong Limited and Hip Hing Construction Company Limited and Andrew Lee King Fun & Associates Architects Limited



Data Exchange Connector for PowerBI
Image Courtesy of CLP Power Hong Kong Limited and Hip Hing Construction Company Limited and Andrew Lee King Fun & Associates Architects Limited



Swept-path analysis supports early logistic planning for site access
Image Courtesy of CLP Power Hong Kong Limited and Hip Hing Construction Company Limited and Andrew Lee King Fun & Associates Architects Limited



ACC Docs is used as single source of truth for design and file management
Image Courtesy of CLP Power Hong Kong Limited and Hip Hing Construction Company Limited and Andrew Lee King Fun & Associates Architects Limited



AR/MR is used to overlay BIM models for real-time site inspection and collaboration
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