

COMPANY

CLP Power Hong Kong Limited

PROJECT

Shing Kai Road 132kV Substation

LOCATION

Shing Kai Road, New Kowloon Inland

TYPE

Design and Construction of Shing Kai Road Substation

SCHEDULED TIME OF COMPLETION

2022 Q2

Innovative Smart Shing Kai Road Substation

“Innovative Smart
Substation.”

—Arras Yeung

Civil Design Manager,
CLP Power Hong Kong Limited

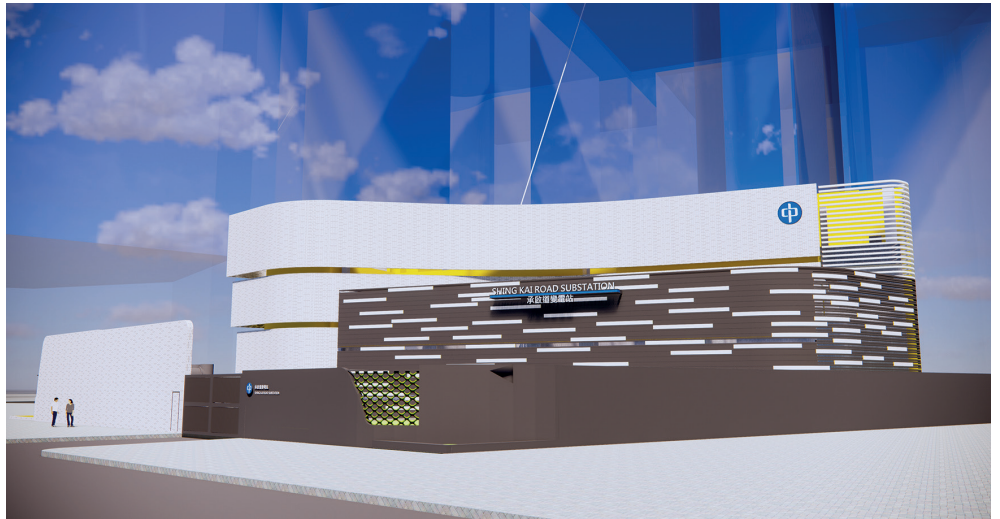
AUTODESK PRODUCTS USED

3DS Max

A360

Navisworks Freedom

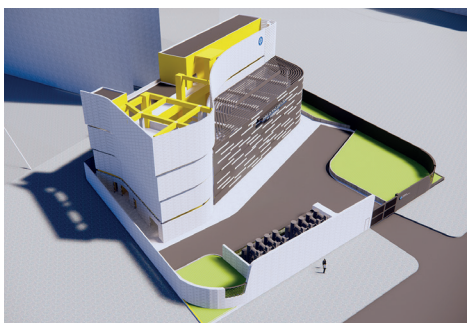
Revit



BIM model is an effective tool to help stakeholders understand the building design and surrounding development.
Image Courtesy of CLP Power Hong Kong Limited

Shing Kai Road Substation (SKR) is a 132/11kV transmission substation for supplying electricity to the Kai Tak Redevelopment area. Kai Tak, a former airport site at the central metropolitan area of Hong Kong is to be redeveloped into an urban oasis for the healthy livings of people. Echoing the healthy development strategy of Kai Tak, SKR is developed with a green and people-friendly approach.

Green practices for the substation have been developed with a systematic and innovative approach. The development of this substation addresses various aspects of environmental protection throughout the entire project life cycle in Feasibility, Planning, Construction and Asset Management.



BIM model is an effective tool to help stakeholders understand the building design and surrounding development.
Image Courtesy of CLP Power Hong Kong Limited

Feasibility, Inception Study and Planning Stage

The 3D BIM model of SKR and its surrounding conditions is presented to the senior management, project management, planning engineer, architect, structural engineer, building services engineer, HV Plant engineer, safety specialists, operation and maintenance team. The short-term and long-term operational requirements of the substation are addressed. The design of the substation addresses various comments from different project stakeholders. The budget and the project programme are adjusted accordingly.

Design Stage

BIM is applied to enhance the design of the substation in meeting various requirements such as the buildability, functional requirements, provisions for operational safety, people-friendly and environmentally friendly features. Designers from different disciplines work collaboratively to produce a well-coordinated design of the substation under the BIM environment. The 3D BIM model contains adequate details that can enhance the accuracy of the cost estimation of SKR. The 3D BIM model of SKR is prepared for communication with the external parties,

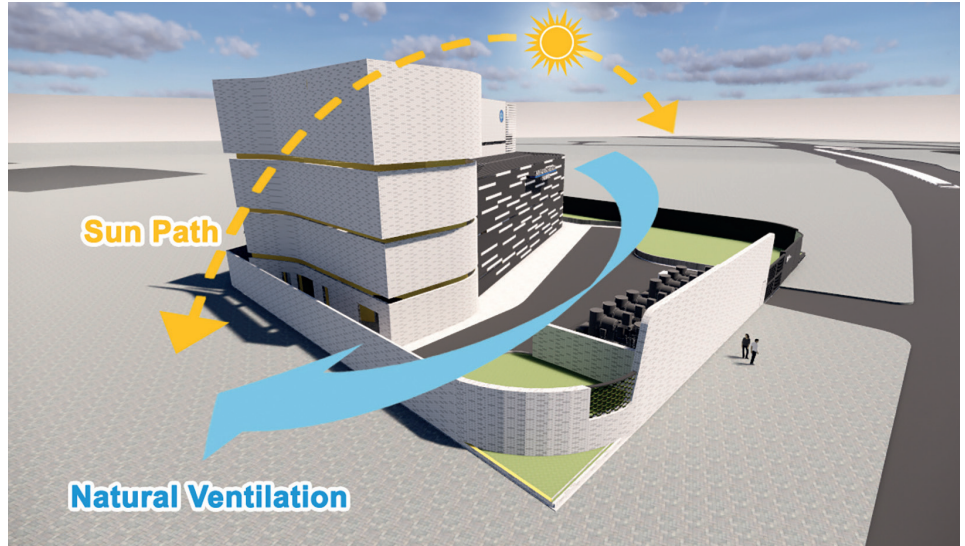
such as potential contractors, local community and other concern groups.

Construction Stage

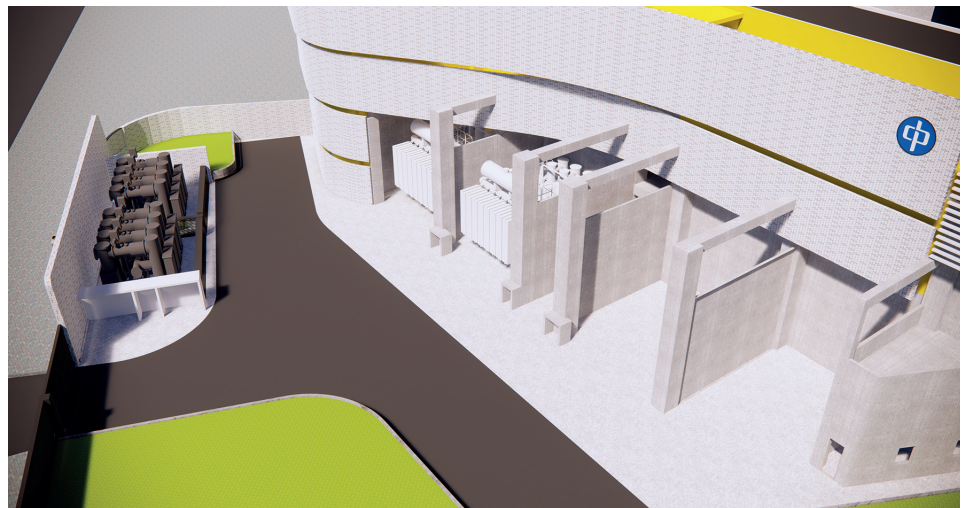
The main contractor applies BIM to enhance the management of the site construction works, improve the site coordination and reduce the construction site wastage. The BIM is used to prepare the 3D models and 4D animations of high-risk work processes and site environments for presentation during the routine coordination with the supervisory level and front-line staff in order to raise their awareness in safety and site work. Upon the completion of work, the contractor will provide the as-fitted BIM of SKR to CLP Power (project owner) for recording purpose.

Asset Management

CLP Power uses BIM technologies to improve the asset management of SKR. The short-term and long-term requirements of SKR are reviewed during the project inception stage with the BIM model. The design of SKR is optimised to address the operational requirement through the collaboration of the project stakeholders through the BIM process. The predicted energy performance of the building such as the photovoltaic installation is prepared for continuous improvement purposes. With the BIM technology, the engineer can produce the



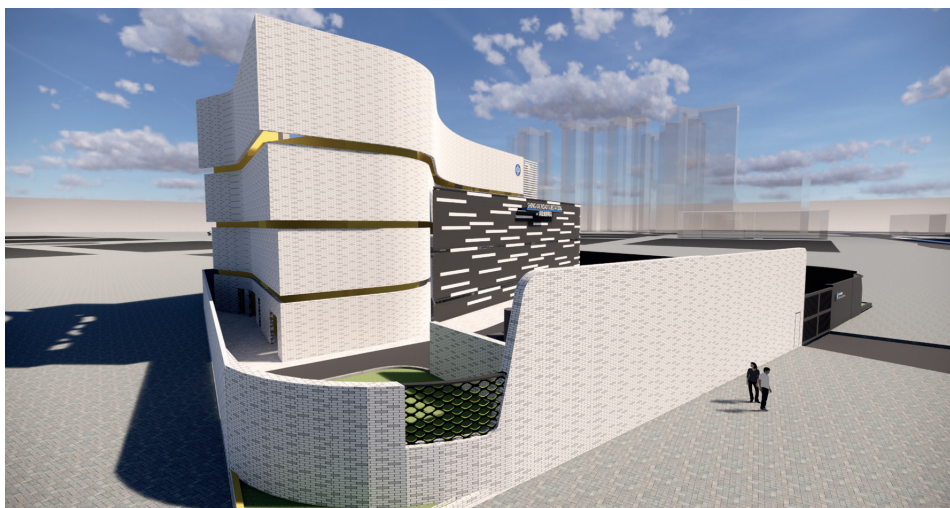
BIM enhances the multidisciplinary design collaboration and effectiveness of photovoltaics operations. Image Courtesy of CLP Power Hong Kong Limited



BIM enhances the multidisciplinary design collaboration and optimisation for high voltage plant equipment installation. Image Courtesy of CLP Power Hong Kong Limited

complicated additional and alternation work plan of future works inside SKR efficiently. The engineer can also convey the message about the work plan and process to others easily under the BIM environment.

Although SKR is located on a small site, the substation comprises two low rise building blocks which reduce the speed of the building induced wind to the nearby pedestrians. Light fittings in the external area is carefully located to avoid obtrusive to people outside the substation. Soft landscape with a variety of plant species covering 35% of the site adds visual interest to the surrounding area. The vertical green wall provides a comfortable visual feature at the perimeter level. The metal mesh opening on the fence wall provides an open and permeable visual linkage which helps enhance the streetscape of the surrounding area. The curved façade of the substation covering the heavy plant equipment makes it out stand from traditional power buildings and perfectly blends into this energetic hub. The positive emotion of passersby will be refreshed by birds and butterflies that are attracted by the delightful, bright and colourful flowers of plants inside the substation.

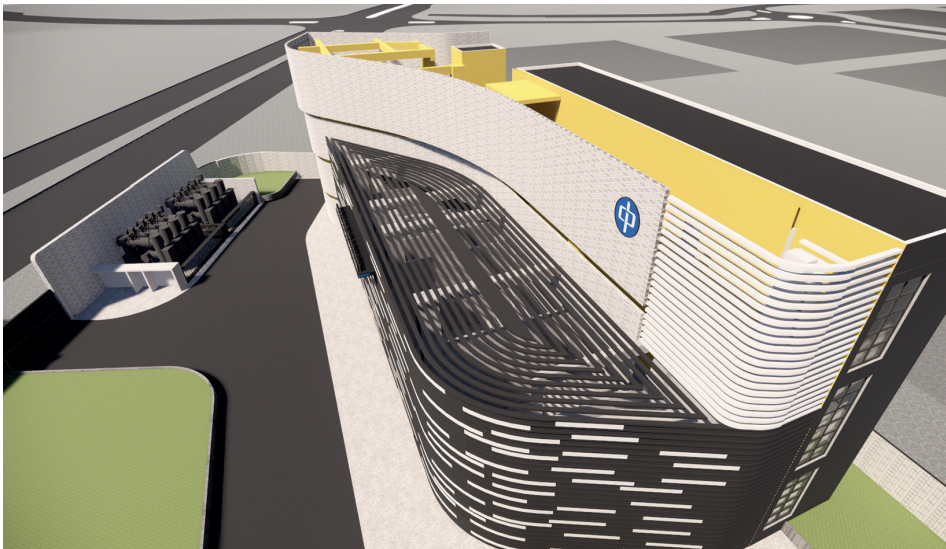


BIM model provides an accurate sense of presence of building structure that is yet to be built. Improvement to the design can be identified easily prior to the construction. Image Courtesy of CLP Power Hong Kong Limited

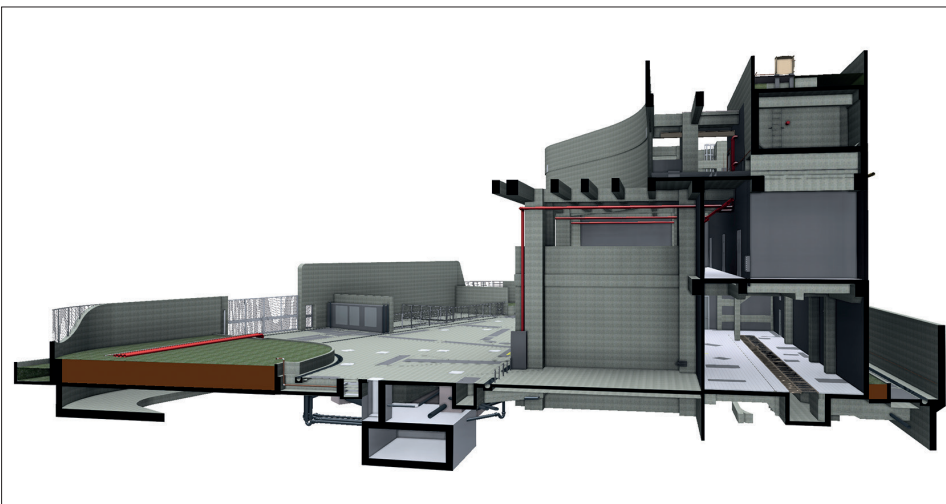
The substation aims to achieve environmental friendly BEAM Plus standard with Platinum Rating through the incorporation of various sustainable design elements. Modern and advanced technologies are applied to enhance the project so that SKR will be more friendly to people within and outside the substation during the entire project lifecycle.

The layout of SKR is planned to cater the future extension of the electrical plant facilities with the long-term developments of Kai Tak area.

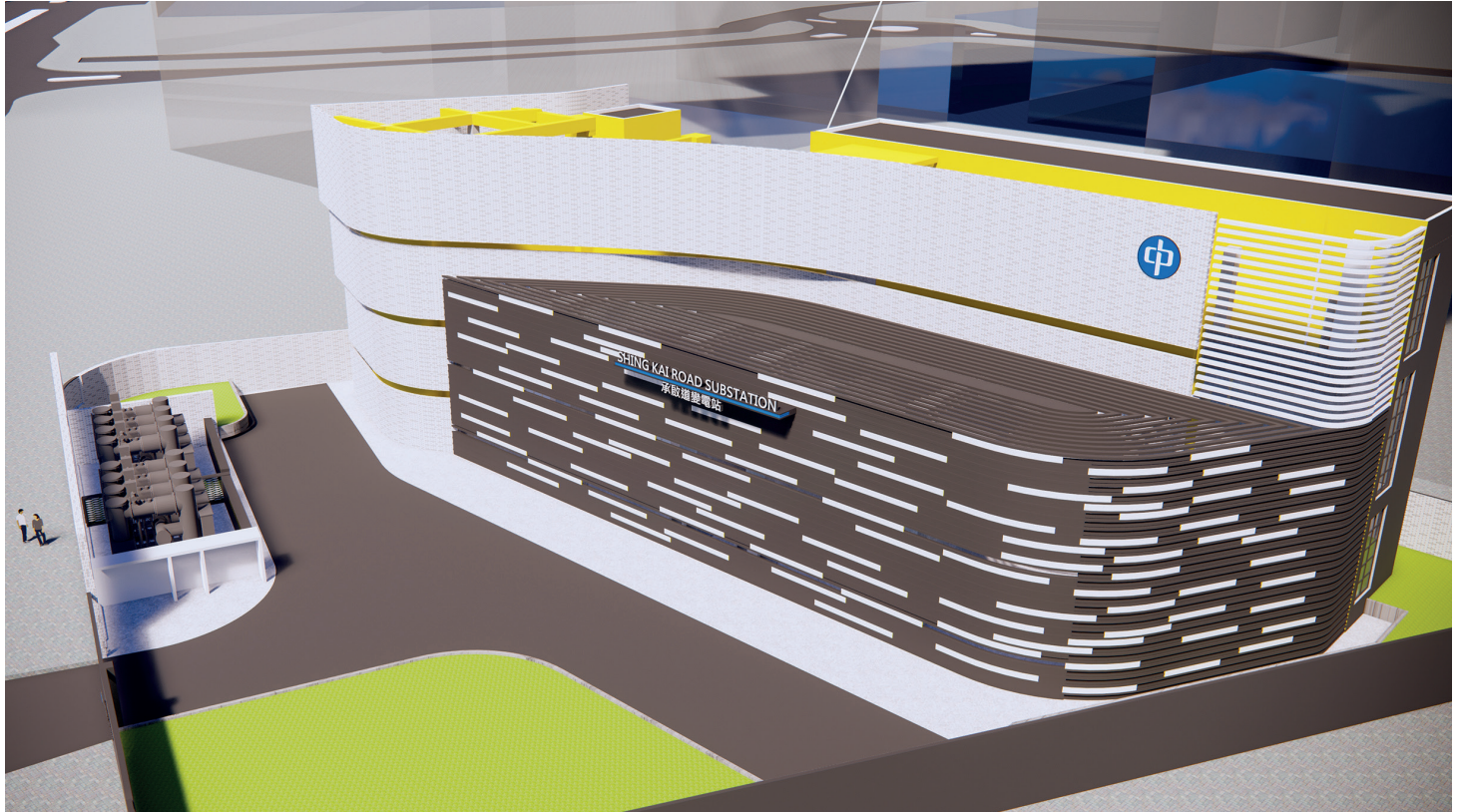
Appropriate facilities are provided inside SKR for the future routine maintenance activities. Lifting facilities like I-shape steel beam and haulage lug for servicing the heavy plant equipment are provided as resilient measures for the emergency operations of the substation.



BIM enhances the multidisciplinary design collaboration and optimisation for high voltage plant equipment installation.
Image Courtesy of CLP Power Hong Kong Limited



BIM model is an effective communication tool to convey design intentions to the project stakeholders and enhance the multidisciplinary design collaboration.
Image Courtesy of CLP Power Hong Kong Limited



BIM model is an effective tool to help stakeholders understand the building design and surrounding development.
Image Courtesy of CLP Power Hong Kong Limited

About CLP Power Hong Kong Limited

CLP Power Hong Kong Limited (“CLP Power”) is a 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 6 million people in its supply area.