CLP Internship Programme 2023

Project Outline - Electrical Engineering

Project Code	E1_SAND_01	
Project Detail	**Internship Category**	Sandwich
	Internship Period	Jun/2023 to May/2024
	Preferred Discipline	**First Preference:** • Electrical **Other Preference:** • Mechanical / Energy / Electronics
	Project Name	Process Flows Enhancement in Trainee Programmes
	Business Objective(s)	Review and digitalise process flows in Trainee Programmes in order to align company direction such as digitalisation and de-carbonisation and enhance the efficiency and effectiveness of trainee programmes. Expected outcomes: • By using of PowerApps, Power Automate, SharePoint, etc. • Digitalise and automate manual processes • Store and analyse data for reporting • Streamline training scheduling
	Project Description	• The intern shall understand and review the training programmes and the involved process flows to propose and develop digital solutions to streamline daily operations, performance management, data accuracy and reporting, etc. • The intern will have opportunity to understand more about the Power Supply Systems and experience some training contents of our trainee programmes during the review process, which would be an advantage for his/her career development in Power Industry
	Required Skills	Basic computer programming / coding knowledge(If required, basic training for PowerApps, Power Automate, SharePoint would be provided.)

CLP Internship Programme 2023

Project Outline - Electrical Engineering

Project Code	E1_SAND_02	
Project Detail	**Internship Category**	Sandwich
	Internship Period	Jun/2023 to May/2024
	Preferred Discipline	**First Preference:** • Electrical Engineering **Other Preference:** • Mechanical Engineering
	Project Name	Went Landfill Gas Power Generation Project Phase II
	Business Objective(s)	• Support during project Planning & execution phase in terms of report preparation, stakeholder management & site work coordination with contractors • Provide inputs/research during technical design checks from perspective of latest technologies and innovation • Provide inputs/research during construction phase on use of quality check tools like BIM • Support Project Controls Team to monitor a portfolio of projects in SHE, Cost, Schedule & Technical aspects in meeting GBG safety, health and environment (SHE) targets, international engineering standards and Project Management Governance System (PMGS) requirements
	Project Description	To continue the Renewable Energy (RE) development, phase-II project execution will install 2 nos. of Low BTU Landfill gas generator sets of 2 MW each with additional technologies on integration of waste to energy and its enhancement e.g. waste heat to power module (ORC), impact analysis on integration of additional Gen sets to the grid etc and ensure quality project execution in safe manner. • The intern will support the project planning & Support during project execution phase in terms of report preparation, stakeholder management & site work coordination with contractors, Provide inputs/research during technical design checks from perspective of latest technologies and innovation as well as during construction phase on use of quality check tools like BIM • The PMGS system consists of project categorization, a project life-cycle with defined decision and review points and a governance system to review and manage project development and execution • Conduct health check of the PMGS & corresponding improvement areas • Enrich Project Control and Monitoring • Promote Information Accuracy, Sharing and Learning
	Required Skills	• Basic Engineering knowledge on Electrical/Mechanical System/Installation

		• Basic project management concept • Analytical mind set • Computer skills (e.g. Word, Excel, Power Point)

CLP Internship Programme 2023

Project Outline - Electrical Engineering

Project Code	E1_SAND_03	
Project Detail	**Internship Category**	Sandwich
	Internship Period	Jul/2023 to Jun/2024
	Preferred Discipline	**First Preference:** • Electrical Engineering **Other Preference:** • Mechanical Engineering
	Project Name	Enerator Inspection Robot, Generator Stator/Rotor Integrity Test & Overhaul
	Business Objective(s)	• Renewable of generator will extend the critical generation equipment life • Research and develop the innovation project for the power plant asset management • Develop the engineering and investment solution of the generation asset in order to the long term operation and maintenance strategic study
	Project Description	• Develop a generator inspection robot for the stator laminated plate's ELCID test without rotor removal which can save the maintenance cost and enhance the productivity • Generator stator and rotor integrity test includes winding pressure and vacuum test, wedge tightness test, capacitance mapping, winding high voltage test and partial discharge test, rotor RSO test, ventilation path recondition and inspection and insulation test • Enhance technical knowledge of the generator and auxiliary system including generator, excitation and start-up systems etc. • Assist engineer to evaluate the generators performance, life time, historical figures, new technology and the operational & maintenance strategic for develop the long-term investment profile and engineering solution of all power plants generators
	Required Skills	MS Word and Excel

CLP Internship Programme 2023

Project Outline - Electrical Engineering

Project Code	E1_SAND_04	
Project Detail	**Internship Category**	Sandwich
	Internship Period	Jun/2023 to May/2024
	Preferred Discipline	**First Preference:** • Electrical Engineering **Other Preference:** • Mechanical Engineering
	Project Name	HV Motor Partial Discharge Monitoring / Transformer Refurbishment
	Business Objective(s)	• Enhancing the surveillance of HV motor in operating condition, to observe any fault symptoms in earlier advanced • Enhancing reliability of transformers and handling maintenance technique in Power Station
	Project Description	• Manage and run the project to meet performance, cost and schedule requirements • Make recommendations or innovation ideas to improve the project in efficiency, safety standards, cost effectiveness and performance • Diagnose the partial discharge from the HV motor monitoring system and analyze the phenomenon as well as provide technical advices • Organize the transformer life assessment report and provide improvement criteria to plant owner
	Required Skills	• Good communication and analytical skills • Fundamental electrical engineering and software compilation knowledge • Fluent in both Cantonese, Mandarin and English • Proficient Microsoft Project skills

CLP Internship Programme 2023

Project Outline - Electrical Engineering

Project Code	E1_SAND_05	
Project Detail	**Internship Category**	Sandwich
	Internship Period	Jun/2023 to May/2024
	Preferred Discipline	**First Preference:** • Electrical Engineering **Other Preference:** • All other disciplines will be considered
	Project Name	Distribution Network Planning
	Business Objective(s)	To improve the planning process by enhancing the load forecast and load profile formation with granular data, by type, with geo-spatial scenario assessment.
	Project Description	• Currently, GIS, DMS and electrical modelling modules (DNAS) are separated. E.g., load assessment cannot be run in parallel for multi rings • Capabilities to run multiple scenarios and time-series profile analysis is also lacking in existing planning system • The silo between modules and lack of functionalities prevent planning team to effectively adopt a scenario-based forecast approach • A next generation planning tool in a combined network planning platform with geo-spatial scenario assessment based on granular time-series would be a desirable solution • The project would help establish the future requirements and capabilities of the platform
	Required Skills	• Data analytic • Programming • Automation skills

CLP Internship Programme 2023

Project Outline - Electrical Engineering

Project Code	E1_SAND_06	
Project Detail	**Internship Category**	Sandwich
	Internship Period	Jun/2023 to May/2024
	Preferred Discipline	**First Preference:** • Electrical Engineering **Other Preference:** • All other disciplines will be considered
	Project Name	Transmission Substation Design for Various Network Configurations and Plant Requirements
	Business Objective(s)	• To develop a full package of optimized transmission substation layouts and corresponding design details for developer substations and land acquisition of CLP substations. • To enhance the company's image and customers' satisfaction.

	Project Description	• Based on the standard layouts in Code of Practice, devise optimized transmission substation layouts for each type of network configuration and meeting specific plant requirements in terms of delivery, installation, testing & commissioning, and operation & maintenance
		• Enrich plant equipment design information as supplement to facilitate the understanding of developers on CLP's requirements in Code of Practice & Learning:
		  ○ Acquire knowledge in transmission substation design and plant equipment
		  ○ Gain exposure to project management, design thinking and analytical skills
		  ○ Visit various transmission substations to gain practical design experience

	Required Skills	• Proficiency in spoken and written Chinese and English • Being self-motivated, customer-oriented, good team player, analytical, and able to work under pressure • Strong sense of responsibility with good interpersonal and communication skills • Proficiency in AutoCAD, Microsoft Office and Microsoft Vision

CLP Internship Programme 2023

Project Outline - Electrical Engineering

Project Code	E1_SAND_07	
Project Detail	**Internship Category**	Sandwich
	Internship Period	Aug/2023 to Aug/2024
	Preferred Discipline	**First Preference:** • Electrical Engineering **Other Preference:** • Energy Engineering, Electronic Engineering
	Project Name	Power System Security Studies
	Business Objective(s)	• To enhance transmission and distribution network security and ensure power delivery in a secure and reliable manner • To improve the current practice on demand response, smart grid, and load forecast
	Project Description	• Identify transmission and distribution network improvement areas • Conduct power flow and fault level studies by using different simulation tools • Conduct study on demand response, smart grid, and load forecast practice • Formulate contingency plans for power systems • Recommend improvement actions
	Required Skills	• Proficiency in both spoken and written Chinese and English • Being customer-oriented, self-motivated, good team player, analytical, and able to work under pressure and tight schedule • Strong sense of responsibility with good interpersonal and communication skills • Proficiency in Microsoft Office, Visual Basic for Applications (VBA), Power BI and Python, etc.

CLP Internship Programme 2023

Project Outline - Electrical Engineering

Project Code	E1_SAND_08	
Project Detail	**Internship Category**	Sandwich
	Internship Period	Jun/2023 to May/2024
	Preferred Discipline	**First Preference:** • Information Technology and Electrical Engineering **Other Preference:** • Electronic Engineering
	Project Name	Distribution Management System (DMS) Enhancement for Smart Grid Development
	Business Objective(s)	To enhance the DMS functionalities to cope with the CLP Smart Grid development along the Utility of the Future (UoF) journey.
	Project Description	• DMS is a critical Operational Technology (OT) system used to monitor and control the Distribution Power Network to ensure safe, reliable, and economic operations • To enhance and develop the functionalities of DMS catering to the latest and future CLP's Smart Grid operation such as Distributed Energy Resources Management, Smart Meter data application, digitalization & automation of critical processes, etc. • To strengthen the OT cyber security protection through the application design and implementation including customization, interfaces, conversion & reporting, and cater for the evolving cyber security requirements • To extend the life of DMS by upgrading the software and hardware
	Required Skills	• Critical Thinking • Software engineering and programming skills (including Windows & Linux Servers, Oracle database, PowerShell, Linux shell script, C++, Visual Basic, Power BI, etc. • Good English writing skills

CLP Internship Programme 2023

Project Outline - Electrical Engineering

Project Code	E1_SAND_09	
Project Detail	**Internship Category**	Sandwich
	Internship Period	Jul/2023 to Jun/2024
	Preferred Discipline	**First Preference:** • Electrical Engineering (E1) **Other Preference:** • Electronic Engineering (E2)
	Project Name	Modern Power System Protection: Adaptive Protection Scheme
	Business Objective(s)	• Study adaptive protection scheme which can improve defects of traditional protection system to improve reliability, sensitive and rapid • Monitor and analysis the performance of protection equipment and verify its integrity • Enhance the protection system operation and maintenance by digitalizing on-line data platform • Support engineers power system faults and formulate corrective actions
	Project Description	• Study different types of protection scheme to enhance the reliability and security of protection system • Involve in investigation and fault analysis of protection systems to facilitate front-line staff and policy makers to perform operation, maintenance and asset management activities • Assist engineers to conduct laboratory tests for various types of protection equipment
	Required Skills	• Good team player and highly adaptable to change • Active and dynamic approach to work and getting things done • Proficiency in MS Word, PowerPoint & Excel etc. • Experience in programming (e.g. VBA/Microsoft Power Platform/Python)

CLP Internship Programme 2023

Project Outline - Electrical Engineering

Project Code	E1_SAND_10	
Project Detail	**Internship Category**	Sandwich
	Internship Period	Jun/2023 to Jun/2024
	Preferred Discipline	**First Preference:** • E1 **Other Preference:** • E2
	Project Name	Power Quality Analysis, Mitigations and Applications
	Business Objective(s)	• To conduct research study on new industrial products / applications for effective power quality mitigations and evaluate their performance with the consideration of customer equipment and power supply arrangement • To assist the annual voltage dip analysis and ad-hoc power quality studies after the familiarization with various power quality monitoring systems
	Project Description	• Our intern will be given a full year to explore CLP's supply network and customers equipment with a focus on power quality. The adoption of advanced equipment, which are susceptible to power quality issues, results in rising concern of power quality. Our team works with customers for cost-effective mitigations to tackle the operational inconvenience due to power quality issues • Our intern will learn the common power quality issues in Hong Kong and the corresponding mitigations. With deeper understanding on the mitigation rationale and power quality standards, he/she will be guided to research on new options for mitigation followed by a technical evaluation, which facilitates our team to offer prudent recommendations to our customers • Hands-on experience on the improvement projects of our power quality information systems will be expected. And ad-hoc assignments may be given considering the operational needs
	Required Skills	• General knowledge in power system arrangement • Basic knowledge in power quality and electronics circuit design • Basic programming skills • Experience on analytic tools / platforms is preferred • Hands-on experience on power testing equipment is preferred

CLP Internship Programme 2023

Project Outline - Electrical Engineering

<table>
<tr><td>Project Code</td><td colspan="2">E1_SAND_11</td></tr>
<tr><td rowspan="6">Project Detail</td><td>Internship Category</td><td>Sandwich</td></tr>
<tr><td>Internship Period</td><td>Jun/2023 to May/2024</td></tr>
<tr><td>Preferred Discipline</td><td>First Preference:
• Electrical Engineering with Business and Data Analytics Background
Other Preference:
• All other disciplines will be considered</td></tr>
<tr><td>Project Name</td><td>Business Process Digitalisation for Performance (KPI) Monitoring</td></tr>
<tr><td>Business Objective(s)</td><td>To build an automation system and performance management system that will leverage data analytics to digitalize the business processes, and to visualize the business performances for process streamlining and resources optimisation.</td></tr>
<tr><td>Project Description</td><td>• Against the backdrop of Climate Change, utilities are facing numerous challenges in managing the business performances to meet an ever-higher customer expectation
• As the parts closer to end-customers, the performance of distribution supply system is crucial to the customer experiences
• A digitalised management system is required to collect, analysze and visdualize the business performance data to improve productivity, optimize resources allocation, and enhance supply reliability
• The system will be developed using data analytics and Microsoft Power Platform to enable digitalized field data acquisition, process digitalization, and dashboard visualization</td></tr>
<tr><td>Required Skills</td><td>Familiar with data analytics and MS Power Platform, including Power BI, Power Apps and Power Automate.</td></tr>
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CLP Internship Programme 2023

Project Outline - Electrical Engineering

Project Code	E1_SAND_12	
Project Detail	**Internship Category**	Sandwich
	Internship Period	Aug/2023 to Jul/2024
	Preferred Discipline	**First Preference:** • Electrical Engineering **Other Preference:** • All other disciplines will be considered
	Project Name	Study of Integrating Large-Scale Renewable Generation on Power System Stability and Protection

	Business Objective(s)	• To ensure the grid-connected Renewable Energy System (RES) could be operated in a safe and reliable manner, the RES have to fulfill the technical requirements specified by the power companies.
		• This project aims to focus on the technical issue of stability and protection for integrating large-scale renewable generation:
		  ○ To get familiar with the technical requirements on the large-scale RES's grid connection with different types of generators (e.g. inverter base and synchronous generator)
		  ○ To build-up typical computer simulation models for analytical study of system stability and protection on large RES
		  ○ To provide recommendations on the protection setting and stability criteria of large-scale RES

	Project Description	• The power industry's decarbonization is a critical step in reducing climate change's effects • The large-scale grid connection of Renewable Energy System (e.g. off shore wind farm and IWMF) into the power grid is required to help achieving carbon neutrality for Hong Kong • Most wind turbines use power electronic converter technology, which is different from conventional synchronous generators • In addition, the grid connection of a large-scale RES could change the load flow/configuration of a power system and introduce dynamic interactions with the existing conventional generators, thus affecting system stability and protection • This project aims to study the model and effect of inverter-based wind turbines and the large-scale waste-to-energy facilities on power system operation, stability and protection
	Required Skills	• Study in electrical engineering • Good knowledge of programming skills • Good interpersonal skills • Self-motivated and proactive

CLP Internship Programme 2023

Project Outline - Electrical Engineering

Project Code	E1_SAND_13	
Project Detail	**Internship Category**	Sandwich
	Internship Period	Jun/2023 to May/2024
	Preferred Discipline	**First Preference:** • Electrical Engineering, Computer Science, Information Technology **Other Preference:** • All other disciplines will be considered
	Project Name	Develop Transmission Equipment Rating Toolbox
	Business Objective(s)	To build up competence on the design and engineering of transmission equipment in CLP Power grid.

	Project Description	• CLP Power grid is continuously extended and reinforced to cater for future load growth and changes on operating environment in a safe, reliable, adequate, and cost-effective manner
		• To develop a more flexible power supply network in future, it is critical to adopt innovative solutions to improve network planning and operation for better asset utilization
		• After completion of this project, the intern should be able to:
		  ○ Build up competence on the design and engineering of transmission equipment in the power grid
		  ○ Understand the current power system network and solutions adopted to facilitate a more flexible network to respond to future load growth and network contingencies in an economical way

	Required Skills	Experience in the use of software programming tools, especially Excel VBA is preferred.

CLP Internship Programme 2023

Project Outline - Electrical Engineering

<table>
<tr><td>Project Code</td><td colspan="2">E1_SAND_14</td></tr>
<tr><td rowspan="6">Project Detail</td><td>Internship Category</td><td>Sandwich</td></tr>
<tr><td>Internship Period</td><td>Jun/2023 to Jun/2024</td></tr>
<tr><td>Preferred Discipline</td><td>First Preference:
• Electrical Engineering
Other Preference:
• All other disciplines will be considered</td></tr>
<tr><td>Project Name</td><td>Transmission & Distribution Overhead Lines Performance Enhancement</td></tr>
<tr><td>Business Objective(s)</td><td>• To explore CM technology for detection of incipient fault and to improve system stability and reliability for T&D OHL.
• To identify weakness and determine the best time for maintenance, refurbishment, and replacement for our overhead line assets.</td></tr>
<tr><td>Project Description</td><td>Taking into consideration that more and more condition monitoring and automation technologies for overhead line assets are available in the market in recent years, we should study if they can be adopted by CLP:
• To review pain points in transmission and distribution overhead lines and justify the need of condition monitoring or applicable improvements
• To explore and assess various condition monitoring technologies that can be introduced to CLP to improve supply reliability, optimize maintenance frequency requirements and determine the best time for refurbishment/replacement
• To introduce various condition monitoring or systems improvement technologies for trial and evaluate their effectiveness, accuracy and benefits</td></tr>
<tr><td>Required Skills</td><td>• Basic knowledge of Power System and overhead line system
• Knowledge in MS Excel, PowerPoint and Presentation Skill
• Good command of both spoken and written English and Chinese
• Knowledge of Python or R studio would be preferred</td></tr>
</table>

CLP Internship Programme 2023

Project Outline - Electrical Engineering

Project Code	E1_SAND_15	
Project Detail	**Internship Category**	Sandwich
	Internship Period	Jun/2023 to Jun/2024
	Preferred Discipline	**First Preference:** • Electrical Engineering **Other Preference:** • Engineering/Science
	Project Name	Research on Smart Grid Development in Global and HK Context
	Business Objective(s)	To research and monitor the smart grid development trends.
	Project Description	To conduct desktop research and study on Smart Grid development in below areas: • Intelligent Grid- Smart Metering • Digital Workforce • Digital Asset Management • To monitor and to benchmark the development progress
	Required Skills	• General understanding of electrical power systems • Knowledge of smart grid development

CLP Internship Programme 2023

Project Outline - Electrical Engineering

Project Code	E1_SAND_16	
Project Detail	**Internship Category**	Sandwich
	Internship Period	Jun/2023 to Jun/2024
	Preferred Discipline	**First Preference:** • Electrical, Electronic, Information Tech **Other Preference:** • Other engineering disciplines
	Project Name	Operation and Maintenance Readiness of New Power Projects
	Business Objective(s)	• Reliability Availability and Maintainability review of new projects • Readiness of O&M infrastructure and IT & business systems for new • projects • Spares selection for new projects • Readiness of procedures at new projects • Operational performance reporting and benchmarking
	Project Description	• To support supervisor to review implementation of Asset Management procedures at new power projects to achieve operational readiness in advance of start-up • Involve in identification and selection of spare parts of new build • Involve in Information Technology Plan and roadmap of new build • To collect key performance indicators of operational plants and prepare annual reports and carry out benchmarking • Operational Readiness program implementation and assurance checks
	Required Skills	MS Excel and Power Point.