PolyU 85th THE HONG KONG POLYTECHNIC UNIVERSITY 香港理工大學

西安交通大學 XI'AN JIAOTONG UNIVERSITY

国家电网有限公司 STATE GRID CORPORATION OF CHINA

港燈 HK Electric 130+ 推動永續未來 Powering for Sustainability

BELT AND ROAD ADVANCED PROFESSIONAL DEVELOPMENT PROGRAMME IN POWER AND ENERGY 2022

THEME: SMART AND SUSTAINABLE POWER SYSTEMS FOR GREEN LIVING

(ONLINE DELIVERY VIA ZOOM)

BELT & ROAD STRATEGIC PLATFORM

一帶一路 策略平台

25 October – 10 November 2022

To facilitate communication and foster long-term collaboration in electric power industry among the Belt and Road countries and regions, an online professional workshop is co-organised by The Hong Kong Polytechnic University (PolyU), Xi'an Jiaotong University (XJTU), State Grid Corporation of China, and The Hongkong Electric Company, Limited (HK Electric). Coordinated by XJTU-PolyU Silk Road International School of Engineering – a collaboration between XJTU and PolyU for talent nurturing and research collaboration in the Belt and Road countries and regions, the online workshop provides a platform for connection and technology exchange among senior executives and researchers of enterprises, government units and higher education institutions. It is the first of its kind workshop in both Mainland China and Hong Kong with cross-regional, multi-cultural, systematic and innovative elements incorporated.

THEME: SMART AND SUSTAINABLE POWER SYSTEMS FOR GREEN LIVING

(All talks and interactive sharing session will be delivered via Zoom.)

Unit 1: Innovative Practice of Super Large Power Grid

25/10/2022 (Tue)

20:00 - 20:30 (UTC+8h)	**OPENING CEREMONY**
20:30 - 21:15 (UTC+8h)	**UHV AC AND DC TRANSMISSION TECHNOLOGY** Mr PENG Yujin *Deputy Head of Training Division of New Energy* *State Grid of China Technology College* This webinar introduces the principle, application, apparatus, and advantages of UHV DC/AC transmission technology in the context of building up a power system and the changes brought by UHV transmission technology.
21:15 - 21:45 (UTC+8h)	**GROUP DISCUSSION & SHARING SESSION**
21:45 - 22:30 (UTC+8h)	**INTEGRATION OF LARGE-SCALE CLEAN ENERGY** Mr CUI Xiyou *Senior Engineer* *State Grid Corporation of China* This webinar introduces the integration situation and core technology of large-scale clean energy, the unified dispatching mechanism which is implemented by the State Grid Corporation of China to rapidly respond to multi-level dispatching and coordinating the accommodation of clean energy sources in China.
22:30 - 23:00 (UTC+8h)	**GROUP DISCUSSION & SHARING SESSION**

Unit 1: Innovative Practice of Super Large Power Grid

27/10/2022 (Thu)

20:00 - 20:45 (UTC+8h)	**THE NEW GENERATION SMART GRID DISPATCHING AND CONTROL SYSTEM** Dr SONG Xinxin *Senior Engineer* *State Grid Corporation of China* This webinar introduces in details the construction background of the new generation smart grid dispatching and control system, construction objectives, specific ideas, related functions and using method combining with specific application scenarios.
20:45 - 21:15 (UTC+8h)	**GROUP DISCUSSION & SHARING SESSION**
21:15 - 22:00 (UTC+8h)	**ENERGY STORAGE TECHNOLOGY** Dr LI Xin *Senior Engineer* *State Grid Corporation of China* This webinar introduces the advantage and application scenario of energy storage, and the characteristics of energy storage based on new energy which will be shared from the viewpoint of State Grid Corporation of China.
22:00 - 22:30 (UTC+8h)	**GROUP DISCUSSION & SHARING SESSION**

Unit 2: Collaborative Smart Energy and Information Systems

1/11/2022 (Tue)

20:00 - 20:45 (UTC+8h)	**CYBER-PHYSICAL ENERGY SYSTEMS AND ENERGY REVOLUTION** Professor GUAN Xiaohong *Academician of Chinese Academy of Science,* *Professor,* *Faculty of Electronic and Information Engineering* *Xi'an Jiaotong University* Carbon emission from power and energy systems poses a huge challenge on the efforts to contain the global climate change. Utilization of new renewable energy such as wind and solar is inevitable. Cyber-physical energy system (CPES) provides a desirable infrastructure for efficient energy production and consumption with uncertain energy resources. With the traditional storage technology, it is very important to solve the problem of security constrained planning and scheduling of power systems with new renewable energy sources. The analytical conditions are discussed for fast identifying the security bottleneck in a complex power grid when new renewable energy sources coordinate with storable energy sources such as hydro and pumped storage. Production, storage and transportation, and utilization of hydrogen as a main secondary energy source are introduced. It is shown that with the nontraditional energy storage technology the hydrogen driven zero-carbon intelligent energy system provides an ideal infrastructure for energy supply and consumption without carbon emission and pollution, and would lead to the energy revolution towards resolving the global warming issue.
20:45 - 21:15 (UTC+8h)	**GROUP DISCUSSION & SHARING SESSION**
21:15 - 22:00 (UTC+8h)	**ELECTROMAGNETIC RESILIENCE ENHANCEMENT OF CRITICAL NATIONAL INFRASTRUCTURE** Professor XIE Yanzhao *Professor, School of Electrical Engineering* *Xi'an Jiaotong University* This talk will introduce the recent progress of resilience enhancement measures for critical infrastructure against the extreme electromagnetic events, e.g. geomagnetic disturbance (GMD) and intentional electromagnetic interference (IEMI), etc. Firstly, this talk will present a triangular pyramid model which aims for evaluation of electromagnetic security of critical infrastructure and discuss the significance of electromagnetic resilience. Then, the characteristics of typical extreme electromagnetic environments, such as GMD and IEMI, will be analyzed. The electromagnetic effect mechanism and susceptibility evaluation theory for critical infrastructure will be introduced. As a typical example, the impact of GMD on the power grid is analyzed. The 100-year and 10,000-year extreme GMD scenarios have been established, and the impact on critical equipment such as transformer are evaluated, including the hot-spot heating, reactive power loss and harmonics, etc. Finally, taking into account the priority of critical infrastructure, a comprehensive electromagnetic resilience enhancement strategy can be developed by integrating the prevention, protection and recovery techniques.
22:00 - 22:30 (UTC+8h)	**GROUP DISCUSSION & SHARING SESSION**

THEME: SMART AND SUSTAINABLE POWER SYSTEMS FOR GREEN LIVING

(All talks and interactive sharing session will be delivered via Zoom.)

Unit 3: Leveraging Intelligent Techniques for Smart Grid Development

3/11/2022 (Thu)	
20:00 - 20:45 (UTC+8h)	**SUSTAINING RENEWABLE ENERGY DEVELOPMENT BY DIGITAL TWIN AND AI** Professor XU Zhao *Professor, Department of Electrical Engineering* *The Hong Kong Polytechnic University* Renewable energy provides a sustainable and carbon free solution for energy supply. However, renewable energy systems such as solar PV system and wind turbine often suffer from random faults and failures due to external disturbances from harsh operation environments. This talk will introduce latest progress of Digital Twin and Artificial Intelligence (AI) applications to operation, planning and control of renewable energy systems to reinforce high operation performance. Different concepts. algorithms and methods will be introduced, and their applications for renewable prognosis, fault diagnosis and predictive maintenance and etc. will also discussed.
20:45 - 21:15 (UTC+8h)	**GROUP DISCUSSION & SHARING SESSION**
21:15 - 22:00 (UTC+8h)	**INTELLIGENT ENABLING TECHNIQUES FOR A SUSTAINABLE AND SECURE POWER SYSTEM** Dr BU Siqi *Associate Professor, Department of Electrical Engineering* *The Hong Kong Polytechnic University* Sustainability and security are sometimes two conflicting factors in modern power system operation, especially when considering the impact of renewable energy. This talk will firstly introduce the growing risks in the operation of sustainable power systems featured by the large-scale integration of renewable power generation. Then some conventional techniques to deal with these emerging challenges will be carefully reviewed and compared. On this basis, the talk will move on to some latest developed intelligent assessment techniques and tools to enable the secure planning and operation of sustainable power systems, which have demonstrated superior performance in terms of accuracy and efficiency.
22:00 - 22:30 (UTC+8h)	**GROUP DISCUSSION & SHARING SESSION**

Unit 4: Sustainable Distribution Network for Smart Cities

8/11/2022 (Tue)	
20:00 - 20:45 (UTC+8h)	**SUSTAINABLE DISTRIBUTION NETWORK DESIGN** Mr LEE Kwok Kin Brian *Chief Distribution Planning Engineer* *HK Electric* Mr CHUNG Wai Kong Jason *Chief Technical Services Engineer* *HK Electric* This webinar introduces the characteristics and merits of various network topologies used in distribution systems as well as the choice of suitable distribution voltage and their technical considerations to support a reliable and sustainable (or more efficient) distribution network. In addition, the network design for special supply solutions, such as high-rise substations, and smart IoT applications in distribution system are covered.
20:45 - 21:15 (UTC+8h)	**GROUP DISCUSSION & SHARING SESSION**
21:15 - 22:00 (UTC+8h)	**APPLICATION OF PYTHON IN ENERGY MANAGEMENT SYSTEM AND DISTRIBUTION MANAGEMENT SYSTEM** Mr TANG Ping Che William *Chief System Operations Planning Engineer* *HK Electric* Ms XU Guangyu Echo *System Control Engineer* *HK Electric* This webinar introduces the application of Python to enhance our self-developed smart-grid applications in Energy Management System (i.e. machine learning for demand forecast) and Distribution Management System (i.e. contingency analysis optimization) to further improve the quality and reliability of power supply to customers.
22:00 - 22:30 (UTC+8h)	**GROUP DISCUSSION & SHARING SESSION**

Closing Ceremony

10/11/2022 (Thu)	
20:00 - 21:30 (UTC+8h)	**CLOSING CEREMONY cum SHARING SESSION**

ATTENDANCE REQUIREMENT

- Participants are advised to join all the sessions of the workshop for better understanding of the topics.
- Participants who have achieved at least 70% of attendance including the Opening and Closing ceremonies, with completion of the online feedback form, will be issued an e-Certificate of Attendance.

ENROLMENT

- Please complete the e-enrolment form (https://polyu.hk/WzWZC) by **30 September 2022**.
- Enrolment will normally be considered via nomination by the invited organisation/institution only.

CONFIRMATION OF PARTICIPATION

- The workshop will be delivered via Zoom. Successful registrants will receive notifications with the meeting ID and password for the online sessions in due course.

ENQUIRIES

The Hong Kong Polytechnic University
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State Grid Corporation of China
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The Hongkong Electric Company, Limited
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General Notes

- *The co-organisers reserve the rights to cancel the workshop and to make any necessary changes to the schedules, contents and mode of delivery of the workshop offered.*
- *The co-organisers reserve the rights to make an enrolment offer taking into consideration the composition of the workshop participants.*
- *All the online sessions will be recorded by the organisers. By joining the workshop, participants agree that the video, audio and chat messages recorded and retained will be used for related academic and promotion purposes.*

Co-organisers

The Hong Kong Polytechnic University
https://www.polyu.edu.hk

Xi'an Jiaotong University
http://en.xjtu.edu.cn

State Grid Corporation of China
http://www.sgcc.com.cn

The Hongkong Electric Company, Limited
https://www.hkelectric.com/en

Closing Ceremonies of 2018 (upper left), 2019 (upper right), 2020 (bottom left) and 2021 (bottom right)