

e-Conference Booklet

HYDROGEN ECONOMY CONFERENCE (HEC) 2020 2020 年氫能經濟會議

23rd November 2020 (Monday), 2:00pm ~ 5:30pm

Online via Microsoft Teams®

Recordings at BEC Auditorium

Co-Organizers:



Hong Kong Green Strategy Alliance

香港綠色策略聯盟



**Hong Kong Environmental
Industry Association**
香港環保產業協會

Hong Kong Environmental Industry Association

香港環保產業協會



香港能源服務協會

Hong Kong Association of Energy Service Companies

香港能源服務協會



**BUSINESS
ENVIRONMENT
COUNCIL**
商界環保協會

Business Environment Council Limited

商界環保協會有限公司

Organizing Committee

Chairman: **Mr. Dominic YIN**

Members: **Ir Louis CHAN (HKGSA)**

Dr Ivan LI (HAESCO)

Ms. Serena CHENG (HKEEnvIA)

Ms. Jill CHOW (BEC)

Language of Conference: **English**

Fee: **Free of Charge**

Number of Participants: **380+**

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The Co-Organizers would respectfully acknowledge the generous assistance of the following organizations for their support and promotion efforts (*in alphabetical order*):



Asian Energy Studies Centre
Hong Kong Baptist University



環境工業協會
Environmental Industries Council

香港工業總會轄下  A FHKI Council

Environmental Industries Council
Federation of Hong Kong Industries



香港燃料電池及氫能學會

HONG KONG FUEL CELL AND HYDROGEN ENERGY ASSOCIATION

Hong Kong Fuel Cell
and Hydrogen Energy Association



THE HONG KONG
INSTITUTION OF ENGINEERS
香港工程師學會

Gas & Energy Division
燃氣及能源分部

Gas & Energy Division
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香港專業及資深行政人員協會
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Hong Kong Branch

Institution of Mechanical Engineers
Hong Kong Branch



School of Energy and Environment

香港城市大學
City University of Hong Kong

School of Energy and Environment
City University of Hong Kong



Chartered Institution of
Water and Environmental
Management

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Environmental Management, Hong Kong Branch



GREEN COUNCIL
環保促進會

Green Council



THE HONG KONG
INSTITUTION OF ENGINEERS
香港工程師學會

Environmental Division
環境分部

Environmental Division
The Hong Kong Institution of Engineers



HKIQEP
香港環專會

Hong Kong
Qualified Environmental Professionals Limited



IEEE PES/PELS/IES/IAS Joint Chapter



Independent Power Producers Forum

Independent Power Producers Forum



School of Professional Education and
Executive Development
專業進修學院

SPEED

School of Professional Education
and Executive Development
The Hong Kong Polytechnic University

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Chairman

Hong Kong Green Strategy Alliance (HKGSA)

Ir Prof Daniel M. CHENG (鄭文聰 教授 工程師) BBS, MH, JP
President

Hong Kong Environmental Industry Association (HKEnvIA)

Mr. Colin TAM (譚兆棟 先生)

Chairman

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Notes: Selected conference presentations and video recordings will be available after the event. Once available, separate email notification will be sent to participants' registered email addresses. Please visit www.hkgsa.org for details

HYDROGEN ECONOMY CONFERENCE (HEC) 2020

2020 年氫能經濟會議

Conference Rundown

Synopsis

Hydrogen (H₂) energy is one of most discussed forms of energy for the future. Its role in enhancing a sustainable living environment and circular economy is promising. The Co-Organizers are organizing this unique half-day online forum, bringing experts on international levels and presenting cutting-edge technological innovations (storage and transportation) and policy directions. The Conference rundown is as follows:

Time	Activity
2:00 - 2:20	Opening Speeches by Co-Organizers: Ir Dr the Hon LO Wai Kwok (盧偉國議員 博士 工程師) SBS, MH, JP Chairman, Hong Kong Green Strategy Alliance (HKGSA) Ir Prof. Daniel M. CHENG (鄭文聰 教授 工程師) BBS, MH, JP President, Hong Kong Environmental Industry Association (HKEnvIA) Mr. Colin TAM (譚兆棟 先生) Chairman, Hong Kong Association of Energy Services Companies (HAESCO) Mr. Adam KOO (顧志翔 先生) Chief Executive Officer, Business Environment Council (BEC)
2:20 - 2:30	Conference Opening and Speaker Introduction by Conference Moderator Mr. Dominic YIN (尹德川 先生)
2:30 - 3:00	"Hydrogen Energy Promotes Fourth Industrial Revolution" Ir Prof. C.C. CHAN (陳清泉 院士) SBS Honorary Professor of The University of Hong Kong Fellow of Royal Academy of Engineering UK Academician of Chinese Academy of Engineering (中國工程院院士) Past President, Hong Kong Institution of Engineers
3:00 - 3:30	"Hydrogen Economy 2.0", Mr. Albert LAU (劉培生 先生) Founder and CEO, EPRO Advance Technology Ltd., Hong Kong
3:30 - 4:00	"Sunlight-driven Water Splitting for Clean Hydrogen Production" Prof. NG Yun Hau (吳永豪 教授), Associate Professor School of Energy and Environment, City University of Hong Kong
4:00 - 4:30	"Global Promotion of Hydrogen Economy by United Nations Development Programme in China" Dr. ZHANG Wei Dong (張衛東 博士) Programme Director, United Nations Development Program (UNDP) (聯合國開發計劃署) in China, Beijing
4:30 - 5:30	Panel Discussion and Interactive Q&A Session

Hong Kong Green Strategy Alliance 香港綠色策略聯盟

Ir Dr the Hon LO Wai Kwok (盧偉國議員 博士 工程師) SBS, MH, JP
Chairman, Hong Kong Green Strategy Alliance

Ir Dr the Hon Lo Wai Kwok is Chairman of HKGSA and was also the President of the Hong Kong Institution of Engineers in 2007/08. WK is currently Member of the Legislative Council of the Hong Kong Special Administrative Region, representing the Engineering Functional Constituency. He also serves as Chairman of the Business and Professionals Alliance of Hong Kong, Honorary Chairman of the Hong Kong Quality Assurance Agency, member of the Housing Authority, the Hospital Authority, and the West Kowloon Cultural District Authority, member of the Airport Authority Hong Kong Board of Directors, and Past President of the Hong Kong Professionals and Senior Executives Association, etc. He was Sha Tin District Councilor for many years. His expertise and areas of services cover infrastructure, town planning, environment, housing, technology, industry, education and community service, etc.



About Hong Kong Green Strategy Alliance

Formed by a group of dedicated and enthusiastic environmental professionals in 2012, the Hong Kong Green Strategy Alliance (HKGSA) is a not-for-profit organization and a Society registered under the Societies Ordinance under Cap. 151 of the Laws of Hong Kong. The Theme of HKGSA is "綠色策略，共創未來".

HKGSA has been highly active in expressing its views and opinions via LegCo, public media and other channels, as well as joining hands with local and international professional counterparts in organizing seminars and conferences, with an aim to establish a strong platform for networking and knowledge-sharing.

Please visit us at www.hkgsa.org for more details of our numerous exciting events and functions, and our "Membership" section on how to join us, free-of-charge.

Hong Kong Environmental Industry Association

香港環保產業協會

Ir Prof Daniel M. CHENG (鄭文聰 教授 工程師) BBS, MH, JP

President, Hong Kong Environmental Industry Association



Ir Professor Daniel M. Cheng *BBS, MH, JP* is the Managing Director of Dunwell Industrial (Holdings) Limited. He is also the Honorary President of Federation of Hong Kong Industries and the President of Hong Kong Environmental Industry Association, Board Member of Business Environment Council and Deputy Chairman of Hong Kong Green Strategy Alliance.

For the HKSAR Government, he is also serving as Member of The Chief Executive's Council of Advisors on Innovation and Strategic Development, Member of the Committee on Innovation, Technology and Re-industrialisation, Member of the Steering Committee on the Promotion of Electric Vehicles, Member of HKX Advisory Committee. Prof Cheng

was the member of Advisory Committee on Water Supplies (Apr 2016 – Mar 2020), the Council Member of Hong Kong Trade Development Council (2013 – Jul 2017), the member of Hong Kong Productivity Council (2009 – 2015) and Vocational Training Council (2011 – 2015), he was also the Past Chairman of Hong Kong Waste Management Association (2000 – 2001) and Chairman of Federation of Hong Kong Industries (Jul 2015 – Jul 2017). In July 2015, Hong Kong Polytechnic University appointed Prof Cheng as Professor of Practice (Management). The University of Hong Kong also appointed Prof Cheng as Honorary Professor in Department of Industrial and Manufacturing Systems Engineering in March 2016 to recognize his continue academic and industrial contribution. Prof Cheng is a Fellow of Hong Kong Institute of Engineers and also Registered Professional Engineer. Prof Cheng graduated from California State Polytechnic University, Pomona, U.S.A. Department of Industrial Engineering in 1981. In February 2014, Prof Cheng was inducted into the "Hall of Fame" by the California Polytechnic University-Pomona, as the first Asian Inductee in the 75th Anniversary.

About Hong Kong Environmental Industry Association

Since its establishment, Hong Kong Environmental Industry Association is dedicated to facilitate the interests and competitiveness of Hong Kong environmental industry, as well as build and maintain a better coordination and communication between environmental companies, government agencies, environmental-related business and organizations in Hong Kong, Mainland China and Overseas.

The objectives of HKEnvIA are:

1. to formulate short and long term strategies and action plans to expand Hong Kong's business into environment-related industry;
2. to promote business and technical co-operation with potential partners in Hong Kong, Mainland China and overseas;
3. to develop close network and relationship with the environment-related industries in Hong Kong, Mainland China and overseas;
4. to conduct market research and to establish databases related to environment-related industry;
5. to foster the communication, interaction and co-operation among members and to establish liaison with and convey the collective opinions to government bodies, industrial or trade organizations;
6. to serve the interest, build up the reputation, develop industry specific practices and standards, and promote the image and capabilities of Hong Kong's environment-related industry; and
7. to assist in upgrading the technology, engineering, and management skills of the industry so as to improve its performance and enhance its competitiveness in the international market.

Hong Kong Association of Energy Services Companies **香港能源服務協會**

Mr. Colin TAM (譚兆棟 先生)

Chairman, Hong Kong Association of Energy Services Companies

Colin Tam has over 44 years of experience in USA, Asia, and Middle East as an entrepreneur and senior executive. He is the current chairman of two NGOs, AESCO and IPPF. Colin was the founder and CEO of two successful regional energy companies which are now listed on the HK Stock Exchange by their new owners. Now, he is a developer, strategic advisor, and investor in the following industries: renewable energy, Fintech, emerging environmental related technologies. He maintains an extensive network in the related business, government, and financial sectors.



About Hong Kong Association of Energy Services Companies

The Hong Kong Association of Energy Service Companies (HAESCO) was founded in January 2008, and is a professional non-profit trade organisation with its headquarters in Hong Kong.

HAESCO places a high priority on making the association a home for the broadest spectrum of market participants, our membership includes a wide range of specialists from the energy and low carbon sector, including ESCO's, legal advisers, facilitators, consultants, financiers, and insurers. We aim to bring about a more liveable Asia by facilitating organisations to leverage the advantages of increased energy efficiency and the application of clean technologies. We will increase the resources and opportunities for Hong Kong-based businesses to carry out clean production and energy efficiency projects throughout Asia.

Business Environment Council 商界環保協會

Mr. Adam KOO (顧志翔 先生)

Chief Executive Officer, Business Environment Council



Mr. Adam Koo is the Chief Executive Officer of Business Environment Council. Mr. Koo works closely with the Board of Directors in setting and implementing organisation strategies. He runs daily operations, leads BEC's policy contribution, ensures BEC's continuing relevance to bring values to its stakeholders as well as the community at large. He is the Vice-Chair of BEC's advisory groups.

Mr. Koo has more than 30 years of executive experience throughout Asia in the private and NGO sectors. He has strong expertise in a broad spectrum of management disciplines including, among others strategic planning, finance and operations management, and business development. Prior to joining BEC, Mr. Koo spent 4 years as CEO of the Hong Kong office of the world's largest environmental NGO. Mr. Koo holds a Bachelor of Commerce degree in Marketing from the University of British Columbia, Vancouver, Canada.

About Business Environment Council

Since its establishment in 1992, BEC has been at the forefront of promoting environmental excellence by advocating the uptake of clean technologies and practices which reduce waste, conserve resources, prevent pollution and improve corporate environmental and social responsibility. BEC offers sustainable solutions and professional services covering advisory, research, assessment, training and award programmes for government, business and the community, thus enabling environmental protection and contributing to the transition to a low carbon economy.

BEC's Vision: That Hong Kong businesses will be recognised as leaders in practising and enabling environmental protection, and in contributing to the transition to a low-carbon economy.

BEC's Mission: To advocate environmental protection amongst our members and the broader community, by adopting clean technologies and practices that reduce waste, conserving resources, preventing pollution and improving the environment.

BEC's Commitment: To identify practical means to address environmental concerns and focus business sentiment on matters related to protecting and sustaining the environment.

To harness the commitment of Hong Kong's business leaders to influence change, maximise the value of their efforts, and improve the overall environmental performance and competitiveness of Hong Kong. To partner with government, business and community organisations to address environmental concerns, with the overall objective of improving performance and moving Hong Kong towards a more sustainable society.

Conference Moderator and Chairman of the Organizing Committee

Mr. Dominic YIN (尹德川 先生)

Education: Industrial Management & Industrial Engineering (1959-1963)

教育：美國俄亥俄州州立大學企業管理及工業工程 (1959-1963)



Present Positions (現任) :

1. EESCO P2E2 Hong Kong Ltd.: Chairman & CEO (Investor, Consultant and Facilitator of Environmental & Energy Projects) 香港環保節能有限公司:董事長兼總裁 (環保及能源的投資,諮詢及資源整合)
2. Trigo Enterprises Ltd.: Chairman (International Trading & Mfg of non-standard Parts & Components)
三劬企業有限公司:董事長(國際貿易及生產非標零部件)
3. Vice Chairman of Tianjin Nankai University Castor Engineering Science and Technology Co., Ltd.(Global Unique Castor Lubricant and airplane degradable jet fuel Producer) 天津市南開大學蓖麻工程科技有限公司:副董事長(全球唯一的蓖麻綠色潤滑油及飛機可降解航油生產者)
4. Former Director of China Overseas Friendship Association till 2011 and Current Honorary Director 中華海外聯誼會兩屆理事及現任名譽理事
5. Board Member of Hong Kong Friendship Association since establishment
香港友好協進會董事(創會及現任董事)
6. Co-Chairman of Smart City Committee of Independent Power Producers Forum (IPPF)
獨立能源投資者協會 (IPPF) 智慧城市委員會現任主席
7. Vice-President of Hong Kong Environmental Industry Association 香港環保工業協會副會長
8. Senior Energy Specialist and Senior Advisor of Energy R & D Center Under China Energy Investment Association 中國能源投資網資深能源專家及高級顧問
9. Principal Consultant of Green Affairs of S.T.A.R.S. Foundation
可持續科技研策基金會首席綠色事務顧問
10. Vice Chairman of Hong Kong Green Strategy Alliance (HKGSA) 香港綠色策略聯盟副主席
11. Executive President of Chinese Society (Hong Kong & Macao) for Sustainable Development
香港可持續發展研究會執行會長
12. Executive President of Greater China Sustainable Development Global Alliance
大中華持續發展全球聯盟執行會長
13. Senior Advisor of Low Carbon Industry & Technology Association of Guangdong 廣東省低碳產業技術協會高級顧問
14. Founder Chairman and Honorary Chairman of Hong Kong Association of Energy Service Companies 香港能源服務協會創會主席及榮譽主席
15. Special Advisor of EPRO Advance Technology Ltd. (Solid State Powder Form Hydrogen Inventor and Producer) 盈保先進科技有限公司特邀顧問 (固體粉狀氫發明及生產者)
16. President of Hong Kong Institute under CAPPC International Smart City Research Institute of Ministry of Science & Technology of People's Republic of China
中國科技部中國生產力促進中心協會國際智慧城市研究院獨立香港院:院長
17. Life Honorable Chairman of Guangzhou Smart City Development Association
廣州市智慧城市發展促進會終身名譽主席

Previous Positions (前任) :

1. Former Director of Chengdu Committee of Chinese People`s Political Consultative Conference
中國人民政協成都委員會前任委員
2. Executive Director of Chongqing Overseas Friendship Association since 1991
重慶市海外聯誼會常務理事
3. Ex-Chairman and current Honorary Chairman of Shenzhen Energy Saving Association
深圳市節能協會前理事長及現任名譽理事長
4. Founder member & Director of Environment Service Association of China Commerce & Industry Association 中國全國工商聯合會環境服務業商會發起人
5. Former Chairman of Energy Committee of American Chamber of Commerce in Hong Kong (2012-2013) 美國商會能源委員會前主席 (2012-2013)
6. Honorary Chairman and The Chief Advisor of Shanghai Energy & Environment Coalition Council 能效與環保上海聯合體名譽理事長兼首席顧問
7. Senior Advisor of China Association of Resource Comprehensive Utilization Energy Saving Cooperation Alliance
國資委/中國資源綜合利用協會能源資源綜合利用專業委員會高級顧問
8. Professional Honorary Consultant of China Energy Efficiency and Investment Research Organization 中國能源研究會能效與投資評估專業委員會榮譽顧問
9. Former Advisor of Zhongde Environment Group (till 2013) 前中德環保集團顧問(至 2013)
10. JCI Senator No.8118 世界青年商會參議員 No.8118
11. Director of Industrial Federation of Republic of China (till 1984)
中華民國全國工業總會理事(至 1984)
12. Chinaman of Taiwan Fasteners Industries Association (1979-1984)
台灣區螺絲同業公司理事長(1979-1984)
13. Executive of Taiwan Hand Tools Industries Association (1979-1984)
台灣區手工界同業公司常務理事(1979-1984)
14. General Committee member of Federation of Hong Kong Industries (1965)
香港工業總會理事 (1965)
15. Director of Tung Wah Group of Hospital (1970)東華三院百週年總理 (1970)
16. Chairman of Island Junior Chamber (1967) 港島青年商會主席 (1967)
17. Director of Chinese Manufacturers Association of Hong Kong (1968-1970)
香港中華廠商會董事(1968-1970)
18. Executive Director of China Foundation for Desertification Control
中國治理荒漠化基金會常務理事
19. Consulting and technical Advisor of “Green Industry Association of New Taipei City, Taiwan” (2013 to 2016)
台灣新北市綠色能源產業聯盟諮詢及技術顧問(2013 年至 2016 年)
20. Honorary Advisor of EUAP Urban Innovations Programme Under European Union Academic Program, Hong Kong (Starting in September, 2014)
香港歐盟學術計劃城市創新系列講座榮譽顧問(2014 年 11 月開始)
21. Advisor of "Smart Mobility in Smart City" Forum & Exhibition Under CINEV in Nov 2015 in Hong Kong.
CINEV 在 2015 年 11 月於香港舉辦的“智慧城市中的智慧機動”論壇及展覽的顧問

Speaker's Biography & Presentation Abstract

"Hydrogen Energy Promotes Fourth Industrial Revolution"

Ir Prof. C.C. CHAN (陳清泉 院士) SBS

Academician, Chinese Academy of Engineering (中國工程院院士)

Fellow, Royal Academy of Engineering, UK

Past President, Hong Kong Institution of Engineers

Honorary Professor, The University of Hong Kong

About The Speaker



Prof. C. C. Chan holds BSc, MSc, PhD, HonDSc, HonDTech degrees. Honorary Professor and Former Head of the Department of Electrical and Electronic Engineering at the University of Hong Kong; Founder of Academician C.C. Chan International Science and Technology Innovation Centre. Visiting Professor of MIT, University of Cambridge, etc. Founding President of the World Electric Vehicle Association; Senior Consultant to governments, Strategic Adviser or Independent Director of public companies and industries; Fellow of the Royal Academy of Engineering, U.K., Chinese Academy of Engineering, Ukraine Academy of Engineering Sciences, Honorary Fellow of Hungarian Academy of Engineering, Fellow and Senior

Advisor of Hong Kong Academy of Engineering Sciences; Fellow of IEEE, IET and Honorary Fellow of HKIE. Recipient of the Royal Academy of Engineering Prince Philip Medal, Chinese Academy of Engineering Guang-Hua Prize, World Federation of Engineering (WFEO) Medal of Engineering Excellence, Silver Bauhinia Star Medal of the Hong Kong Special Administrative Region Government, Gold Medal of Hong Kong Institution of Engineers, IEE International Lecture Medal, "Asia's Best Technology Pioneers" by Asiaweek, "Father of Asian Electric Vehicles" by Magazine Global View, "Pitamaha (Grandfather) of Electric Vehicle Technology" in India, "Environmental Excellence in Transportation Award" by Society of Automotive Engineers (SAE). His major research field includes the philosophy and technology of electric vehicles, intelligent energy systems, the integration of four systems namely transportation, energy, information and humanity, and the integration of four flows, namely energy, information, material and value; published 17 books, over 450 technical papers and holds 10 patents. Please visit Prof. Chan's website for more details: <http://www.eee.hku.hk/people/ccchan.html>.

Abstract

This speech will overview the development of hydrogen energy and its contribution to Fourth Industrial Revolution and Digital Economy. Hydrogen energy is not only clean and low carbon, but also possess a unique character of enabling the coupling of electrical energy and chemical energy, hence the building of smart energy, smart industry, smart transportation and smart city. The technical development status of hydrogen energy will be discussed including exciting innovation from Hong Kong company on generation of hydrogen from silicon at low cost, competitive performance and safety. The outlook of hydrogen energy will also be presented.

Speaker's Biography & Presentation Abstract

"Hydrogen Economy 2.0"

Mr. Albert LAU (劉培生 先生)



Founder and CEO, EPRO Advance Technology Limited

About The Speaker

Albert graduated at age of 20 with a Bachelor Degree in Materials Science and Engineering and a minor in Environmental Engineering from Carnegie Mellon University. Since graduation, he has returned to Hong Kong, and worked extensively in the field of energy and environment, ranging from silicon material synthesis, lithium ion batteries, solid state hydrogen, photovoltaic as well as water treatment processes. Albert is the co-inventor of several families of patents filed in major economies, countries and regions.



Before founding Epro Advance Technology in 2015 where Albert serves as Director and CEO, Albert has co-founded two manufacturing companies over a period of 16 years, and served as Director and COO in both companies, managing around 600 people across Hong Kong, China and USA.

Albert also holds a LLB degree from University of London.

Abstract

EAT has developed and now commercializing a patented a sub milli-meter scale silicon material that possess nano-structure properties, capable of releasing up to 14% wt. H_2 when reacted with a basic solution. EAT Si can also be manufactured via renewables, thus making green hydrogen.

EAT Si fundamentally changes how H_2 can be utilised. For example, economical and safe H_2 stations that can boldly replace current H_2 infrastructure, transportation is directly comparable to current fossil fuels etc. Other possibilities include grid balancing modules to support the expanded power usage from battery powered devices, increase effective utilisation of renewables, to name a few. All of which moves the world towards carbon neutrality, in other words, a Deep Green Hydrogen Economy.

Current \$/kg of green EAT Si H_2 at consumer level is between the retail price of H_2 of refuelling stations in California and Japan.

Speaker's Biography & Presentation Abstract

"Sunlight-driven Water Splitting for Clean Hydrogen Production"

Prof. NG Yun Hau (吳永豪 教授)

**Associate Professor, School of Energy and Environment
City University of Hong Kong**



**能源及環境學院
SCHOOL OF ENERGY
AND ENVIRONMENT**

About The Speaker

Yun Hau Ng received his Ph.D. from Osaka University in 2009. After a brief research visit to Radiation Laboratory at University of Notre Dame, he joined the ARC Centre of Excellence for Functional Nanomaterials at UNSW with the Australian Postdoctoral Fellowship in 2011. He became a Lecturer in 2014 and was promoted to Senior Lecturer (2016) in the School of Chemical Engineering at UNSW. He joined City University of Hong Kong in 2018. His research is focused on the development of novel photoactive semiconducting particles for sunlight energy conversion, including hydrogen generation from water and conversion of carbon dioxide to solar fuels. Dr. Ng has attracted more than HK\$30 million from government and industries on photocatalysis research. He received the *APEC Science Prize for Innovation, Research and Education (ASPIRE Prize 2019)* in Chile, and *Honda-Fujishima Prize* in 2013 in recognition of his work in the area of photo-driven water splitting. He was also selected as *Emerging Investigator* by the *Journal of Material Chemistry A* in 2016. In 2018, he was given the *Distinguished Lectureship Award* by the Chemical Society of Japan. He has published more than 160 peer-reviewed papers in internationally renowned journals such as *Chem. Rev.*, *Chem. Soc. Rev.*, *Energy Environ. Sci.*, *J. Am. Chem. Soc.*, *Angew. Chem. Int. Ed.*, *Adv. Mater.*, and *Adv. Energy Mater.* He currently has 13 papers recognized as **ESI Top 1% Highly Cited Paper** by Web of Science. He has attracted >10,000 times of total citation to date. Dr. Ng's works have been selected as **Journal Cover** and **Frontispiece** for >10 times, including *Adv. Mater.*, *Adv. Energy Mater.*, *Small*, and *J. Mater. Chem. A*. Dr. Ng has delivered >25 keynote and invited talks at international conferences. He is currently serving as an editor for the *Journal of Materials Science: Materials in Electronics* (Nature-Springer).



Abstract

Hydrogen generation from photocatalytic and photoelectrochemical water splitting under visible light has been considered as an effective way to make solar energy storable and transportable. As oxygen is the only by-product from splitting water, this reaction has great potential to simultaneously address the energy shortage and environmental issues by replacing fossil fuel. A great number of photoactive semiconductors (be it oxide, sulphide or etc) has attracted extensive attention due to its low-cost, mostly non-toxic, usually high stability, and with considerable theoretical photocurrent density for H₂ generation. These characteristics meet favourably the requirements for water splitting. In contrast, the challenges in extending their capability in this application lie on several aspects, such as the extension of the solar spectrum absorption, the charges transportation, and the photo-stability of the materials. For example, TiO₂ absorbs only UV wavelength, ZnO suffers from photo-corrosion and many others experience significant charges recombination processes. Introduction of nanostructures or secondary components into the parental semiconductor is a potential way in tackling the above mentioned issues. Therefore, the main driving force for our research in SEE CityU is to improve (if not overcome) the above shortfalls by using several different electrochemical and chemical synthetic approaches.

Speaker's Biography & Presentation Abstract

"Global Promotion of Hydrogen Economy by United Nations Development Programme in China"

Dr. ZHANG Wei Dong (張衛東 博士)

Programme Director
United Nations Development Program (UNDP, 聯合國開發計劃署) in China

About The Speaker



Currently serving as **Programme Manager** with UNDP China, Zhang Weidong is in charge of developing and implementing projects related to water resources management, sustainable livelihood, hydrogen economy, carbon emission reduction, and Climate Change adaptation / mitigation in partnership with both governments and private sectors.

In developing capacities for climate change in China, he has been involved in implementing projects in partnership with **National Development and Reform Commission (NDRC)** in developing the provincial climate change programmes and institutional arrangement; developing the provincial capacities in creating Greenhouse Gases inventories and registry system for emission trading system in China.

In promoting hydrogen economy in China, he has been involved in designing and implementing two phase of promoting the commercialization of Fuel-Cell Bus with funding from GEF and involving in the design and implementation of the 3rd phase of the FCV project; the UNDP first hydrogen economy pilot project, in which he leads the development of carbon trading methodologies; He is now advocating a shift to a Hydrogen Economy with hydrogen from renewable sources and eventually a Hydrogen Society in China.

In actively promoting UNDP Public-Private Partnership, he is leading a flagship programme in partnership with Ministry of Water Resources, Ministry of Commerce, and Coca-Cola Greater China in addressing water related issues in China, including climate change adaptation, ecosystem management, drinking water safety in rural regions; use of recycled water from urban sewage; sustainable agriculture through improving irrigation efficiency; reduction of non-point source pollution from agriculture.

Before officially joining UNDP in 2010, he served as Project Manager with State Forestry Administration in managing a 4-year project, i.e. *ADB/GEF Combating Land Degradation in China*; as the National Project Director of an FAO funded 13-year forestry project for combating land degradation. He also has one year working experience with WWF China Office as Forest coordinator for biodiversity conservation.

Abstract

UNDP project formulation in areas related to climate change adaptation and mitigation, renewable energy, green mining carbon recycling economy, land degradation, livelihood, elderly care, poverty alleviation and South-South Cooperation; social and environmental screening prior to project formulation and implementation; needs assessment; capacity building; and formulation of Public-Private Partnership; Fuel Cell-based hydrogen economy; and carbon emission trading.