

ICESI 2020

International Conference on Electric-Vehicle, Smart Grid and
Information Technology

September 16~18, 2020

Booyoung Jeju Hotel & Resort, Korea

PROGRAM BOOK

Hosted by



Korea Institute of Electrical Engineering (KIEE)
KIEE Electric Vehicle Research Society

ICESI 2020

International Conference on
Electric-Vehicle, Smart Grid and
Information Technology

Table of Contents

03	Message from the General Chair
04	Committee Members
06	Sponsors
07	General Information
	- Registration
	- Hotel Information
09	Instruction for Presentation
10	Conference Site Map
11	Scope and Topics
12	Program at a Glance
14	Plenary Lectures
22	Technical Session Table
23	Author Index

Message from the General Chair



Welcome and thank heartily the participants of the ICESI 2020, the International Conference on Electric Vehicle, Smart Grid and Information Technology, and 7th EV-EXPO in Jeju Island, South Korea. This ICESI 2020 is held through the cooperation of Korea Institute of Electrical Engineering (KIEE), Institute of Control, Robotics and Systems (ICROS), Korean Society for Big Data Service, Korea Information Processing Society (KIPS), Korea Institute of Information Scientists and Engineers, and The Korean Society of Smart City.

We all will witness, here in ICESI 2020 and EV-Expo realistic and vivid events showing that energy paradigm is changing. Electric energy, which is the cleanest energy, started to conquer all the usage fields of human's final energy step by step. In the fields of energy such as cooking, heating, cooling, and moving, usage of electric energy is increasing and preferring due to clean and easy to deal. Penetration of electric vehicles may be the final state that electric energy occupies all the energy usage fields related to residential life.

Academic fields supporting electric vehicle include electric, electronic, mechanic, communication, computer, material engineering, and etc. This international conference on those fields must be continued and extended year by year, and so will contribute to the advance of mankind's living and culture.

We would like to appreciate heartily all participants for being here and future cooperation on the next conference, ICESI 2020 and all members of the EV-Expo office for preparing this conference successfully.

Jaeseok Choi

General Chair of ICESI 2020

Chair of KIEE

Committee Members

Program Committee Chairs

General Chair	Prof. Jaeseok Choi (KR)	
Vice General Chair	Prof. Chul-Hwan Kim (KR)	
General Co-Chair	Prof. Wan-Sup Cho (KR) Prof. Kenji Iba (JP) Prof. Changup Kim (KR) Prof. Seon-Bok Kim (KR) Prof. Gaemyoung Lee (KR) Prof. Jae-yun Lim (KR) Prof. Yosuke Nakanishi (JP) Prof. Mahmud Fotuhi Firuzabad (IR)	Prof. Lalit Kumar Goel (SG) Prof. Jeong-Woo Jwa (KR) Prof. Do-Hyeun Kim (KR) Prof. Chang-Hee Kwon (KR) Prof. Young Il Lee (KR) Prof. Sungil Moon (KR) Prof. Kyongsu Yi (KR)
Vice-chair from Industry	Dr. Jaewon Chang (KR) Dr. Young Uk Son (KR)	Dr. Junho LEE (KR)
Program Co-Chair	Prof. Young Chul Byun (KR) Prof. Woongchul Choi (KR) Prof. Soohee Han (KR) Prof. Wooyoung Jeon (KR) Prof. Rajesh Karki (CA) Prof. Jeongtae Kim (KR) Prof. Kichan Kim (KR) Prof. Taeheoung Kim (KR) Prof. Kyungsoo Kook (KR) Prof. Yong-Min Lee (KR)	Prof. Junmin Cha (KR) Prof. Bum Jin Chung (KR) Prof. Bonghee Hong (KR) Prof. Sang-Yong Jung (KR) Prof. Ho Chan Kim (KR) Prof. Junyoung Kim (KR) Prof. Kyeong-Hwa Kim (KR) Prof. Yong Ha Kim (KR) Prof. Byoung-kuk Lee (KR) Prof. Nah-Oak Song (KR)
Industry Program Co-Chair	Dr. YanhoBae (KR) Mr. Yonggil Choi (KR) Dr. Jongwook Jin (KR) Dr. Hyungchul Kim (KR) Dr. Jaejo Lee (KR) Dr. Sang Taek Lee (KR) Mr. Jeongho Park (KR) Mr. Yeongtae Park (KR) Mr. Jaejin Yoo (KR)	Dr. Hong Seok Choi (KR) Dr. Yeongap Jeong (KR) Dr. Eungsang Kim (KR) Mr. Sangyong Kim (KR) Mr. Jiseon Lee (KR) Mr. Sunjong Lee (KR) Dr. Kijun Park (KR) Dr. Jung Wook Woo (KR)


Organized Session Co-Chair	Prof. Changsun Ahn (KR) Dr. Hyun Rok Cha (KR) Prof. Gilsoo Jang (KR) Prof. Ock Taek Lim (KR) Prof. Seung-Yong Park (KR) Prof. Jaehyung Roh (KR)	Prof. Young Jun Byun (KR) Prof. Jin Hur (KR) Prof. Takeyoshi Kato (JP) Prof. Chulwon Park (KR) Prof. Daesuk Roh (KR) Prof. Lei Wu (US)
Local Arrangement Chair	Prof. Young-gyu Jin(KR)	Prof. Ho-Min Kim (KR)
Advisory Council	Soo-hyun Baek (Prof. Dongguk University, KR) Keum-Shik Hong (President, Asian Control Association, KR) HyunKyo Jung (Prof. Seoul National University, KR) Jae-Chul Kim (Prof. Soongsil University, KR) Myung Ja Kim (Chairman, KOFST, KR) Kwang Y. Lee (Prof. Baylor University, US) Chan-mo Park (Former President, POSTECT, KR) Yacov A. Shamash (Vice Chair, Advance Energy Center at Stony Brook University, US) Ryuichi Yokoyama (Prof. Waseda University, JP)	Chung Choo Chung (Prof. Hanyang University, KR) Woo Hyun Hwang (Prof. SeoulTech, KR) Daewhan Kim (Chairman, IEVE & GEAN, KR) Kiseon Kim (President, GIST, KR) Joo Yeoun Lee (Prof. Ajou University, KR) Kook Hyun Moon (Director, New Paradigm Institute, KR) Mohammad Shahidehpour (Prof. Illinois Institutes of Technology, AE) Chung-yuen Won (Prof. Sungkyunkwan University, KR)
International Relation Co-Chair	Prof. Yousef Al-Hammadi (AE) Dr. Saw Sanda Aye (MM) Dr. Lina Bertling (SE) Dr. Bayasgalan Dugarjav (MN) Prof. Bo Hu (CN) Prof. Albert Kim (US) Prof. Ir. Muljowididi K. (ID) Prof. Jong-Bae Park (KR) Prof. Chresten Træholt (DK) Prof. Marianna Vaiman (US) Prof. Chan-yeob Yeun (AE)	Prof. S. Massoud Amin (US) Dr. Bagen Bagen (CA) Prof. Carmen L. Borges (BR) Prof. Chung Seon Hong (KR) Prof. Zechun Hu (CN) Dr. Yossapong Laoonual (TH) Prof. Jun-seok Oh (US) Prof. Uthane Supatti (TH) Dr. Le Anh Tuan (VN) Prof. Kaigui Xie (CN)

Sponsors

Organized by

IEVE (International Electric Vehicle EXPO) 

ICROS (Institute of Control, Robotics and Systems) 

IFAC (International Federation of Automatic Control) 

Asian Control Association (ACA) 

GEAN (Global EV Association Network) 

Korean Society for Big Data Service

KIPS (Korea Information Processing Society) 

Korea Institute of Information Scientists and Engineers 

The Korean Society of Smart City 

Sponsored by

Research Institute of Electrical and Information Technology (RI-EIT, SeoulTech)

Korea Electrical Contractors Association

Korea Electric Engineers Association

Korea Electimes

Jeju Energy Corporation

The Korean Federation of Science & Technology Societies(KOFST)

General Information

Registration

* Registration Fees

Category	By Aug. 16, 2020		By Sep. 6, 2020		After Sep. 6, 2020	
	Early	Early - Cyber	Regular	Regular - Cyber	On-Site	On-Site - Cyber
Regular / Regular Cyber Attendance	\$450 (KRW 500,000)	\$300 (KRW 340,000)	\$510 (KRW 570,000)	\$340 (KRW 380,000)	\$550 (KRW 650,000)	\$367 (KRW 440,000)
Student / Student Cyber Attendance	\$250 (KRW 300,000)	\$167 (KRW 200,000)	\$300 (KRW 350,000)	\$200 (KRW 240,000)	\$350 (KRW 400,000)	\$234 (KRW 270,000)

*Notice

- To upload your final paper, your registration number / cyber registration number is needed. Please make a registration before the final paper submission.
- Up to two papers can be submitted by (Cyber) REGULAR REGISTRATION
- Only one paper can be submitted by (Cyber) STUDENT REGISTRATION

*Payment Method

- Credit Card
- Bank Transfer

* Cancellation Policy

- The registration fee will not be refunded under any circumstances after the early registration deadline.

* Registration at the conference

Sep 16~17	Wednesday - Thursday	08:00-18:00
Sep 18	Friday	08:00-12:00

Cash and credit card will be accepted. The registration fee includes Admission to all (Cyber) sessions, Banquet (Not for cyber attendance), (Cyber) IEVE Expo, refreshment breaks, program book and materials. Registration and general information are available at the registration desk. The following dates and times are the schedule for registration.

Hotel Information

Booyoung Jeju Hotel & Resort

- Website: www.booyoungjejuhotel.com
- Distance from the venue: 8min. on foot (576m away)
- Address: 222, Jungmun Gwangwang-ro, Seogwipo-si, Jeju-do
- Contact: +82-64-731-5500
- Transportation – By Airport Limousine Bus
 - ✓ Travel Time: Approx. 75 min
 - ✓ Bus stop: Exit to Gate 5, turn right for Airport Limousine platform (Samyoung Bus #600) → get off at the Seaes Hotel.
 - ✓ Fare: Airport ↔ ICC JEJU KRW 4, 500 (one way)

Room Type (min/max)		Room Rate		Details
		Weekday (Sun~Thurs)	Weekend (Fri~Sat)	
Hotel	Standard Twin (2/2) (Single 2)	KRW 90,000	KRW 120,000	23.1 m ² (Mountain View)
	Deluxe Twin (2/3) (Double bed 1 + Single 1)	KRW 130,000	KRW 160,000	39.6 m ² (Garden View)
	Deluxe Twin Ocean (2/3) (Double bed 1 + Single 1)	KRW 150,000	KRW 180,000	39.6 m ² (Ocean View)
Resort	Premium (3/4) 1 bedroom (King bed 1) + living room	KRW 150,000	KRW 180,000	72.6 m ² (Garden View)
	Premium Suite (6/8) 2 bedrooms (King bed 1) (double beds 2) + living room	KRW 240,000	KRW 270,000	148.5 m ² (Garden View)
Breakfast	Buffet (Diamond 07:00 ~ 10:00)	KRW 27,000		(Only bookings prepaid, non-refundable)

Instruction for Presentation

Instruction for Offline Presentation

To make sure that all sessions run smoothly, we provide the following brief guidelines for all authors to follow:

Oral Presentation Sessions

- Please try to arrive at the meeting room of your presentation session at least 20 minutes before the start of the session.
 - ※ Online presenters are recommended to enter the online session room of your presentation session at least 30 minutes before the start of the session.
 - Please upload your PowerPoint file onto the computer for presentation and make sure that your file runs appropriately.
 - Please introduce yourself to your session chair so that the session chair will know who is presenting the paper.
- Time management is VERY critical because people may switch between sessions for presentations that they are interested in.
- Please note that the presentation time is about 20 minutes including Q&A.
- There are three presentation types as follows: Offline presentation, Online real-time presentation (through the zoom program), Online video presentation.

Poster Sessions

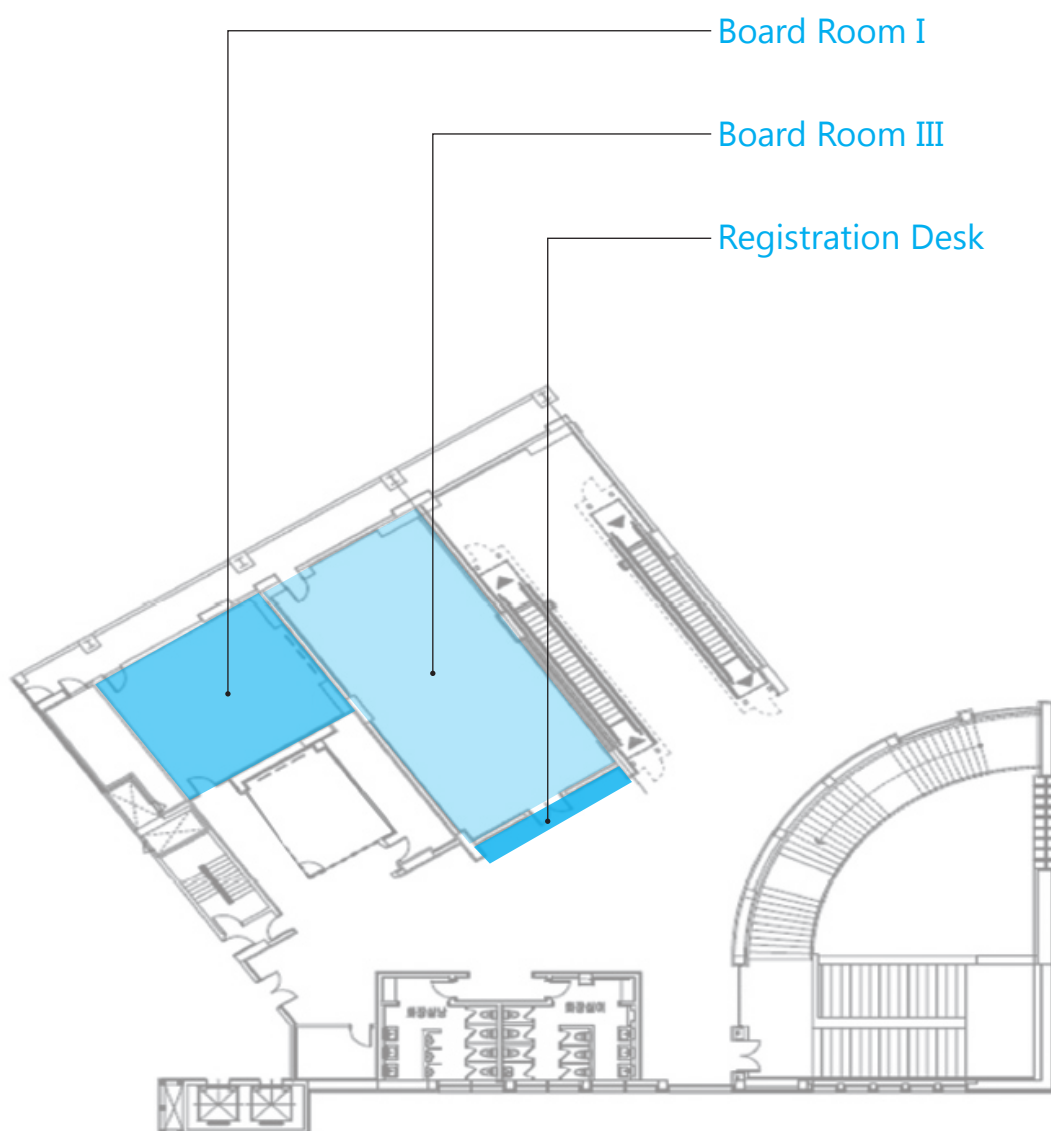
- Every poster presentation is consisted of Online video presentation through web-proceedings.
- Please note that the presentation time is about 5 minutes.

Instruction for Online Presentation

- Please access to the official website (<http://icesi2020.org>) and click the web-proceedings button to join the Online session.
 - Please use the ID and PW that you have entered on online registration.
- Please respond to Session Chair and check your presentation file runs appropriately before the start of the session by chatting with staff at the Online session room.
- Please mark your name as "Name(Presenter)" or "Name(Organization)".
- Make sure to keep the microphone off (mute) except your presentation session.

Conference Site Map

B1F, Booyoung Hotel & Resort Jeju



Scope and Topics

Scope

EV and renewable energy are seeing rapid growth in numbers, hence EV charging load and renewable generation increasingly challenge the existing power system. The impact of intermittent renewable electricity production and the significant increase in load caused by the EV charging must be anticipated in a robust manner. It is time to profoundly discuss challenging issues of operating EV in conjunction with renewable energy resources and integrating in Smart Grid in efficient and reliable ways. Smart Grid, Electrical Infrastructure, and V2G/V2I Applications

Topics

- Connected and Automated Vehicles, Smart Mobility, Intelligent Transportation Systems, and Vehicle Security
- Power System Stability and Reliability
- Blockchain/AI/Bigdata for Electric Vehicles, Autonomous Vehicles and Smart Grid
- IoT Connectivity and Smart City
- Optimal Design, Control and Operation of Renewables
- Intelligent Integration of Renewable and Energy Storage Systems
- Modelling and Control of Prosumer Resources
- Transaction-based P2P Energy Management System
- Power Electronics and Electric Motor Drives
- Electric Machines and Actuators
- Battery, Battery Management Systems, Chargers and Charging Infrastructures
- Grid Codes, Standards, Politics, and Regulations for Transportation Electrification
- Electric Vehicle and Product Design

Program at a Glance

15th(Tue) Sep. 2020

13:00~18:00	Registration
Evening	Welcome Reception

16th(Wed) Sep. 2020

	Room1 (Board Room I)
09:00~10:00	Plenary Lecture I Ossama Hassanein <i>March Towards the Future: Coming Trends in Sustainability</i>
10:00~10:30	Opening
10:30~12:10	OR1_1 <i>Connectivity and Computing for Smart Grid and Vehicles</i>
12:10~13:30	Lunch
13:30~15:10	OR2_1 Electric Vehicles Integrated <i>with Renewable Generating Resources for Sustainable Energy System</i>
15:10~15:20	Break
15:20~17:00	OR3_1 <i>Low-power Autonomous EV in Smart Energy Town</i>
17:00~18:00	Poster Session I

17th(Thu) Sep. 2020

	Room1 (Board Room I)	Room2 (Board Room III)
09:00~10:00	Plenary Lecture II Yacov A. Shamash <i>Research Initiatives for the Integration of Renewables into the Smart Grid</i>	-
10:00~12:00	OR4_1 <i>Connected and Automated Vehicles, Smart Mobility, Intelligent Transportation Systems, and Vehicle Security</i>	OR4_2 <i>Smart Grid, Electrical Infrastructure, and V2G/V2I Applications</i>
12:00~13:30	Lunch	
13:30~14:30	Plenary Lecture III Ryuichi Yokoyama <i>Resilient and Expandable Distribution Network for Smart Community in Asian Countries and Islands</i>	-
14:30~16:30	OR5_1 <i>IoT Connectivity and Smart City</i>	OR5_2 <i>Power System Stability and Reliability</i>
16:30~17:00	-	-
17:00~18:00	Poster Session II	

18th(Fri) Sep. 2020

	Room1 (Board Room I)	Room2 (Board Room III)
09:00~10:00	Plenary Lecture IV Kwang Y. Lee <i>Energy Internet & Energy System Integration</i>	-
10:00~11:40	OR6_1 <i>Machine Learning for EV</i>	OR6_2 <i>IoT Connectivity and Smart City</i>
11:40~12:00	Closing	-

Plenary Lectures 1

Title: March towards the Future – Coming Trends in Sustainability

Ossama Hassanein, Ph.D



Ossama has co-managed over \$1 billion of international technology funds in diverse leadership roles including EVP of Berkeley International in San Francisco, Chairman of Technocom Ventures in Paris, President of Newbridge Networks Holding in Canada, Senior managing Director of Newbury Ventures, and Chairman of the Rising Tide Fund in Silicon Valley. In the eighties, Ossama had the opportunity to co-lead the mezzanine financing of 80+ Silicon Valley based IT companies that became spectacular successes, including: Adaptec, Cirrus Logic, Atmel, PMC-Sierra, LSI Logic, Linear Technologies, and Oracle. Their combined market value today exceeds \$200 billion. In the last 25 years, Ossama was chairman or co-founder of seven cutting-edge startups in the U.S., UK, France and Switzerland including ACC in Santa Barbara (routers, acquired by Ericsson), Algety in Lannion (soliton transmission, acquired by Corvis), HighDeal in Caen (rating engines, acquired by SAP), HighWave in Bretagne (fiber optic amplifiers, Listed on Euronext), NetCentrex in paris (VoIP, acquired by Comverse), nCipher in Cambridge (encryption, listed on LSE), and Zong in Menlo Park (acquired by eBay). Currently, Ossama serves as a member of the Board of Directors of Bank of the West in San Francisco. On the social entrepreneurship side, he is a charter member of the C100, a Silicon-Valley based association dedicated to mentoring and angel financing Canadian entrepreneurs. Ossama also served on the Board of Directors of the nonprofit Relief International, a nonprofit, focusing his efforts on social entrepreneurship and development of women in the Middle East. He was chairman o f the board of TechWadi and the Egyptian American Society in Silicon Valley and vice-chairman of the Board of PSD, an NGO focused on providing one laptop per child for up to 130,000 Palestinian children in need of education. On the academic side, Ossama served on the Board of Advisors of Harvard University Center for

Middle Eastern Studies and of UCSF Department of Ophthalmology, School of Medicine in San Francisco. He was appointed as the Willard Brown Distinguished Professor at the American University in Cairo School of Business, where he remains a member of the Board of Advisors. Ossama lectured on Management Science and Engineering at Stanford University and the University of San Diego, and on international business at UC Berkeley and Santa Clara University. He was also a guest speaker on entrepreneurship in diverse venues including the White House, the State Department, MIT, Harvard University, and the Commonwealth Club.

Abstract :

The 2030 Agenda for Sustainable Development adopted by all United Nations Member States in 2015, provides a shared blueprint for peace & prosperity for people and the planet, now and into the future. Since the 1970s, fossil fuels commanded 60-70% share of the global power generation mix. This 50-year dominance is coming to an end. Cheap renewable energy and batteries will reshape the electricity system, shifting us from two-thirds fossil fuels in 2017, to two-thirds renewable energy in 2050. We see \$548 billion being invested in battery capacity by 2050. The arrival of cheap battery storage will mean that it becomes increasingly possible to finesse the delivery of electricity from wind and solar, so that these technologies can help meet demand even when the wind isn't blowing and the sun isn't shining. The result will be renewables eating up more and more of the existing market for coal, gas and nuclear.

Plenary Lectures 2

Title : Research Initiatives for the Integration of Renewables into the Smart Grid

Yacov A. Shamash, Ph.D

Professor, Stony Brook University, USA



Dr. Yacov A. Shamash is a professor of Electrical and Computer Engineering at Stony Brook University where he was the founder of the New York State Center for Excellence in Wireless and in Information Technology, and the New Your State Center for Excellence in Advanced Energy Research and Technology (AERTC). He has previously served as the Vice President for Economic Development, the Dean of Engineering and Applied Sciences and the Dean of the Harriman School for Management and Policy. Prior to joining Stony Brook University, Dr. Shamash developed and directed the National Science Foundation Industry/University Cooperative Research Center for the Design of Analog/Digital Integrated Circuits and also served as Chairman of the Electrical and Computer Engineering Department at Washington State University. He serves on the Board of Directors of Comtech Telecommunications Corp., KeyTronic Corp., and Applied DNA Sciences, Inc. Dr, Shamash is a Fellow of the IEEE and holds a Ph.D. degree in Electrical Engineering from Imperial College of Sciences and Technology in London, England.

Abstract :

This conference addresses what is a very nice problem to have: at the same time that the growth of renewables poses the task of integrating this clean but intermittent energy resource smoothly into the electric power grid, the capacity of the grid is also being challenged by the growth of EV demand. As we recently experienced with Hurricane Isaias where I live in New York, the resilience of the grid is a critical issue in the aftermath of natural disasters.

As we all know, an important solution to this problem is energy storage, specifically batteries. It provides a critical charging resource deployable in a variety of scales and a diversity of private and public settings, from utility scale grids to cities to workplaces and commercial venues to

communities and neighborhoods to individual EV drivers' garages. More broadly, storage can flatten out the highs and lows that inevitably result from resource intermittency.

My intent in this talk is to report on some of Stony Brook University's many accomplishments in addressing renewables integration into the grid and its key role in EVs' contribution to a carbon-free future.

Through the New York State-designated Center of Excellence in Advanced Energy Research and Technology (AEC), we are making extraordinary contributions across the spectrum of renewables, efficiency and conservation, in the era of the Smart Grid. The AEC is the home of exceptional faculty researchers, pioneering startup companies and a US Department of Energy (DOE) EFRC — Energy Frontier Research Center — whose mission is conduct transformative science that results in fundamental energy innovation. The AEC hosts the DOE National Center for Off-Shore Wind — a \$40M investment in this potentially very large source of renewable energy — as well as an industry/university sponsored Institute for Gas Technology and Innovation, and a New York State Center for Advanced Technology in Integrated Electric Energy Systems.

The multi-faceted problem of integrating renewable energy sources into the grid requires the talents of multidisciplinary faculty researchers working with industry – both the utilities and the manufacturers of their equipment and systems — and supported by national, regional and local government entities. Examples of several different kinds of University/Government/Industry partnerships that have been developed and implemented in the AEC will be discussed.

For Stony Brook's Energy Frontier Center, the application of fundamental science means studying the functioning of electrochemical energy storage systems by looking beyond the macro property of heat as a product of inefficient operation to actual ion and electron behavior. Current areas of study include LI-ion batteries, with their familiar supply chain, cost, raw material availability, and safety issues, and a potential lower cost alternative, Zinc anode batteries with a non-flammable aqueous electrolyte.

One of the AEC's startup companies has developed patent-pending innovations in fluid dynamics, electrolyte molarity and battery design to increase the power and energy density of vanadium flow batteries, reducing the power cost by 50%, increasing battery capacity by 25% and achieving a 20-year operating life.

I very much hope to arrive at a future conference in person in an EV powered by a Stony Brook battery.

My very best wishes for an excellent conference experience.

Plenary Lectures 3

Title : Resilient and Expandable Distribution Network for Smart Community in Asian Countries and Islands

Ryuichi Yokoyama, Ph.D

Emeritus Professor, Waseda University, Japan



Ryuichi Yokoyama received the degrees of B.S., M.S., and Ph.D in electrical engineering from Waseda University, Tokyo, Japan in 1968, 1970, and 1974, respectively. After working in Mitsubishi Research Institute, from 1978 through 2007, he was a professor in the Faculty of Technology of Tokyo Metropolitan University. Since 2007, he had been a professor of the Graduate School of Environment and Energy Engineering in Waseda University. His fields of interests include planning, operation, control and optimization of large-scale environment and energy systems, and economic analysis and risk management of deregulated power markets.

Now, he is a Professor Emeritus of Waseda University, a Life Fellow of IEEE, a Senior Life Member of IEE of Japan, a member of CIGRE. He is also Chairmen of Standardization Commissions of Electric Apparatus in METI Japan. He is a President of Consortium of Power System Technology of Japan and CEO of the Energy and Environment Technology Research Institute.

Abstract :

A paradigm shift has been taking place toward reorganizing the energy management practice in Japan and many projects started to study the "Smart Grid and Smart Community" which utilize renewable energy from solar and wind sources.

Due to the widespread shortage of electricity occurred by the East Japan Earthquake in March of 2011, we are keenly aware of the need for households, offices, factories, and local governments to maintain their own power sources that are not completely dependent on electric power companies. In constructing such power sources, locally generated and consumed renewable energy from

solar and wind sources would be mainly utilized. However, such power sources would affect the power grid through fluctuation of power output and the deterioration of power quality. Therefore, a new social infrastructure to supply electric power would be required. As a countermeasure of the problem, it would be suitable to create resilient and expandable distribution networks that are of appropriate scale for their respective regions instead of large-scale networks all at once. The network will add new clusters when needed and have them collaborate with each other where regional governments are the main entities. In this presentation, the current status and features of the government driven developments for smart grids and communities in Japan are introduced, and cluster-oriented expandable networks are discussed focusing on resiliency of the grid against natural disaster. Vital lifelines could be secured even during large-scale natural disasters, if such administrative agencies, hospitals, police stations, schools, evacuation centers, communication bases, and elderly housing facilities were completed centering on the Cluster-Oriented Expandable Network operated by regional governments. This concept is known as "resiliency", and it will one day be the guideline for building the social infrastructure.

Plenary Lectures 4

Title : Energy Internet & Energy System Integration

Kwang Y. Lee, Ph.D

Chair and Professor, Electrical & Computer Engineering, Baylor University, USA



EDUCATION:

Ph.D. System Science 1971 Michigan State University

M.S. Electrical Engineering 1968 North Dakota State University

B.S. Electrical Engineering 1964 Seoul National University

Ph.D. Thesis: "Optimal Sampled-Data Control of Distributed Parameter Systems"

Advisor: Robert O. Barr

PROFESSIONAL EXPERIENCE:

8/07- Present Baylor University Professor & Chairman

8/07- Present The Pennsylvania State University Professor Emeritus

8/92-8/07 The Pennsylvania State University Professor

8/86-8/92 The Pennsylvania State University Associate Professor

9/76-8/86 University of Houston Associate Professor

Su of 1976 Bonneville Power Administration Electrical Engineer

9/75-8/76 Oregon State University Assistant Professor

9/73-8/75 Michigan State University Assistant Professor

12/71-8/73 Michigan State University Research Associate

Su of 68, 69 Lockheed Ship Building and Construction Electrical Engineer

5/66-8/67 Han Young Industrial Co. Electrical Engineer

4/64-4/66 The Army Signal School Instructor

RESEARCH INTERESTS:

Artificial intelligence, computational intelligence and multi-agent systems, and their applications to power & energy systems. Control, operation, and planning of power systems with renewable energy sources. Modeling, simulation and control of fossil-fuel, hydro and nuclear power plants and renewable energy sources, distributed generation, energy storage systems, V2G & G2V electric vehicles, and micro-grid.

PROFESSIONAL SOCIETY ACTIVITIES:

Fellow of IEEE Editor, IEEE Transactions on Energy Conversion

Associate Editor, IEEE Transactions on Neural Networks

Associate Editor, IFAC Journal on Control Engineering Practice

Chair of IFAC Technical Committee 6.3 on Power and Energy Systems

Chair of IFAC Workshop on Control of Smart Grid and Renewable Energy Systems (CSGRES 2019), Jeju Island, Korea, June 2019

Abstract

Today large complex physical systems interact with a considerable and increasing number of distributed computing elements for monitoring, control and management. The elements of the physical systems are interconnected through the exchange of matter, energy or momentum while the elements of the control and management systems are interconnected through communication networks, which often impose restrictions on the information exchange. Example of systems are smart grids and power plants, water management, traffic management (for cars, airplanes or ships), smart manufacturing process with many cooperating elements (e.g., robots, machines, warehouses, conveyer belts), large processing plants with many process units, buildings with advanced distributed control, etc.

This talk is geared to power and energy systems. By better design, coordination and management of these systems, day to day life can be improved significantly by better services, lower consumption of energy and resources, and lower emissions. With rising environmental regulation, a paradigm shifts from fossil to green energy; however, without the intervention of control, this shift wouldn't be as effective. Power and energy system as an area divided into numerous subareas and each subarea has a different control problem. Control technology is inevitably at the heart of as many engineering and science applications as one can imagine. The talk summarizes the role of systems & control in generation, transmission, distribution, renewable energy, energy storage and energy market.

Technical Session Table

Author Index

A
A

