9th INTERNATIONAL CONFERENCE on SMART GRID
(icSmartGrid2021)

Setubal, Portugal 29 June-01 July 2021
icSmartGrid2021
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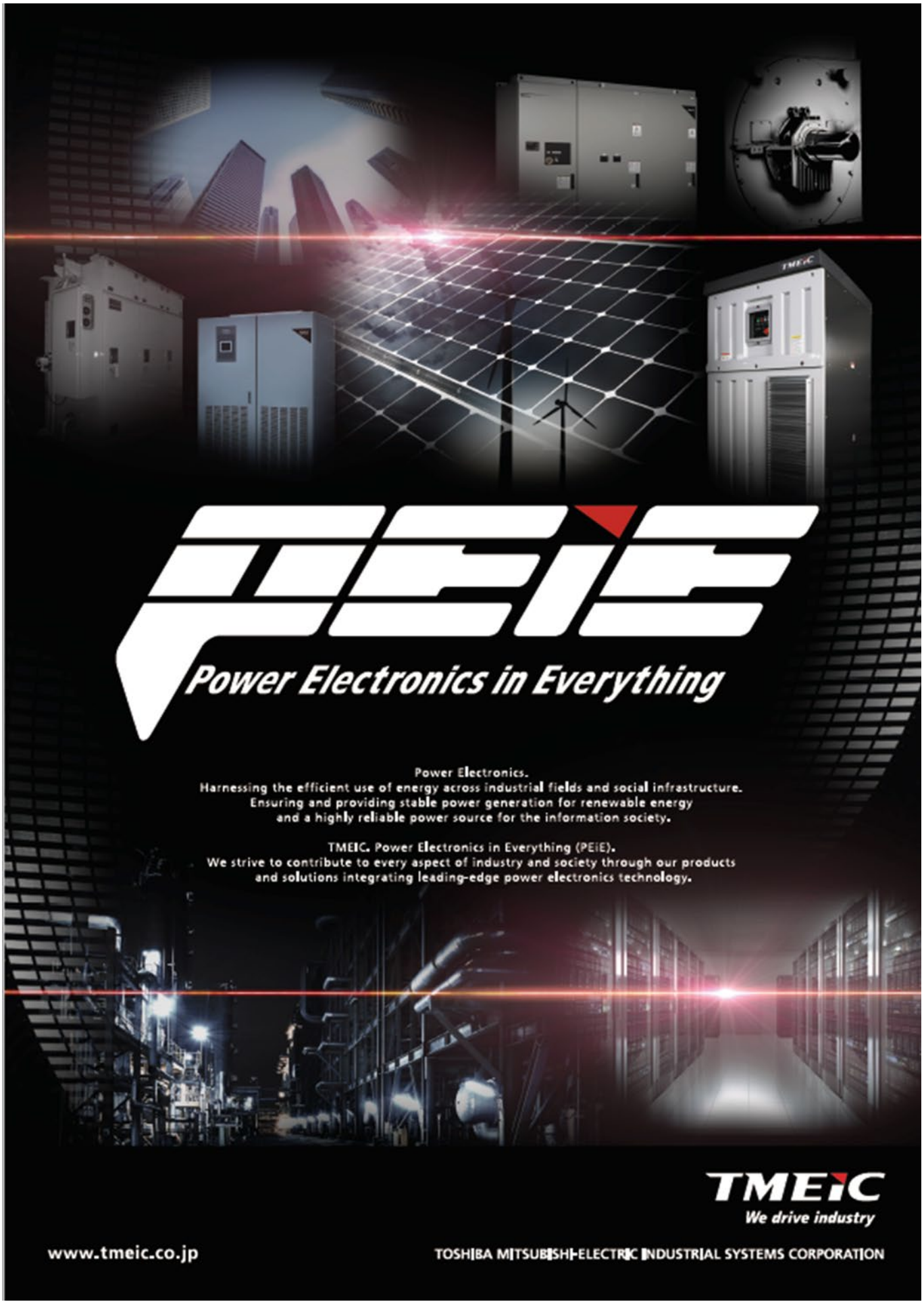

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TOPICS

The coverage of the Conference on Smart Grids includes the following areas, but not limited to:

- Distributed Power Energy Systems and Sources,
- Renewable Energy,
- Conventional Power Sources
- New Trends and Technologies for Smart Grid
- Policies and Strategies for Smart Grid
- Microgrids for transportation electrification
- Energy Transformation from Renewable Energy System to Smart Grid
- Novel Energy Conversion Studies for Smart Grid
- HVDC for Smart Grid
- Power Devices and Driving Circuits for Smart Grid
- Performance Analysis of Smart Grid
- Decision Support Systems for Smart Grid
- Control Techniques for Smart Grid
- ICT, IoT, Real-time monitoring and control
- Applications for Industries
- Smart Grid for Electrical Vehicles and Components
- Energy Management Systems, etc.
- Future Challenges and Directions for Smart Grids

LANGUAGE

The working language of the icSmartGrid2021 conference is English.

WELCOME to icSmartGrid 2021

Dear Colleague,

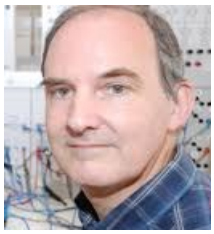
The purpose of the International Conference on Smart Grid (icSmartGrid) is to bring together researchers, engineers, manufacturers, practitioners and customers from all over the world to share and discuss advances and developments in Smart Grid research and applications.

After the successes of the first and the second editions of Smart Grid Workshops on behalf of European Commission Joint Research Centre at Antalya in September 18-20, 2013 and in September 23-25 April, 2014, the third edition is at Istanbul in February 22, 2015, the fourth edition is at Istanbul in April 28, 2015, fifth edition is at Istanbul in March 21-25, 2016 with the technical co-sponsorship of IEEE IES, the sixth edition is at Nagasaki in December 4-6, 2018, the seventh edition at Newcastle, Australia in December 9-11, 2019, eighth edition at Paris, France in 2020 with the technical co-sponsorship of IEEE IES and IAS, we are now organizing the nineth International Conference on Smart Grid at Setubal, with the technical co-sponsorship of IEEE IES and IAS, Portugal. icSmartGrid will continue promoting and disseminating the knowledge concerning several topics and technologies related to smart energy systems and sources. It is therefore aimed at assisting researchers, scientists, manufacturers, companies, communities, agencies, associations and societies to keep abreast on new developments in their specialist fields and to unite in finding alternative energy solutions to current issues such as the greenhouse effect, sustainable and clean energy issues.

However, due to spread of COVID-19 all over the World, we received the permission from IEEE to organize icSmartGrid on a digital platform. Therefore, we will organize icSmartGrid2021 virtually.

You will find the detail information about this activity on the conference official website. Please visit http://www.icsmartgrid.org/

Honorary Chair, icSmartGrid2021
Mr. Hidehiko KIKUCHI
Senior Advisor to TMEIC, Japan



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Professor Fujio KUROKAWA

KEYNOTE SPEAKERS

Keynote 1: Mr. Masayuki TOBITA, Vice President of TMEIC, Japan

Date : June 29, 2021 10.00-11.00 AM

Mr. Masayuki Tobita graduated from master course of Electrical and Electronic Engineering, Tokyo Institute of Technology in 1994, where he majored in Power Electronics. He joined Toshiba Corporation in April 1994, developed his carrier as the engineer and made excellent technical achievements in high-capacity power electronics applications.

In October 2003, he moved to Toshiba Mitsubishi-Electric Industrial Systems Corporation (TMEIC), Tokyo, Japan, when the joint venture between Toshiba and Mitsubishi-Electric was established. At that time, he was Specialist of Power Electronics Department. He became Senior Manager of Power Electronics Department in 2013 and Senior Manager of Energy & Environment Power Electronics Systems Department in 2014. He became Senior Manager of Planning & Administration Department in 2017.

He was President & CEO of Power Electronics Products Corporation in Houston from 2019. From June 2021 to present, he is Vice President of Power Electronics System division.

Contributions to Carbon Neutral through PEiE, Power Electronics in Everything

Summary: The world is now moving towards Carbon Neutral. The power electronics technology contributes to Carbon Neutral by expanding renewables furthermore and by improving the energy use efficiency. The power electronics technology also contributes to Green Hydrogen production for replacing the fossil fuels and supports digital transformation for managing new energy circulation systems. The speech introduces some examples of such contributions.

The speech reminds the global goal, Carbon Neutral by 2050. As an example, the Japanese Prime Minister declared it and the government made the strategic plan. The plan includes development of the hydrogen power in addition to expanding renewables and batteries. The speech explains why power electronics is one of key technologies in the plan by introducing recent technology trend of industrial power electronics especially for the high capacity in MW range.

The first topic is the power electronics for the renewables and the energy storage systems, ESS. The speech introduces the key technologies for high power and high system efficiency for the industrial MW-range PV inverters. The speech also introduces the ESSs necessary for stabilizing the power grid by managing the power and energy from the renewables. The smart control systems are also introduced which integrates the renewables, the ESSs and the loads in the power grids. The speech also addresses the power electronics for the wind power generation. The wind power generation increases its power ratings in MW range and requires high-capacity power electronics.

The second topic tries to cover the energy transition, Green Hydrogen, and heating electrification. For these fields also, the power electronics technology is essential. Green Hydrogen is made with the electricity from the renewables. Quite large amount of hydrogen is necessary to replace the fossil fuels now used in the world.Then, very high DC current of kA is required in the electrolytic process for mass production of Green Hydrogen. The speech introduces such high current equipment. The fossil fuels widely used for heating processes. In industries, power electronics technologies of MW range can electrify some of heating processes. The speech goes back to Green Hydrogen, which, however, will be used in the rotating generator to stabilize the AC power network.

The third topic is the energy efficiency in industries. The motors consume more than half of the electricity in the world. The motor drive by inverters is well recognized for better system efficiency in low voltage applications. The speech notes that, for expanding the inverter drive to higher voltage applications, the inverter technology for several kV and higher is required. Then, such technology is introduced with the high voltage motors.

The fourth topic is related to the digital transition. For achieving Carbon Neutral, the digitalization is the other essential technology to manage the new energy supply chain starting from renewables

via Green Hydrogen to users. The digital transition is made of two elements, the vast information in data centers and the hardwaremade on Silicon wafers. The power electronics technology, UPS, is essential to supply the stable power to the data centers. The other type of power electronics, MPC, multiple purpose converter, reinforce power supply systems in the semiconductor device factories for maintaining the hardware supply chain.

In the summary, the speech remarks that the power electronics technology is now embedded almost in everything. Then, a concept "PEiE", Power Electronics in Everything, will create new values by linking the power electronics in things. Through applications in various fields, PEiE firmly is believed to contribute to achieve Carbon Neutral.

Keynote 2: Dr. Khaled AHMED, Strathclyde University, Glasgow, UK

Date : June 29, 2021 11.10-12.10 AM

Dr Khaled Ahmed received the B.Sc. and M.Sc. degrees from Alexandria University, Egypt in 2002 and 2004, respectively. He received the PhD degree in power electronics applications from the Electronic and Electrical Engineering Department, University of Strathclyde, UK, 2008. In 2011, he was appointed as a Lecturer in Power Electronics at the University of Aberdeen, and was promoted to Senior Lecturer in 2015. Currently, He is a Reader (Professor) in power electronics at the University of Strathclyde (PEDEC Group). He has over 19 years of research experience in power electronics, renewable energy integration, solar energy systems, off-shore wind energy, smart grids, DC/DC Converters and HVDC. He has won funding of £2.8 million as Primary and Co-Investigator on projects funded by EPSRC, the EU, KTP, the British Council, the Royal Society, the Carnegie Trust, the Scottish Funding Council, the Oil and Gas Technology Centre, and industry (Rolls-Royce, Scottish Power, and Scottish and Southern Energy). He has supervised 18 PhD students; 10 have graduated and the others are ongoing. Dr Ahmed has published over 120 technical papers in refereed journals and conferences, 1 book, 1 book chapter, and a patent (PCT/GB2017/051364). Total citations of 4562 and h-index of 28. Two of his journal papers are rated in the top 1% of those cited in the academic field of Engineering (Web of Science). He is a senior member of the Institute of Electrical and Electronics Engineers (IEEE) Industrial Electronics and Power Electronics Societies, IET member, Chartered Engineer, and Fellow of Higher Education Academy (HEA). He serves as a Co Editor-in-Chief of Elsevier Alexandria Engineering Journal, and as an Associate Editor of IEEE Open Journal of the Industrial Electronics Society (OJIES), and IEEE Access.

Unlocking Opportunities for DC Grids by Fault Tolerant DC-DC Converters

Summary: DC grid is a promising choice for future DC transmission system. It can be defined as a DC transmission network, which includes more than two terminals with at least one meshed DC line. With DC grids there are multiple power-flow paths between two grid terminals. Power flow between two DC grid terminals may not be affected (or partially affected) by tripping a single DC line. DC grids will require some protection technology in order to isolate faulted lines/units allowing remaining part of the grid to continue power transfer. Normally, any number of new terminals can be added to an existing DC grid.

It is expected that DC grids will eventually evolve into large meshed networks, which will inevitably have multiple DC voltage levels. A DC-DC converter will be needed in order to connect two DC grids operating at different DC voltage levels. One evident DC-DC application is to connect DC cables (which have DC voltage up to 600 kV) with overhead DC lines, which may have a higher DC voltage. The existing HVDC (high-voltage direct-current) links have wide range of highly optimized DC voltage levels and their possible integration into the DC grid will require DC-DC converters. It is also expected that medium-voltage DC grids, either distribution or collection systems (like those with offshore wind farms) will rapidly develop following acceptance of DC transmission grids, and their connection to DC transmission will require high-stepping ratio DC-DC converters. This role is similar to a transformer function in traditional AC systems.

Nevertheless, even in a DC grid with a single nominal DC voltage there might be a need for DCDC converters in order to regulate the power flow in some cables or DC voltage level at some nodes. These DC-DC converters may have low stepping ratio and perform a similar function to tap-changing transformers and phase-shifting transformers in AC systems. The power flow in DC grids will be primarily controlled using AC/DC converters located at grid terminals (connecting points with external AC grids).

The main objective of the talk is to discuss the fault tolerant high power DC-DC converters with clarifying different topologies advantages and disadvantages. The current, future, and challenges of high power DC-DC converters development will be covered. The talk will discuss DC-DC converter operation, control and interactions with DC/AC systems. The connection between VSC (Voltage Source Converter) and LCC (Line Commutated Converter) DC systems will be analysed

via DC-DC converters. The talk covers also the latest modular multilevel converter based DC-DC converter topologies. AC and DC faults analysis for different DC-DC converter technologies will be presented. The talk is supported with simulation on MATLAB/SIMULINK software and practical prototype results.

Keynote 3: Professor Kazuto YUKITA, Aichi Institute of Technology, Japan

Date : June 30, 2021 10.00-11.00 AM

Prof. Kazuto YUKITA received the BE, MD and PhD degrees from Tokai University, Japan in 1992,1994 and 1997, respectively. In 1997, he was appointed as an assistant lecturer in Department of Electrical and Electronics Engineering at Aichi Institute of Technology and was promoted to Lecturer in 1998. He has been Professor in 2012. Currently, He is a Chief Professor in Eco-electric power research center at the Aichi Institute of Technology in 2016. He is interested the power system, AC/DC microgrids, smartgrids, renewable energy and DC power system. He is a member of the Institute of Electrical and Electronics Engineers (IEEE) , CIGRE and IEC, respectively.

Study on AC/DC microgrids at Aichi Institute of Technology Eco-Electricity Research Center

Summary: In this lecture, we will introduce the research activities at the Eco-Electricity Research Center of Aichi Institute of Technology. The Eco-Electricity Research Center, established in 2005, is conducting research on renewable energy. The center uses the lecture building to build an AC / DC hybrid microgrids and conduct multifaceted researches. These grids are an AC / DC hybrid type and can shift from an independent mode to an interconnected mode without power interruption. In addition, DC grids are constructed to supply DC power to DC load equipment. Furthermore, we are developing a prediction method using a sky camera to predict the amount of power generated by solar power generation equipment and wind power generation equipment.

In this lecture, we will introduce the results of these researches.

Keynote 4: Professor Thomas Strasser, AIT Austrian Institute of Technology, Austria

Date : June 30, 2021 11.10-12.10 AM

Dr. Thomas Strasser received a master's and a PhD degree from Vienna University of Technology (TU Wien) and was awarded with the venia docendi (habilitation) in the field of automation from the same university. For several years, he has been a senior scientist in the Center for Energy of the AIT Austrian Institute of Technology. His main responsibilities involve strategic development of smart grid automation and validation research projects and mentoring/supervising junior scientists and PhD candidates. He is active as a senior lecturer (Privatdozent) at the Vienna University of Technology.

He is the co-author of more than 200 scientific publications (journal publications, book editorials and chapters, conference papers, editorial of conference proceedings, technical reports) as well as two patents in the above-mentioned areas. Thomas Strasser has presented results of his research work in various international conferences, workshops, events, and seminars. He is an active member in various program committees of scientific conferences and he serves as an associate editor/editorial board member of IEEE, Hindawi, MDPI, and Springer journals.

Dr. Strasser was and is involved since almost two decades in various national and international research projects in various roles (coordinator, WP leader, principal investigator, researcher). In addition, he is an evaluator of research proposals and projects for several national and European funding agencies. He is member of international IEC and IEEE standardization working groups and senior member of IEEE where he is also involved in different activities of IES (AdCom member-at-large 2018-2020, Energy TC Cluster Delegate to AdCom 2020-2021), SMCS (BoG member-at-large 2018-2020, VP for Systems Science & Engineering 2021-2022), PES, IEEE AT Section (secretary 2015-2017, vice chair 2020, chair 2021-2022) and SYSC (SMCS representative and AdCom member 2021-2022). He serves also as the Austrian representative in the CIGRE study committee C6 on active distribution grids.

Recent Research Trends in Designing and Validating Smart Grids

Summary: A driving force for the realization of a sustainable energy supply is the integration of renewable energy resources. Due to their stochastic generation behaviour, energy utilities are confronted with a more complex operation of the underlying power grids. Additionally, due to technology developments, controllable loads, integration with other energy sources, changing regulatory rules, and the market liberalization, the system's operation needs adaptation. Proper operational concepts and intelligent automation provide the basis to turn the existing power system into an intelligent entity, a cyber-physical energy system. The electric energy system is therefore moving from a single system to a system of systems. While reaping the benefits with new intelligent behaviours, it is expected that system-level developments, architectural concepts, advanced automation and control as well as the validation and testing will play a significantly larger role in realizing future solutions and technologies. The implementation and deployment of these complex systems of systems are associated with increasing engineering complexity resulting also in increased engineering costs. Proper engineering and validation approaches and tools are partly missing until now. Therefore, this keynote talk discusses and summarizes the main needs and requirements as well as the status quo in research and development related to the engineering and validation of cyber-physical energy systems. Also, validation examples and short demos are presented. Finally, research trends and necessary future activities are outlined

Keynote 5: Professor Peter Palensky, TU Delft, Netherlands

Date : July 01, 2021 10.00-11.00 AM

Peter Palensky is full Professor and Chair of Intelligent Electric Power Grids and Scientific Director of the PowerWeb institute at TU Delft (Netherlands). Before that he was Principal Scientist for complex energy systems and Head of Business Unit "Sustainable Building Technologies" at the Austrian Institute of Technology, CTO of Envidatec Corp., Hamburg, Germany, associate Professor at the University of Pretoria, South Africa, Department of Electrical, Electronic and Computer Engineering, University Assistant at the Vienna University of Technology, Austria, and researcher at the Lawrence Berkeley National Laboratory, California. He is active in international committees like ISO, IEEE and CEN. He carries a PhD (EE, 2001) from the Vienna University of Technology and is Editor in Chief of the IEEE Industrial Electronics Magazine. His research field is complex energy systems and smart grids. In his research he models, (co-)simulates and optimizes heterogeneous cyber-physical energy systems. The areas of optimization are stability, robustness, efficiency and control of smart grids..

IEC61850 and Cyber-Physical Security of Power Systems

Summary: The power system of the future is expected to host lots of distributed and renewable generation, smart EV charging, energy-aware IoT, dynamic markets, and many more applications and technologies. These fundamental changes go along with the digital transformation of the power grid. SCADA, digital substations, IEC61850, sensors, and actuators are deployed in order to make the grid more observable and controllable. The digital "operational technology", or OT, enables the required flexibility, but also imports a new phenomenon: cyber-threats. The combination of the physical renewable power system and its stability issues with the digital system and its security issues leads to a cyber-physical system that deserves special attention. This presentation will introduce the audience into digital power systems and demonstrate that weakly protected digital substations are an easy target and that deliberate attacks can lead to catastrophic consequences.

TUTORIALS

Speaker 1: Professor Seref Sagiroglu, Gazi University, Turkey

Date : July 01, 2021 11.10-12.10 AM

Prof. Dr. Seref Sagiroglu completed his undergraduate education in 1987 at Erciyes University, Department of Electronics Engineering. He completed his doctoral studies at the University of Wales College of Cardiff (now Cardiff University, UK) in 1994. He continues his academic career as a professor in Software Engineering at Gazi University Computer Engineering Department. Prof. Sagiroglu has an outstanding academic with h-index=32 and i10-index=82; more than 3750 citation; 60 SCI/SSCI indexed articles, 100 national and international indexed articles; 200 national and international conference and symposium articles. He has also author and/or editor of more than 20 books, owns 6 patents and has completed national and international projects on security, big data, intelligent modeling and control, biometric, electromagnetic fields, etc. Sagiroglu has organised more than 50 national and international events on 5G, Big Data, Machine Learning, Deep Learning, Information and Cyber Security, IPv6, etc. as chairman or co-chairman. Some of them are: International Conference on Information Security and Cryptology (www.iscturkey.org); IEEE International Conference on Computer Science and Engineering (www.ubmk.org); IEEE Big Data, Deep Learning and Fighting Cyber Terrorisms (www.ibigdelft.org); IEEE International Conference on Machine Learning and Applications (www.icmla-conferences.org); Big Data Analytics, Security and Privacy Workshop (www.bigdatacenter.gazi.edu.tr); National Cyber Terrorism Conference (www.siberteror.org); Turkey Open Data Conference (www.acikveriturkiye.org); IEEE 5G Summit-Istanbul (www.ieeesummit.org); National IPv6 Conference (www.ipv6.org). He has also been founding members of Information Security Association (www.bilgiguvenligi.org.tr); Turkish Science Research Foundation (www.tubav.org.tr), and The Foundation of the People Caring for the Future (www.gonder.org.tr). Sagiroglu has/had such duties as: President and Executive Committee Member of Information Security Association; President and Member of Turkish Science and Research Foundation; Director of Graduation School of Science and Technology at Gazi University; Head of Computer Engineering Department, Gazi University; Member of IEEE Biometric Task Force; President of IPv6 Council Turkey (www.ipv6forumtr.org); Editors of International Journal of Information Security Science (www.ijiss.org); International Journal of Information Security Engineering (in Turkish) (www.dergipark.gov.tr/ubgmd) and CyberMag (www.cybermag.com); General Director of FutureTech (www.futuretech.com.tr); Member of Cyber Security Group of Higher Education Council of Turkey; Supervisors to Havelsan; IT Regulatory Body of Turkey (BTK) and Personal Data Protection Regulatory Body of Turkey (KVKK). Prof. Sagiroglu has delivered as invited or keynote speakers more than 500 seminars, talks, conferences at universities, schools, sectors, TV and Radio Programs, institutions and organisations in the topics of Information Security, Big and Open Data, Cyber Security and Defense, Artificial Intelligence, Computer and Software Engineering, Privacy, Biometrics, Innovation Culture Creation, IPv6, 5G, etc.

Big Data And Cyber Security Issues In Smart Grids

Summary: Big data has potential to provide opportunities not only many fields but also power grid sectors enhancing technical, organizational, social and economic gains and contributions. The current potential of applying big data approaches for better planning, managing, designing, and securing power grid operations are very challenging tasks and needs significant efforts. This talk will cover the issues of computational complexity, data security and privacy, cost, management, planning and integration of big data into power grid systems and also focus on the key challenges of cyber security and big data issues.

CONFERENCE PROGRAM SUMMARY

Program Summary of icSmartGrid 2021, June 29-July 1, 2021, Setubal, Portugal

	Tuesday, 29 June 2021			Wednesday, 30 June 2021			Thursday 01 July 2021		
09:40-10:00	Opening Ceremony (20 Min)								
10:00-11:00	Keynote Speech-I (60 Min)		10:00-11:00	Keynote Speech-III (60 Min)		10:00-11:00	Keynote Speech-V (60 Min)		
11:00-11:10	Break		11:00-11:10	Break		11:00-11:10	Break		
11:10-12:10	Keynote Speech-II (60 Min)		11:10-12:10	Keynote Speech-IV (60 Min)		11:10-12:10	Tutorial-I (60 Min)		
12:10-13:00	Break		12:10-13:00	Break		12:10-13:00	Break		
13:00-14:40	VP1 VP2 VP3 VP4 VP5	Virtual Session-1 5 PAPERS (5*20=100 Min)	13:00-14:40	V19 VP20 VP21 VP22 VP23	Virtual Session-5 5 PAPERS (5*20=100 Min)	13:00-14:40	V37 VP38 VP39 VP40 VP41	Virtual Session-9 5 PAPERS (5*20=100 Min)	
14:40-15:00	Break		14:40-15:00	Break		14:40-15:00	Break		
15:00-16:40	VP6 VP7 VP8 VP9 VP10	Virtual Session-2 5 PAPERS (5*20=100 Min)	15:00-16:40	VP24 VP25 VP26 VP27 VP28	Virtual Session-6 5 PAPERS (5*20=100 Min)	15:00-16:40	VP42 VP43 VP44 VP45 VP46	Virtual Session-10 5 PAPERS (5*20=100 Min)	
16:40-16:50	Break		16:40-16:50	Break		16:40-16:50	Break		
16:50-18:30	VP11 VP12 VP13 VP14 VP15	Virtual Session-3 5 PAPERS (5*20=100 Min)	16:50-18:30	VP29 VP30 VP31 VP32 VP33	Virtual Session-7 5 PAPERS (5*20=100 Min)	16:50-18:30	VP47 VP48 VP49 VP50 VP51	Virtual Session-11 5 PAPERS (5*20=100 Min)	
18:30-18:40	Break		18:30-18:40	Break		18:30-18:40	Break		
18:40-19:40	VP16 VP17 VP18	Virtual Session-4 3 PAPERS (3*20=60 Min)	18:40-19:40	VP34 VP35 VP36	Virtual Session-8 3 PAPERS (3*20=60 Min)	18:40-19:00	VP52 VP53 VP54	Virtual Session-12 1 PAPER (1*20=20 Min)	
							Closing Ceremony		

CONFERENCE PROGRAM

Date: 29 June 2021	
09:40-10:00	Opening Ceremony and Speeches: -Mr. Hidehiko Kikuchi, Senior Advisor to TMEIC, Honorary Chair, icSmartGrid2021, Japan -Prof Susana Piçarra, Vice-President, Polytechnic Institute of Setubal, Portugal -Prof. Vitor Pires, General Chair, icSmartGrid 2021, Portugal -Prof. Fujio Kurokawa, General Co-Chair, icSmartGrid 2021, Japan -Prof. Ilhami Colak, General Co-Chair, icSmartGrid 2021, Turkey **Chairs: Rosario Micheli, Nobumasa Matsui**
KEYNOTE	
10:00-11:00	Speaker: Mr. Masayuki TOBITA, Vice President of TMEIC, Japan. **"Contributions to Carbon Neutral through PEiE, Power Electronics in Everything"** **Chairs: Brayima Dakyo, Fabio Viola,**
11:00-11:10	**BREAK**

Date: 29 June 2021	
09:40-10:00	Opening Ceremony and Speeches: -Mr. Hidehiko Kikuchi, Senior Advisor to TMEIC, Honorary Chair, icSmartGrid2021, Japan -Prof Susana Piçarra, Vice-President,Polytechnic Institute of Setubal, Portugal -Prof. Vitor Pires, General Chair, icSmartGrid 2021, Portugal -Prof. Fujio Kurokawa, General Co-Chair, icSmartGrid 2021, Japan -Prof. Ilhami Colak, General Co-Chair, icSmartGrid 2021, Turkey **Chairs: Rosario Micheli, Nobumasa Matsui**
KEYNOTE	
10:00-11:00	Speaker: Mr. Masayuki TOBITA, Vice President of TMEIC, Japan. **"Contributions to Carbon Neutral through PEiE, Power Electronics in Everything"** **Chairs: Brayima Dakyo, Fabio Viola,**
11:00-11:10	**BREAK**

Date: 29 June 2021	
VIRTUAL SESSION 3	**CHAIRS: Paula Carroll, Naki Guler**
16:50-17:10	**ID:21 Smart Grid Power Management Interface for Use of short-term Flexibility** Felix Heider (Helmut Schmidt University)*
17:10-17:30	**ID:22 Experimental Evaluation of the True Remaining Capacity of Legacy Lead-Acid Batteries** Khadim Ullah Jan (University Paris-Saclay)*; Aurore Brézard Oudot (University Paris-Saclay); Anne Migan Dubois (University Paris-Saclay); Demba Diallo (University Paris-Saclay)
17:30-17:50	**ID:23 IoT Enabled Real-time Energy Monitoring and Control System** Syed Zain R Hussain (Habib University)*; Junaid Ahmed Memon (Habib University)
17:50-18:10	**ID:24 Modeling and Simulation Analysis of a Hybrid PV–Wind Renewable Energy Sources for a Micro-Grid Application** Abderrahmane AlKassem, Mazan AlAhmadi, Azeddine Draou (Islamic University in Madina)*
18:10-18:30	**ID:27 Forecasts on the development of Hydrogen Refuelling Infrastructures in Portugal** Gabriella Di Filippo (University of Palermo)*; Guido Ala (University of Palermo); Fabio Viola (Università di Palermo); Rosario Miceli (University of Palermo); Pietro Romano (University of Palermo); Ilhami Colak (Nisantasi University); Carla Silva (University of Lisbon); Stanimir Valtchev (FCT/UNL); Giuseppe Schettino (University of Palermo)
18:30-18:40	**BREAK**
Date: 29 June 2021	
VIRTUAL SESSION 4	**CHAIRS: Jorge Solis, Felix Heider**
18:40-19:00	**ID:90 Long Term Benefits of Advanced Communication Techniques in Smart Grids** Ayse Colak (University of Strathclyde)*; Melike S Ayaz (GAZI UNIVERSITY); Dr K Ahmed (Strathclyde)
19:00-19:20	**ID:89 Fuzzy High Order Sliding Mode Control Based DPC of DFIG using SVM** Mazouz Farida (univ Batna 2)*; belkacem sebti (univ Batna 2); Ilhami Colak (Nisantasi University)
19:20-19:40	**ID:87 Study of a hybrid system wind-photovoltaic on grid for the self-supply of energy to an area with bioecological infrastructure.** Daniel Icaza (Catholic University of Cuenca, Cuenca, Ecuador)*; Jorge Rojas Espinoza (Universidad Politécnica Salesiana); Darío Valarezo (Universidad Politécnica Salesiana)

Date: 30 June 2021	
	KEYNOTE
10:00-11:00	Speaker: Professor Kazuto YUKITA, Aichi Institute of Technology, Japan. **"Study on AC / DC microgrids at Aichi Institute of Technology Eco-Electricity Research Center "** **Chairs: Mihai Cernat, Khaled Ahmed**
11:00-11:10	**BREAK**
	KEYNOTE
11:10-12:10	Speaker: Professor Thomas Strasser, AIT Austrian Institute of Technology, Austria. **"Recent Research Trends in Designing and Validating Smart Grids "** **Chairs: Robert Cuzner, Kazuhiro Kajiwara**
12:10-13:00	**BREAK**

VIRTUAL PRESENTATIONS	
Date: 30 June 2021	
VIRTUAL SESSION 5	**CHAIRS: Selami Balcı, Mehmet Demirtas**
13:00-13:20	**ID:28 Grid Interfacing of Multi-megawatt Photovoltaic System under Normal and Partial Shading Conditions** Isaac Owusu-Nyarko (University of Strathclyde)*; Dr K Ahmed (Strathclyde); Fahad Alsokhiry (King Abdulaziz University); Yusuf Al-Turki (King Abdulaziz University)
13:20-13:40	**ID:29 A Survey on Efficient Consensus Mechanism for Electricity Information Acquisition System** Hanji Ju (State Grid JiBei Electric Power Co.Ltd Metrology Center); Xiaoli Zhang (State Grid JiBei Electric Power Co.Ltd Metrology Center)*; Haoyue Jia (State Grid Jibei Electric Power Co., Ltd. Lulong County Power Supply Subsidiary Company); Xu Zhang (Material Branch of State Grid JiBei Electric Power Co.Ltd); Enguo Zhu (China Electric Power Research Institute); Kai Yan (State Grid JiBei Electric Power Co.Ltd); Jiao Guo (State Grid JiBei Electric Power Co.Ltd Metrology Center)
13:40-14:00	**ID:32 Methods for the Analysis of the Distribution of Decentralized Energy Generation** Alo Allik (Estonian University of Life Sciences)*; Siim Muiste (Estonian University of Life Sciences); Heino Pihlap (Estonian University of Life Sciences); Matti Lehtonen (Aalto University Finland)
14:00-14:20	**ID:33 New Hybrid Circuit Breaker Using a Twin Contact Mechanical Breaker** Farzad Banihashemi (University of Wisconsin, Milwaukee)*; Siavash Beheshtaein (UW-Milwaukee); Robert Cuzner (UW-Milwaukee)
14:20-14:40	**ID:34 Super Twisting Algorithm Based Sliding Mode Controller for Buck Converter with Constant Power Load** Orhan KAPLAN (Gazi University)*; Ferhat Bodur (Gazi Universty)
14:40-15:00	**BREAK**
Date: 30 June 2021	
VIRTUAL SESSION 6	**CHAIRS: Heino Pihlap, Orhan Kaplan**
15:00-15:20	**ID:35 Bidding strategy for VPP incorporating price market and solar generation uncertainties using information gap decision theory** Michelle Maceas Henao (Universidad Nacional de Colombia)*; Jairo Espinosa Oviedo (Universidad Nacional de Colombia); Idi Isaac Milan (Universidad Pontifica Bolivariana)
15:20-15:40	**ID:38 A Modelling for an Optimum Facility Design in a Clinic as a Smart Grid** Yuji Mizuno (Osaka Electro-Communication University)*; Nobumasa Matsui (Nagasaki Institute of Applied Science); Fujio Kurokawa (Nagasaki Institute of Applied Science); Yoshito Tanaka (Nagasaki Institute of Applied Science)
15:40-16:00	**ID:39 Solar Radiation Reduction Monitoring of Macao World Heritage District Photovoltaic System Using GIS and UHF RFID Obstacle Detection Approach** Rong Wang (University of Macau)*; Oi Tai Tai (University of Macau); Kam Weng Tam (University of Macau)
16:00-16:20	**ID:40 Parameter Independent, Simple Backstepping Controller for PV interface Boost Converter in DC Microgrids with CPL** RENUKA V S (NIT CALICUT)*; nikhil sasidharan (national institute of technology, calicut,kerala); Abraham T Mathew (National Institute of Technology, Calicut, Kerala, India)
16:20-16:40	**ID:42 Effect of mathematical models on forecasting analysis of photovoltaic power** Omar HENNI (Université des Sciences et de la Technologie d'Oran Mohamed Boudiaf, USTO-MB, BP 1505, El M'naouer, 31000 Oran); Mustapha BELARBI (University Ibn Khaldoun of Tiaret)*; belarbi mustapha (University Ibn Khaldoun Tiaret)
16:40-16:50	**BREAK**

Date: 30 June 2021	
VIRTUAL SESSION 7 **CHAIRS: Halil Ibrahim Bulbul, Mehmet Yesilbudak**	
16:50-17:10	**ID:4 Machine Learning Based Online Monitoring of Step-Up Transformer Assets in Electrical Generating Stations** Julia Penfield (BC Hydro)*; Matt Holland (BC Hydro)
17:10-17:30	**ID:47 Ultra long-Term Wind Farm Generation Forecast by Combining Numerical Weather Prediction with Gated Recurrent Units** Julia Penfield (BC Hydro)*
17:30-17:50	**ID:51 Intelligent Techniques to Connect Renewable Energy Sources to the Grid: A review** Medine Colak (Gazi University)*; Selami Balcı (Karamanoğlu Mehmetbey University)
17:50-18:10	**ID:57 Fuzzy Logic and Artificial Neural Network Based Grid-Interactive Systems For Renewable Energy Sources: A Review** Medine Colak (Gazi University); İpek Çetinbaş (Eskişehir Osmangazi University); MEHMET DEMIRTAS (GAZİ UNİVERSİTY)*
18:10-18:30	**ID:61 A Review on the Efficiency Increment in a Power System Using Smart Grid Technologies** Alperen Colak (TMEIC)*; Orhan Kaplan (Gazi uni)
18:30-18:40	**BREAK**
Date: 30 June 2021	
VIRTUAL SESSION 8 **CHAIRS: Orhan Kaplan, Murat Akil**	
18:40-19:00	**ID 93 Accurate Identification of the Electrical Parameters of Triple-Diode Photovoltaic Model Using a Metaheuristic Algorithm** Mehmet Yesilbudak (Nevsehir Haci Bektas Veli University)*
19:00-19:20	**ID 94 Scenarios of operation of an energy production system of a hybrid WT/PV system of a bioecological infrastructure.Scenarios of operation of an energy production system of a hybrid WT/PV system of a bioecological infrastructure.** Daniel Icaza (Catholic University of Cuenca, Cuenca, Ecuador)*; Dario Valarezo (Universidad Politécnica Salesiana); Jorge Rojas Espinoza (Universidad Politécnica Salesiana); Santiago Pulla Galindo (Catholic University of Cuenca, Cuenca, Ecuador)
19:20-19:40	**ID:91 A Brief Review of NILM and Its Impact on Social Life** Fethi Batincan Gurbuz (Gazi University); Ramazan Bayindir (Gazi University)*; Halil Ibrahim BULBUL (Gazi University)

Date: 01 July 2021	
KEYNOTE	
10:00-11:00	Speaker: Professor Peter Palensky, TU Delft, Netherlands. **"IEC61850 and Cyber-Physical Security of Power Systems"** **Chairs: S. S. Dash, Seref Sagiroglu**
11:00-11:10	**BREAK**
TUTORIAL	
11:10-12:10	**Speaker:** Professor Seref Sagiroglu, Gazi University, Turkey. **"Big Data and Cyber Security Issues in Smart Grids"**
12:10-13:00	**BREAK**

VIRTUAL PRESENTATIONS	
Date: 01 July 2021	
VIRTUAL SESSION 9	**CHAIRS: Hossein Shahinzadeh, Emrah Dokur**
13:00-13:20	**ID:62 Reducing Voltage and frequency Fluctuations in Power Systems using Smart Grid Technologies** Alperen Colak (TMEIC)*; Korhan KAYISLI (Gazi University)
13:20-13:40	**ID:25 A Proposed Secure Hybrid, Hierarchical Communication Architecture to Facilitate Fault Prediction in Secondary Distribution Power Network** Ally T Bitebo (University of Dar es Salaam)*; Godfrey William Chugulu (University of Dar Es Salaam); David Makota (institute of Finance and Management); Fatuma Simba (University of Dar es Salaam)
13:40-14:00	**ID:74 Techno-Economic Analysis of Hybrid Energy System for Efficient Utilization of Waste Flare Gas from Oil and Gas Fields** Deepika Bishnoi (Indian Institute of Technology Guwahati)*; Harsh Chaturvedi (Indian Institute of Technology Guwahati)
14:00-14:20	**ID:75 Optimization of fuzzy logic controller based maximum power point tracking using hierarchical genetic algorithms** Abdelhakim Belkaid (Bordj Bou Arreridj University)*; Ouahib GUENOUNOU (University of Bejaia); Ilhami Colak (Nisantasi University); Boutaib Dahhou (Université UPS, Toulouse); ferhat chabour (University of le HAVRE)
14:20-14:40	**ID:76 Ancillary Services Using Battery Energy Systems and Demand Response** Umit Cetinkaya (Gazi University)*; Ramazan Bayindir (Gazi University); Samet Ayik (Gazi University)
14:40-15:00	**BREAK**
Date: 01 July 2021	
VIRTUAL SESSION 10	**CHAIRS: Kazuto Yukita, Umit Cetinkaya**
15:00-15:20	**ID:77 A Superconducting Saturable Core Reactor for Power Flow Control in Transmission Grids** Diogo Varela (NOVA School of Science and Technology); Luis Romba (UNINOVA/CTS, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa); Roberto Oliveira (UNINOVA - Instituto de Desenvolvimento de Novas Tecnologias); João M Murta-Pina (UNINOVA - Instituto de Desenvolvimento de Novas Tecnologias)*
15:20-15:40	**ID:79 Impact of Electric Vehicle Charging Profiles in Data-Driven Framework on Distribution Network** MURAT AKIL (Aksaray University)*; Emrah Dokur (Bilecik S.E. University); Ramazan Bayindir (Gazi University)
15:40-16:00	**ID:80 A Resilience-Oriented Decision-Making Model for the Operation of Smart Microgrids Subject to Techno-Economic and Security Objectives** Hossein Shahinzadeh (Amirkabir University of Technology (Tehran Polytechnic)); Srete Nikolovski (Faculty of electrical enrgineering, computer science and information technology)*; Jalal Moradi (Islamic Azad University Esfahan); Ramazan Bayindir (Gazi University)
16:00-16:20	**ID:81 An Improved DTC Strategy for a DFIG using an Artificial Neural Network Controller** Harrouz Abdelkader (Department of Hydrocarbon and Renewable Energy, Laboratory (LEESI), University of Adrar, Algeria)*; Ibrahim Yaichi (University of Djillali Liabes, Sidi Bel Abbe 022000); Boussaid Ibrahim (Laboratoire de Développement Durable et Informatique LDDI, Ahmed Draya University, Adrar, Algeria); ABDELHAFID SEMMAH (ICEPS); WIRA PATRICE (Universite de Haute Alsace); Ilhami Colak (Nisantasi University); Korhan KAYISLI (Gazi University)
16:20-16:40	**ID:82 Power Quality Improvement using ASO Technique** G Srinivasa Rao (DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING, CMR COLLEGE OF ENGINEERING & TECHNOLOGY, HYDERABAD); B Srikanth Goud (Research Scholar, Koneru Lakshmaiah Education Foundation, Guntur, India); Ch Rami Reddy (Assistant Professor, Malla Reddy Engineering College, Maisammaguda, Secunderabad, Telangana)*
16:40-16:50	**BREAK**

Date: 01 July 2021	
VIRTUAL SESSION 11	**CHAIRS: Srikanth Goud, Mazouz Farida**
16:50-17:10	**ID:83 New Islanding Detection Method With Voltage Amplitude Variation for Inverter-based Distributed Generator** Kianoush Naraghipour (strathclyde university)*; Dr K Ahmed (Strathclyde); Campbell Booth (University of Strathclyde)
17:10-17:30	**ID:84 Basic study for the construction of a microgrid using small wind turbines as the main power source** Yuto Iwasaki (Aichi Institute of Technology); Kazuto YUKITA (Aichi Institute of Technology)*; Tadashi HOSOE (Aichi Institute of Technology); Kazuki Ikeda (Aichi Institute of Technology)
17:30-17:50	**ID:85 A New Modulated Model Predictive Current Controller with Reduced Computational Burden** Euan T Andrew (University of Strathclyde)*; Dr K Ahmed (Strathclyde); derrick Holliday (Unknown)
17:50-18:10	**ID:86 Frequency regulation of hybrid distributed power systems integrated with renewable sources by optimized type-2 fuzzy PID controller** Dr.S.S DASH (GCE, Keonjhar odisha)*
18:10-18:30	**ID:14 Hardware-in-the-Loop Experimental Validation for a Lab-Scale Microgrid Targeted by Cyberattacks** Ehsan Naderi (Southern Illinois University Carbondale); Arash Asrari (Southern Illinois University Carbondale)*
18:30-18:40	**BREAK**
Date: 01 July 2021	
VIRTUAL SESSION 12	**CHAIRS: Harrouz Abdelkader, Daniel Iceza**
18:40-19:00	**ID:16 A Cyberattack Model for Decentralized Congestions in Smart Distribution Systems** Samaneh Pazouki (Southern Illinois University Carbondale); Arash Asrari (Southern Illinois University Carbondale)*
20:20-21:00	**CLOSING CEREMONY**

Presentation Instruction for icSmartGrid 2021 Presenters

Virtual presentation

Presentation time is 15 minutes including 5 minutes Question/Discussion.