

WORKSHOP LECTURE - 1
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
FACULTY OF ENGINEERING
NATIONAL UNIVERSITY OF SINGAPORE

TOPIC The Evolution towards Greener & Resilient Digital Grid : The ABB way
SPEAKER Ms. Nirupa Chander, ABB Singapore
HOST Associate Professor Sanjib Kumar Panda
DATE Tuesday, 21 May 2019
TIME 10:15 AM – 11 AM
VENUE LT2, NUS

SYNOPSIS Emerging technologies are revolutionizing the way we generate and consume power, transformed by changing grid infrastructure. In this talk, you will hear ABB's view on the changes to the grid systems and the role technologies like microgrids, distributed energy management systems, enabled by digitalization, are playing in transforming the commercial models and roles of the traditional generators and distributors.

BIOGRAPHY Nirupa brings 15 years of international experience with a career that started in the Power Generation sector in India and Australia and then worked across several industries. She led the team that has successfully delivered some of the most transformative projects in the energy sector employing ABB's flagship technology in Energy Storage and Microgrids. She moved to Singapore in 2017 and led ABB's Service organisation and Digital Portfolio – ABB Ability™ for Southeast Asia and worked closely with customers to realise value through Digitalisation and Industry 4.0 technologies. She now leads the Power Grids business in Singapore and works with major utilities and industrial customers

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WORKSHOP LECTURE - 2
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
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TOPIC Introduction to the concept of Transformer Intelligence : ABB Ability Power Transformer
SPEAKER Dr. Bhaba Das, ABB Singapore
HOST Associate Professor Sanjib Kumar Panda
DATE Tuesday, 21 May 2019
TIME 11:30 AM - 12:15 PM
VENUE LT2, NUS

SYNOPSIS POWER TRANSFORMER is the most important asset in an electricity grid. During its operational life, power transformers are subjected to thermal, mechanical, and electrical stresses, which lead to transformer ageing. Electrical network operators, around the world are facing an increasingly aged population of power transformers in their grids. Consequently, the traditional approach to the risk of unexpected failure has been based on periodic inspection and conservative rating assumptions. Most transformers that are currently in service were fitted with basic sensors which at best only provided alarms after the condition of the transformer had already started to deteriorate. Due to this, evaluating transformer's health is a complex and challenging task. To ensure reliable operation and good return on investment of the transformer, its health condition must be continuously monitored and evaluated for appropriate asset management decisions. Recent years have seen a step change in both the availability of cost effective and reliable sensing solutions which provide asset managers with actionable intelligent data. This talk will provide an insight into the concept of transformer intelligence developed by ABB for smart asset management.

BIOGRAPHY Graduated from the University of Canterbury, Christchurch, New Zealand where he completed his PhD on harmonics mitigation in HVDC transformer using current reinjection. Work experience includes Project Manager for Smart Transformers, R&I Engineer for Transformer Condition Monitoring for New Zealand's largest transformer manufacturer. Awarded the "New Zealand Young Engineer of the Year 2017" for his work on design and development of Smart Transformer. He is a Senior-Member of IEEE and YP in IEC. He has three transformer related patents in Australia & New Zealand. He has been working as the Lead Digital Business Developer (Asia Pacific) since January 2019.

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WORKSHOP LECTURE - 3
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
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TOPIC Paradigm shift in Distribution Transformer Asset Management: ABB Ability TXpert

SPEAKER Mr. Jean Carlos Leicht, ABB Singapore
HOST Associate Professor Sanjib Kumar Panda
DATE Tuesday, 21 May 2019
TIME 12:15 PM – 1 PM
VENUE LT2, NUS

SYNOPSIS

The traditional approach to DISTRIBUTION TRANSFORMER management has been to run till failure & subsequent replacement. As distribution transformers are relatively cheap, most users can afford to keep spares in stock and replace quickly upon failure. However, the way power is delivered is changing. The ever increasing power system complexity at distribution levels due to EV's & PV's, increase in harmonic levels, challenges network operators in such a manner which were never encountered. On top of it, the penalties for power not delivered to customers, due to planned or unplanned outages are increasing. All of these are putting a lot of pressure on utilities to better manage transformers at the LV levels. The traditional approach to the risk of unexpected failure is based around conservative rating assumptions. Underutilization meant that new tenders/contracts need to be made and kept, often on a short-term basis, and often for higher power levels. This approach could be avoided if the asset managers had access to real time information from distribution transformers such that informed decisions could be made. This talk will focus on the paradigm shift in distribution transformer management using ABB Ability Txpert – the world's first digital distribution transformer.

BIOGRAPHY

Mr. Jean Carlos Leicht is a Brazilian, 39 years old. Graduated in Electrical and Telecommunication Engineering, MBA in Strategic Business Management and MBA in Industrial Management. Has over 14 years of experience with Distribution and Power Transformers that includes Design Electrical Engineer before moving into Engineering Application over energy efficiency, renewable energy and data centers, Sales and Marketing, where he has held local and international management positions for the last 10 years. He has been working in the Transformer Business Unit for 14 years and is the HUB Asia Specialist for the Transformer Digitalization and Energy Efficiency.

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WORKSHOP LECTURE - 4

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

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TOPIC Power Electronics for Battery Based Energy Storage System
SPEAKER Dr. Amit Kumar Singh, Advanced Energy
HOST Associate Professor Sanjib Kumar Panda
DATE Tuesday, 21 May 2019
TIME 2:00 PM – 3:00 PM
VENUE LT2, NUS

SYNOPSIS

Energy storage is a key element in diversifying energy sources and adding more renewable energy sources into the energy market. The grid voltages are AC in nature, whereas the solar PV cells and batteries operate with DC voltage. Therefore, the integration of the solar energy generation system and battery to the grid requires power electronic converters (i.e. AC-DC, DC-AC, DC-DC) to convert, condition and regulate the electrical power exchange. In this talk, a single stage bidirectional isolated AC-DC converter will be discussed. The key performance metrics of the presented power electronic converter in terms of efficiency, power density and reliability will be investigated. The charge/discharge control for battery-based energy storage will be discussed. Further, the approach for active/reactive power compensation will be presented and conditions for unity power factor will be derived. Finally, the topics of future research and industry trend in the area of power electronics for the grid to energy storage will be discussed.

BIOGRAPHY

Dr. Amit Kumar Singh is a Senior Electrical Engineer (R & D) at the Advanced Energy, Singapore where he is responsible for the design and development of Radio Frequency (RF) power electronic systems for high power Remote Plasma Sources (RPS). He is also serving as an adjunct lecturer for the Department of Electrical and Computer Engineering at the National University of Singapore. He received Bachelor of Technology Degree with 1st Class Honours from the Indian Institute of Technology, Banaras Hindu University, Varanasi, India, in 2009 and earned a Ph.D. Degree from the National University of Singapore, Singapore in 2017. Prior to his Ph.D., he served as a Scientist for the Defence Research and Development Organization (DRDO), Ministry of Defence, India for almost 4 years (2009-2013).

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WORKSHOP LECTURE - 5

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

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TOPIC Recent Development and Challenges in Electrification for Transportation
SPEAKER Dr. Parikshit Yadav, WiredBox Company
HOST Associate Professor Sanjib Kumar Panda

DATE Tuesday, 21 May 2019
TIME 3:00 PM – 4:00 PM
VENUE LT2, NUS

SYNOPSIS

Mobility and Energy are the twin pillars of transformations to create sustainable living conditions in Urban areas. Cities require mobility and energy solutions that are sustainable, affordable, secure and inclusive, and integrated with customer-centric infrastructure and services. The presentation focuses on the recent trends in the Singapore Transportation Infrastructure. Singapore's urban mobility and infrastructure are evolving to incorporate more Electric Vehicles (EVs). While the potential additional demand generated by EVs will be relatively small as compared to Global Energy Demand, locally it could create challenges, leading to the need for additional investments in grid peak capacity and grid reinforcements. Thus, allowing integration of renewables, Decentralized Energy Storage System with EVs Charging Infrastructure. In the current proliferation model, EVs are seen primarily as a means of transport; their use as Decentralized Energy Resources remains at a very preliminary stage. EVs could be used as decentralized energy resources (DERs), given their controllable electricity demand (through smart charging), capabilities for decentralized energy storage (batteries) and potential as a source of power. There are endless possibilities as we are witnessing exciting times in which new technologies allow people to rethink the way we commute in a more sustainable and efficient manner. Smart mobility, Smart grid. Smart integration are the foundations of tomorrow's Singapore, which are being realized today.

BIOGRAPHY

Dr. Parikshit Yadav received his Ph.D. degree in Electrical Engineering from the National University of Singapore, in 2013. In 2012, he joined Alstom Transport Pte. Ltd as Design Manager (Traction Power Supply) to execute the Tuas West Extension MRT Project. In 2015, he took the additional role of "APAC Power and Transverse Engineering Specialist" to establish the Transverse Engineering Department to focus on Electromagnetic Compatibility, Earthing and Bonding, Stray Current Mitigation and Traction Simulations in APAC Region. In 2016, he co-founded "WBG(SG) Pte Ltd". WBG specializes in Electrification for Transportation and Building Environment. Dr. Yadav and his team have successfully executed Electrification Projects in Singapore, Malaysia, Indonesia and Thailand. More recently the team has been involved in commissioning charging infrastructure for Electric Buses.

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