Day 1 – 13.02.2023 - "RESEARCH PERSPECTIVES ON POWER CONVERTERS, CONTROLS AND HYBRID GRID INTEGRATION OF RENEWABLE ENERGY SOURCES" 13th Feb – 17th Feb 2023



(13.02.2023 to 17.02.2023) AICTE sponsored Faculty development program on **Research Perspectives on Power Converters, Controls and Hybrid Grid Integration of Renewable Energy Sources** was inaugurated on 13.02.2023. Dr.S.Ramkumar, HoD/EEE, New Horizon College of Engineering welcomed the participants and guests. He also Empasised the importance of Power Converters, Controls and Hybrid Grid Integration of Renewable Energy integration of Electrical Grid.



In his presidential address, Dr.Manjunatha, Principal, New Horizon College of Engineering emphasized the need for change in mindsets of the faculty members to learn new technologies in order to improve learning levels of students effectively in class room. He mentioned that attending the program like this is essential for the faculty members to understand the needs of industry and implement the strategies in teaching learning process. Further, he mentioned that this topic is emerging in the field of Electrical Engineering.



In his special address, Dr.C.S.R.Prashanth, Dean(Academics) mentioned the statistics of generation of renewable energy sources in India. He emphasized the importance of such sources keeping in mind the demand for power due to employing electric vehicles and other gadgets which require abundant electric power. He highlighted that there is lot of scope for research in this domain. Hence, he emphasized that this topic is appropriate in the current context.



Mr.G.Gobalakichenan, Project Manager, IBM Bangalore delivered a key note address on the Role of IoT In Renewable Energy Resources Integration to Electricity Grid. He explained how the development has taken place in Renewable Energy Resources and their Integration to Electricity Grid with the development of Power Converters and Control techniques. Further, he emphasized the role of IoT in grid integration. He highlighted that there is a lot of scope/potential for growth in this area. Hence, he explained the need of the faculty members to motivate the students for carrying out useful projects based on IoT and Energy Integration.



Mr.V.Sunil Kumar, Managing Director, VI Solution mentioned that Virtual instrumentation is possible with the current technology and data acquisition features. He came forward to help the faculty members pursuing any research on this emerging area by providing technical and infrastructural support and invited them for visiting their organization as and when required. He highlighted the need of graphical design for providing engineering solutions to the societal problems. He emphasized the role of virtual instrumentation



Mr.V.Jeejesh Kumar, Hardware Engineer, VI Solution gave a Hands-on experience to the participants on Model Based Controller Tuning & Deployment in RIO Platform. He trained the participants with examples using LabVIEW. He emphasized on adaptive control strategies. He also explained about Smart Grid system in India. He emphasized on measurement techniques used in smart grid. He also highlighted the use of various power tools employed for effective control of various parameters in a smart grid system.



Mr.Rajkumar, Hardware Engineer, VI Solution **Hands on Industrial Internet of Things – Interconnecting Things, Cloud & Dashboard** For the Internet of Things, or any control system, the **dashboard** or **IoT dashboard** is the key HMI (Human-Machine Interface) component that organizes and presents digital information from our physical world into a simply understood display on a computer or mobile device. With the help of IoT Dashboards, users and operators can (remotely) monitor and control specific assets and processes, and depending on safety requirements, access and control an environment from anywhere in the world.



Artificial Intelligence for Test Systems – Machine Learning Algorithms

Mr. Gobalakichenan. G, Project Manager, IBM Bangalore.Artificial intelligence – simply put, is the opposite to the natural intelligence shown/exercised by humans and animals. It is the study of agents those who perceive the world around them, form plans, and make decisions to achieve their goals. Its foundations include mathematics, logic, probability, linguistics, neuroscience, decision theory and even philosophy. Many fields fall under the umbrella of AI, such as computer vision, robotics, machine learning, and natural language processing.



Power Converter Design for Green Energy using Electronic Design Automation Tool

Dr.Dharmalingam, RTD GM, BHEL, Trichy

Electrical power converter allows grid to easily accept **power** from **renewable energy**. ... Engineering researchers have invented a novel **electrical power converter** system that simultaneously accepts **power** from a variety of **energy** sources and converts it for use in the **electrical** grid system



Power Converter Design for Green Energy using Electronic Design Automation Tool

Dr.Dharmalingam, RTD GM, BHEL, Trichy.

Electronic design automation (**EDA**), also referred to as **electronic computer-aided design** (**ECAD**)is a category of software tools for designing electronic systems such as integrated circuits and printed circuit boards. The tools work together in a design flow that chip designers use to design and analyze entire semiconductor chips.



Real Time Power Converter Signal Generations using RIO Hardware

Mr.Rajkumar, Hardware Engineer, VI Solution.

A hardware in the loop (HIL) simulation is the implementation of a system model in embedded hardware, which represents part of a real system. The main requirement of HIL simulation is that it has to be in real-time. HIL simulation plays a significant role in the development of technology for many applications, presenting advantages such as the short time to market for new products; low cost of prototyping;



Real Time Power Converter Signal Generations using RIO Hardware

Mr.Rajkumar, Hardware Engineer, VI Solution

Many examples of the use of this technology can be found in the literature, including simulating power electronics converters the simulation of a Voltage Source Converter (VSC), used in a High Voltage Direct Current (HVDC) system for distributed generation and power quality regulation,



Mr.V.Jeejesh Kumar, Hardware Engineer, VI Solution gave a Hands-on experience to the participants on Model Based Controller Tuning & Deployment in RIO Platform. He trained the participants with examples using LabVIEW. He emphasized on adaptive control strategies. He also explained about Smart Grid system in India. He emphasized on measurement techniques used in smart grid. He also highlighted the use of various power tools employed for effective control of various parameters in a smart grid system.



Smart Grid Monitoring (SMT) and Control using Electrical Power Toolkit

Mr.Jeejesh Kumar V, Hardware Engineer, VI Solution

Smart grid technology is enabling the effective management and distribution of **renewable energy sources** such as **solar**, **wind**, and hydrogen By leveraging the **Internet of Things** (**IoT**) to collect data on the **smart grid**, utilities are able to quickly detect and resolve service issues through continuous self-assessments.The smart grid also delivers significant environmental benefits by conservation and renewable generation integration.



Real Time Demo – cDAQ Power Quality Monitoring (Road-Map to PMU)

Mr.Jeejesh Kumar V, Hardware Engineer, VI Solutionto help measure voltage, measure current, and measure power with computer based instrumentation. The following material will cover common sensors found in the market, measurement hardware from National Instruments for voltage and current measurement, and software packages for power calculations. Combine the sensors, NI hardware, and software products referenced in this paper to assemble a complete, custom test measurement and control system for voltage, current and power measurements.



Discussions – Academic, Research & ISO Certifications related to energy scenerio and Smart Grid Mr.Jeejesh Kumar V, Hardware Engineer, VI Solution

Environmental sustainability remains a big trend; topics such as climate change and global warming are generating a lot of discussion. Growing world energy demand from fossil fuels plays a key role in the upward trend in CO 2 emissions and is the main source of human-induced climate changes. While energy systems around the world remain at vastly different stages of development, all countries share a common problem: they are far away from achieving sustainable energy systems.



Industrial Visit to TuVRheinland, Bangalore

Mr. Prashanth
Sr. Testing Engineer
TUV Rheinland,Bangalore



Industrial Visit to TuVRheinland, Bangalore

Mr. Prashanth
Sr. Testing Engineer
TUV Rheinland,Bangalore



Role of IoT in Renewable Energy Resources – Integrated to Smart Grid Dr.S.Sujitha NHCE, Bangalore

In recent years, a number of U.S. states have adopted or are considering smart grid related laws, regulations, and voluntary or mandatory requirements. At the same time, the number of smart grid pilot projects has been increasing rapidly. Recent activity includes the deployment of smart meters, distribution automation and demand response (DR) programs.



Importance and Recent Challenges on Renewable energy Integration Applications

This increased activity is supported by the disbursement of almost $4.5 billion of American Recovery and Reinvestment Act funding targeted specifically to smart grid initiatives. Federal mandates are promoting smart grid projects, specifically Energy Independence and Security Act of 2007, Title XIII, which establishes a national policy for grid modernization and provides incentives for stakeholders to invest in smart grid initiatives.