

**Day 1 – 17.02.2020 – AICTE Sponsored Short Term Training Program on “THE ROLE OF IOT IN RENEWABLE ENERGY RESOURCES INTEGRATION TO ELECTRICITY GRID” ON 17<sup>th</sup> Feb 2020 to 21<sup>st</sup> Feb 2020**



(17<sup>th</sup> Feb 2020 to 21<sup>st</sup> Feb 2020) AICTE Sponsored Short Term Training Program On “the ROLE OF IOT IN RENEWABLE ENERGY RESOURCES INTEGRATION TO ELECTRICITY GRID” was inaugurated on 17.02.2020. Dr.S.Ramkumar, HoD/EEE, New Horizon College of Engineering welcomed the participants and guests. He also Emphasised the importance of renewable energy , Controls and Grid Integration of Renewable Energy integration of Electrical Grid.



In 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 necessary 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 renewable resources.



Mr.Sunil Kumar V, Managing Director, 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.

### Concept of Smart Grid in Renewable Energy Systems

**Dr. K. Vijayakumar, Professor, IIITDM, Kanchepuram**



Dr. K. Vijayakumar, Professor, IIITDM, Kanchepuram stressed the role of smart grid in renewable energy systems during his special talk on 24.02.2020. In his address, how renewable energy systems such as wind, solar, etc. can be connected and integrated to the grid using smart monitoring and control features of Smart Grid. The main **components** of a **Smart Grid** (Figure 1) are electric power generators, electric power substations, transmission and distribution lines, controllers, **smart meters**, collector nodes, and distribution and transmission control centers. A **smart grid** is an electrical **grid** which includes a variety of operation and energy measures including **smart meters**, **smart** appliances, renewable energy resources, and energy efficient resources

### Concept of Smart Grid in Renewable Energy Systems



The **Smart Grid** and **Renewable Energy**. **Smart grid** technology is enabling the effective management and distribution of **renewable energy sources** such as **solar**, **wind**, and hydrogen. The **smart grid** connects a variety of distributed **energy** resource assets to the power **grid**. A **smart grid** is an electrical **grid** which includes a variety of operation and energy measures including **smart meters**, **smart** appliances, renewable energy resources, and energy efficient resources. ... **Smart grid** policy is organized in Europe as **Smart Grid** European Technology Platform. The **smart grid** uses computer technology to improve the communication, automation, and connectivity of the various components of the power network. ... This allows them to reduce production when less power is needed and quickly ramp up generation when peak periods approach

### Solar PV Testing Methods and Technologies

**Mr. Prashanth, Sr. Testing Engineer, TUV Rheinland, Bangalore**



Mr. Prashanth, Senior Testing Engineer, TUV Rheinland, Bangalore pointed out the need for testing PV cells. He also mentioned about the need for cleaning cells for improving efficiency. He explained about various Solar PV Testing Methods and Technologies employed currently on PV cells.

To test solar panel voltage output, put your solar panel in direct sunlight, set your multi-meter to the "volts" setting and... ..

To test solar panel amperage output, put your solar panel in direct sunlight, set your multi-meter to the "amps" setting and... ..

Volts x Amps = Watts.



### Cyber Security for Smart Grid

**Dr. Yuvaraja, Professor, Anna University, Coimbatore.**

Dr. Yuvaraja, Professor, Anna University, Coimbatore delivered a special address on Cyber Security for Smart Grid on 26.02.2020. In his address, he mentioned that there is a scope for unauthorized people to access the confidential data on smart grid. Hence, he stressed that the data should be protected and secured. He elaborated on various aspects of cyber security issues and methods to protect the grid.



### Cyber Security for Smart Grid

**Dr. Yuvaraja, Professor, Anna University, Coimbatore.**

**Cyber-Security in Smart Grid: Survey and Challenges.** **Smart grid** uses the power of information technology to intelligently deliver energy to customers by using a two-way communication, and wisely meet the environmental requirements by facilitating the integration of green technologies. **Smart Grid** being the vital national infrastructure, **smart grid cyber security** should not only address potential threats from disgruntled employees, terrorists, and espionage operations but also should take care of vulnerabilities arising from user errors, equipment failures, and natural disasters.



### Challenges implementing Smart Grid Technology

**Dr.K.Vinoth Kumar, Research Director, ABB Solutions, Chennai.**

With energy being a premium resource, ensuring security against theft, abuse, and malicious activities in a **smart grid** is of prime concern. The **challenges** of ensuring cybersecurity in a **smart grid** are diverse in nature due to the diversity of the components and the contexts where **smart grids** are deployed



### Challenges implementing Smart Grid Technology

**Dr.K.Vinoth Kumar, Research Director, ABB Solutions, Chennai.**

Countries worldwide are looking for an efficient **implementation** of the same. ... Keywords: **Smart Grid Challenges**, Intelligence, Communications, Integrating ... power is one of the major and most important **technologies** that led to the rapid ... **Self-healing grid**: fault protection, outage management, dynamic control of voltage, weather data integration, centralized capacitor bank control, distribution and substation automation, advanced sensing, automated feeder reconfiguration.





### Power Converter Design for Green Energy using Electronic Design Automation Tool

**Mr. Rajkumar, Hardware Engineer, VI Solution**

Mr. Rajkumar, Hardware Engineer, VI Solution introduced the concept of Hardware in Loop and RIO platform for the design of power electronic converters. He emphasized that this will play a vital role in validating the experimental results. He also discussed about waveform and signal generation using RIO hardware. He highlighted the importance of these signals in a real time power converter functioning.



### Hands-on EDA Tool – Circuits Capture and Analysis of Power Converters

**Mr.Rajkumar, Hardware Engineer, VI Solution**

Transformers and Inductors for **Power Electronics**: Theory, **Design** and ... massively **used** for switchmode regulated **power** supply, **renewable energy conversion** ...**Design** for Reliability of **Power Electronics** in **Renewable Energy** Systems ... **Power electronics** is the enabling technology for maximizing the **power** captured **from** renewable electrical generation, e.g., the wind and ... Full scale **power converter**. (a) ... introducing new reliability **design tools** and robustness validation methods.



### Introduction to HIL and RIO Platform for Power Converter Design and Validation

**Mr.V.Suresh Testing Engineer, VI Solution**

Mr.V.Suresh, Testing Engineer, VI Solution introduced the concept of Hardware in Loop and RIO platform for the design of power electronic converters. He emphasized that this will play a vital role in validating the experimental results. He also discussed about waveform and signal generation using RIO hardware. He highlighted the importance of these signals in a real time power converter functioning.



### Real Time Power Converter Signal Generations using RIO Hardware

**Mr.V.Suresh, Testing Engineer, VI Solution**

**Real-Time Digital Hardware** Simulation of **Power** Electronics and Drives ... for the 2-level 6-pulse IGBT-based voltage-source **converter** (VSC). ... a **real-time** simulator for a complete induction machine drive **using** ... a highly detailed and precise accounting of gating **signals**. ... time after the PWM **generation**.



### Role of IoT in Renewable Energy Resources – Integrated to Smart Grid

Dr.S.Sujitha,NHCE, Bangalore.

**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.



### Importance and Recent Challenges on Renewable energy Integration Applications

Dr. S. Ramkumar,NHCE, Bangalore

The most **challenges** as: power quality issues, availability, variation, and speed of power, generation forecast, and RE plants' location. Speaking in the **benefits** of RE, the positive impacts of RE-Grid **integration** were presented in worksshop. it is **important** to gain insight to **renewable energy** pricing by work shop done in renewable smart grid systems in **recent** years



### Industrial Visit to TuVRheinland, Bangalore

Mr. Prashanth ,Sr. Testing Engineer,TUV Rheinland,Bangalore

An industrial visit to TuV Rheinland, Bangalore was organized for the participants on the same day. Mr. Prashanth, Senior Testing Engineer, TUV Rheinland, Bangalore coordinated the visit and explained the standards and procedures followed in the organization. He mentioned that the company inspects technical equipment, products and services, oversees projects, and helps to shape processes and information security for various companies. He further said that the company employs a global network of approved labs, testing and education centers.



### Industrial Visit to TuVRheinland, Bangalore

Mr. Prashanth ,Sr. Testing Engineer,TUV Rheinland,Bangalore

Topic **TÜV Rheinland Academy**. We offer more than just the transfer of technical know-how! Benefit from personnel certifications, digital learning formats and our ...He further said that the company employs a global network of approved labs, testing and education centers.

