A Report On

"vishwakarma yojana phase-vi"

TECHNICAL WORKSHOP

EMPOWERING RURAL AND SMART INDIA

Date: 23rd March, 2019, 10.30 AM to 5.30 PM
Venue : B0-Conference Hall , GTU Campus, Chandkheda

Presented by:

Prof. (Dr.) Jayesh Deshkar
Ms. Darshana Chuhan

ESTD -2007

GUJARAT TECHNOLOGICAL UNIVERSITY
Ahmedabad

Gujarat Technological University,
Ahmedabad, Gujarat.

Gujarat Technological University had organized a One Day Technical Workshop of Vishwakarma Yojana Phase-VI for the students of Electrical Engineering on **"Recent application of point on wave technology for renewable integration & Power Electronic Technology for Rural Electrification through Renewable Energy Sources & Solar water pumping system"** held on **23rd March, 2018** at GTU, Chandkheda Campus from 10.30AM to 6.00PM.

Prof.(Dr.)Navin Sheth , Hon'ble Vice Chancellor, GTU has given opportunity to the students for "Learning the Live" Experience while visiting the Villages in their Bachelor Engineering Degree.

Prof.(Dr.)J.C.Lilani, Registrar, GTU welcomed Experts Faculty with the token of the books, all invitees & participants in the workshop, and given the insight of the Importance of the students initiative in the University and their learnings.

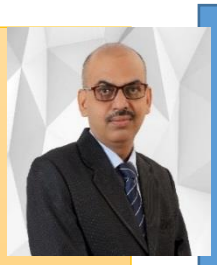
Ms. Darshana Chauhan, OSD given introduction of the Expert speakers **Dr. Urmil Parikh, Principal Engineer, ABB India**, **Dr.P.N.Tekwani, Professor, Nirma University, Mr. Divyesh Vaghela, Assistant Professor-VGEC, 5** No dal officers and **250** students from **32** Institutes affiliated with GTU were remain present. She greeted and thankful to the **Prof.(Dr.) Jayesh Deshkar, Honorary Director-Vishwakarma Yojana Project**, Principal-VVP Engineering College, Rajkot, who's constant support making this project successful.

Technical Session has been clustered in three core themes:

(I) Recent application of point on wave technology for renewable integration
(II) Power Electronic Technology for Rural Electrification Through Renewable Energy Sources
(III) Solar water pumping system

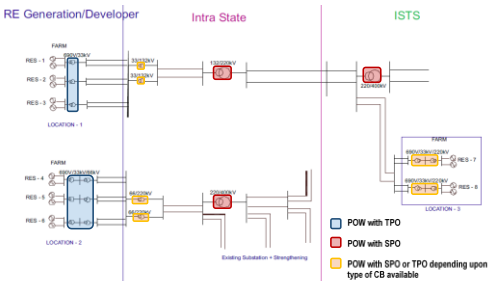
Technical Session I

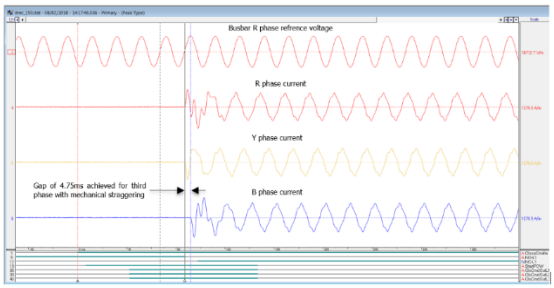
Recent application of point on wave technology for renewable integration



The session is delivered by Dr. Urmil Parikh, ABB India Limited, Maneja Vadodara, who is global expert for Point on wave technology for ABB. He is also member of Cigre WG A3.35: Guidelines and best practices for the commissioning and operation of controlled switching projects and new coming standard IEC 62271-113 for Alternating current circuit-breakers with intentionally non-simultaneous pole operation. Both study committees are working in area of point on wave switching.

The session was started with basic concepts of point on wave switching technology and it's advantages in terms of mitigation of switching transients. Furthermore, the challenges in terms of renewable sources integration while starting up the renewable plant is elaborated. Especially the challenges are foreseen in terms of high magnetizing currents, which may severely impact the power quality of main grid during energization of large power transformers working as link between renewable sources with the main grid. Furthermore, now a days, offshore wind farms are becoming quite popular, especially in countries like INDIA, which are enrich of wind energy resources due to geographical location. The generation sources are connected with quite long HV cables with large reactive compensation to compensate for reactive losses. This would lead to high over voltages on the cable and at the same time, may result into missing zero phenomenon at time of charging of the compensated cables. Consequently, the application of said technology for mitigating or handing of the aforesaid issues related to renewable integration issue has been discussed supported with field application cases studies.





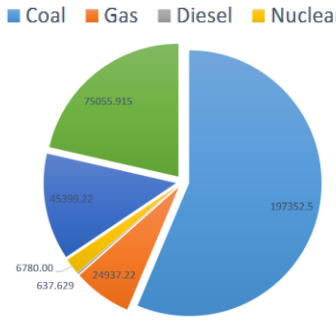
Technical Session II

Power Electronic Technology for Rural Electrification Through Renewable Energy Sources

Prof. Dr. P. N. Tekwani is working as Professor of the Electrical Engineering Department of Institute of Technology, Nirma University (NU), Ahmedabad. He has 23 years of experience. His areas of interest are Power Electronics, Machines, Power Supplies, Solar Inverters, Energy Conservation, Multi-Level Inverters, Drives, Active Power Filters, Power Quality, and Smart Grid.

Dr.Tekwani has delivered an expert talk on **"Power Electronic Technology for Rural Electrification Through Renewable Energy Sources".** The lecture covered following salient points. These points were discussed at length in context with Indian scenario.

Growth of installed electrical power generation capacity in India (5-year plan wise) up to 28-2-2019

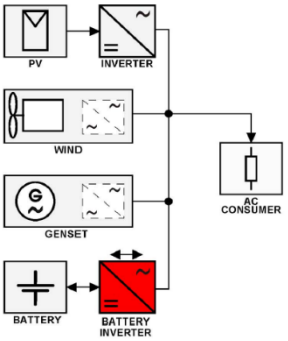


*Break up of RES all India as on 31.01.2019 is given below (in MW) :

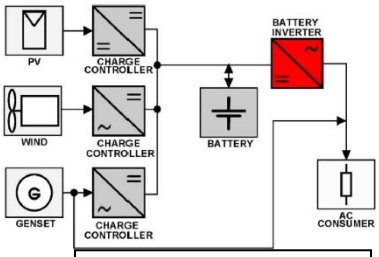
Small Hydro Power	Wind Power	Bio-Power		Solar Power	Total Capacity
		BM Power/Cogen.	Waste to Energy		
4528.05	35288.10	9075.50	138.30	26025.97	75055.92

Total installed capacity in India as on 28 Feb., 2019

Dr.Tekwani has taken following points in his lecture, Region and sector wise scenario of installed capacity, and contribution from various sources, Coal consumption, sector wise as-well-as per capita electricity consumption, growth in generation from renewables, village electrification status, pump sets energized, national wind-solar hybrid policy,What is power electronics, power electronics in generation through renewables, size of wind turbines, Doubly-fed induction generator based wind energy conversion system, classification of high-power converters, grid connected and standalone systems, micro grid, fault ride-through compliance. Multi-level back-to-back connected voltage source converters, standalone renewable energy systems (SARES), modular hybrid systems for rural electrification, configurations of PV generation systems, MPPT algorithms, buck-boost converters, and multi-function solar inverters as filters and SVCs.



AC-Bus Modular Svstem



DC-Bus Modular Svstem

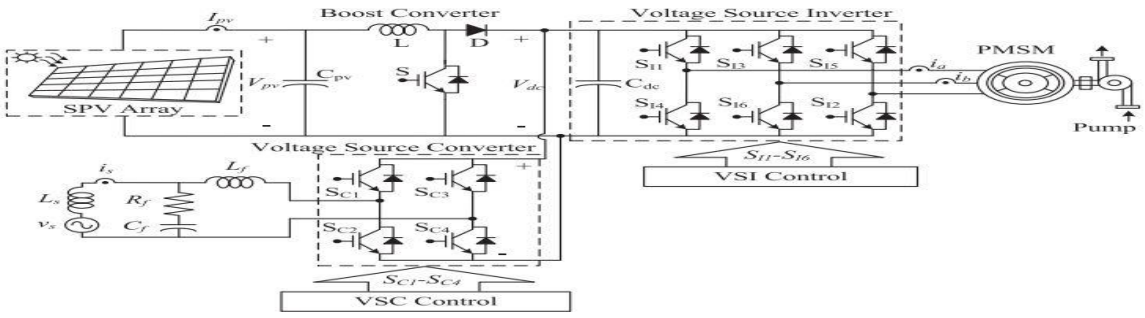
Participants were interactive during session, and they appreciated the session for great learning outcome.

Technical Session III

Solar water pumping system

Prof. Divyesh J. Vaghela, is working as Assistant Professor in Electrical Engineering Department, Vishwakarma Government Engineering College. His area of interest in research and development majorly in Design of DC to AC converter, Closed loop controlled PMSM drive, Power Quality issues and its mitigation, Front End Converter (FEC), use of digital signal processing in power electronics converter. Prof. Vaghela has published many research papers in peer reviewed international journal (Scopus) and international IEEE conference.

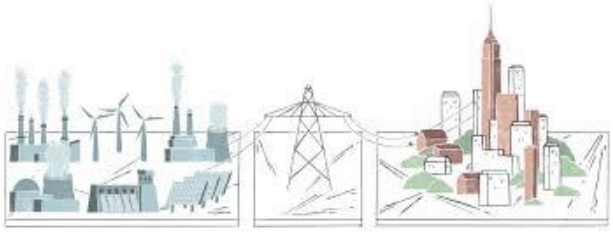
Prof. Dr.Jayesh Deshkar, Honorary Director has welcomed **Prof. Divyesh J. Vaghela**. This session of expert talk is delivered by him was on "Solar Water Pumping System" in the Technical workshop the main aim of the lecture is to discuss about energy efficient solar water pumping system concept which include highly efficient dc-dc converter with variable MPPT structure to cater maximum power; external energy source like battery source (BESS technology) or super capacitor to provide maximum power at constant voltage during low irradiation and voltage source inverter performance evolution to reduced switching losses, improving output power quality.

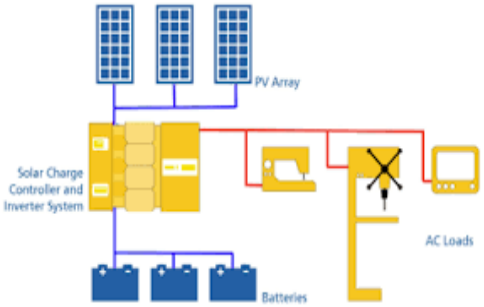


The talk also covered following salient points. These points were discussed at length in context with Indian scenario. To improve dc-dc converter efficiency by proper selection of converter topology for solar water pumping application.To promote variable MPPT control algorithm to make constant power at pump drive during any variable irradiation. To make efficient voltage source converter by proper selection of PWM techniques. To Promote Kisan Urja Suraksha Utthan Mahaabhiyan (KUSUM) yojna of GOI by providing highly efficient PMSM driven solar water pumping system.Participants were interactive during session, and they appreciated the session for great learning outcome.

Conclusion:

The workshop organized on Renewable energy sources development for rural area helps the Distribution Generation in Electricity generation. The use of power electronics converter like boost converter, buck converter, back to back converter in renewable energy sources has wide range of research areas and new technology developments. The MPPT charge controller use also explained in detail in solar PV plant installation. Ultimately the topics covered in this workshop is helpful for energy sources development in rural areas as well as it has wide range of various research areas for research scholars.. Overall the students have enjoyed expert lecture with the various topic on the Electrical Technology for generating the renewable energy and solar water pumping system and students can implement the same in their allotted villages for the development of the smart villages.





On behalf of GTU
Prof.(Dr.) Jayesh Deshkar
Ms. Darshana Chauhan