



# VIGNAN'S

Foundation for Science, Technology & Research

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-Estd. u/s 3 of UGC Act 1956

A Report on One Day Webinar  
**Issues in Grid Integration of Renewable Energy**  
Organized by  
Department of Electrical and Electronics Engineering  
6<sup>th</sup> June 2021 (11:30 to 1:00 PM)

**Resource Person:** Dr.Sukumar Mishra is working as Professor in Department of Electrical Engineering Indian Institute of Technology Delhi. He has a vast experience in emerging areas like Smart Grid, Grid integration of Renewable Energy Sources, FACTS based controller to improve angle and voltage stability of power system, Power quality analysis and mitigation, Intelligent control, modelling and optimization of power systems, Optimal controller for AGC of a power system, Vehicle-to-Grid (V2G) and Grid-to-Vehicle (G2V) etc, He received 15 academic recognition by various societies. He completed 22 projects sponsored by various government organizations of worth rupees in millions. Dr.Sukumar Mishra has incorporated a new company named SILOV SOLUTIONS PRIVATE LIMITED specifically deals in products related to renewable energy sources utilizable at household scale as well as at commercial setups for example bidirectional electric vehicle supply equipment, AC based EV charger, DC based EV charger, grid connected solar inverters, smart DC home management systems, online UPS etc.

**Description of the Program:**

EEE department organized a one-day webinar on “**Issues in Grid Integration of Renewable Energy**”. This webinar has received an overwhelming response 155 out of 258 registered participants turned up during the session. Faculty members, research scholars, students from of various educational institutions and industry people have participated and made it grand success. E-Certificates are issued to all the 155 participants.

Dr. G. Srinivasa Rao Coordinator, introduced the resource person Dr.Sukumar Mishra and welcomed all the delegates and participants to the webinar. He conveyed the motivation to conduct this webinar.

Dr.Sukumar Mishra explained about the methods used for the photovoltaic operations like P & O and Incremental Conductance. He discussed about the Energy Storage System(ESS) to accommodate the load fluctuations.

He pointed on grid connected PV that are usually expected to operate at MPPT with or with our any storage backup.

Dr.Sukumar Mishra insisted on how a PV system acts from grid point of view and the role of PLL in integration of Renewables in Grid. He clearly explained about the challenges of integration and impacts of PV on AC grid system on distribution system. The impacts include changes in network voltage profiles including voltage rise and unbalance, reduction of effective inertia in the system. He gave solutions for mitigating the impact of voltage rise and fluctuations viz., modify the control settings of capacitor banks to ensure that they are off during maximum PV output. Avoid using fixed capacitor banks, lower the voltage reference on LTCs and line voltage regulators. He specified the best solution is to operate the PV plants at non unity leading power factors-absorbing Vars.

The webinar gave a clear idea about power quality issues, voltage unbalance issues and about islanding detection.

Dr. G. Srinivasa Rao, Program Coordinator thanked the resource person for his valuable, outstanding, and overwhelming presentation. He expressed this webinar has given insights of applications of **Grid Integration of Renewable Energy**. He thanked the resource person for his valuable suggestions, and this program has opened up the different directions to scholars and students for further application in research areas.

He also thanked every participant for their active participation during entire session. Also, he expressed his sincere thanks to Dr. L. Rathaiah Garu Chairman, Vignan's group of institutions, Vice-Chancellor Dr. M.Y.S. Prasad and Dr. G Srinivasa Rao HOD EEE for given an opportunity to organize this webinar.

Feed Back:

The webinar "**Grid Integration of Renewable Energy**" met its objective and all the participants appreciated the efforts spent by the Resource Person in covering the emerging areas. All the participants actively participated in queries session and expressed very positive feedback. They expressed its an outstanding and as an innovative research area.

## Snapshots of the Program:


### 1. Brochure of the Webinar



**VIGNAN'S**  
Foundation for Science, Technology & Research  
(Deemed to be University)  
-Estd. u/s 3 of UGC Act 1956

**The Department of  
Electrical and Electronics Engineering (EEE) at VFSTR  
WELCOMES YOU**

to the one day Webinar on  
**Issues in Grid integration of  
Renewable Energy**



**Resource Person**

**Prof. Sukumar Mishra**  
Bimal Bose Awardee,  
Professor,  
Indian Institute of Technology (IIT), Delhi

Date and time:  
**6<sup>th</sup> June 2021 (Sunday) (11.30 AM to 1.00 PM)**

The link of the webinar will be sent to registered participants.  
The participants will be given an e-certificate after the completion of the webinar.

<p><b>Chief Patrons</b></p> <p><b>Dr. L. Rathaiah,</b> Chairman, Vignan Group</p> <p><b>Mr. L. Sri Krishnadevarayalu,</b> Vice-Chairman, Vignan Group</p> <p><b>Patrons</b></p> <p><b>Dr. K. Rama Murthy Naidu,</b> Chancellor, VFSTR <b>Dr. M.Y.S. Prasad,</b> Vice-Chancellor, VFSTR <b>Cmdr. Dr. M.S. Raghunathan,</b> Registrar, VFSTR <b>Dr. G. Srinivasa Rao,</b> Dean R&amp;D &amp; HOD-EEE, VFSTR</p>	<p><b>Organizing Committee</b></p> <p><b>Dr. K. Mercy Rosalina,</b> Professor, VFSTR <b>Dr. P.V.S. Sobhan,</b> Associate Professor, VFSTR <b>Dr. M. Subba Rao,</b> Associate Professor, VFSTR <b>Mr. Ch.UmaMaheswaraRao,</b> Assistant Professor, VFSTR <b>Mr. A. Sri Hari Babu,</b> Assistant Professor, VFSTR <b>Mr. N. Narasimha Rao.Ch.,</b> Assistant Professor, VFSTR <b>Mr. N. Bharath Kumar,</b> Assistant Professor, VFSTR <b>Dr. Bala Krishna Kethineni,</b> Assistant Professor, VFSTR <b>Dr. Attuluri R. Vijay Babu,</b> Assistant Professor, VFSTR <b>Ms. K Rachananjali,</b> Assistant Professor, VFSTR <b>Dr. P.M. Venkatesh,</b> Assistant Professor, VFSTR <b>Dr. Y. Srinivasa Rao,</b> Assistant Professor, VFSTR <b>Mr. V.B. Thurai Raaj,</b> Assistant Professor, VFSTR <b>Mr. Umamaheswara Rao. M.,</b> Assistant Professor, VFSTR <b>Mr. P. Lakshmi Narayana,</b> Assistant Professor, VFSTR</p>
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**For any other queries, please contact  
Dr. K. Bala Krishna (k bk\_eee@vignan.ac.in, Ph:9030452652)**

## 2. Gallery of Session

The screenshot shows a GoTo Meeting interface with a presentation slide. The slide title is "Impacts of PV on AC grid system". The slide content includes a list of impacts:

- ✓ power quality, PV intermittency may lead to voltage fluctuation issues
- ✓ overcurrent and overvoltage protection, including mal-operation of overcurrent protection equipment and temporary overvoltage (TOV)
- ✓ change in electric losses, where relatively large reverse power flow may increase losses
- ✓ variations in power factor of a feeder or system, which may have economic impacts on local distribution companies purchasing power from larger utilities

The meeting interface shows 140 participants and a meeting ID of 905-491-421. The system tray at the bottom indicates the time is 12:15 on 06-06-2021.

The screenshot shows a GoTo Meeting interface with a presentation slide. The slide title is "Steady State Issues Reverse Power Flow:". The slide content includes a bullet point:

- Increase in PV can lead to reverse power flow conditions at section, feeder, and substation levels, as shown.

Below the text is a line graph titled "Reverse Power Flow Versus PV-DG Penetration Level". The graph plots "Normalized Apparent Power" on the y-axis (ranging from -1.5 to 1.5) against "Hour" on the x-axis. Multiple curves represent different PV-DG penetration levels: 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, and 100%. The curves show that as penetration increases, the power flow becomes more negative (indicating reverse power flow) during certain hours of the day.

The meeting interface shows 140 participants and a meeting ID of 905-491-421. The system tray at the bottom indicates the time is 12:16 on 06-06-2021.

GoToMeeting REC

Talking: Sukumar View Everyone

142

People 142/251

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- [Waiting for name 100100]
- 18FE1A0257
- 19FE5A0201
- Akash
- AKHIL Vardhan
- Akula Vishnu Priya
- ANAND KUMAR MYLA
- Aruna
- ASK
- Atmakuri Gayathri
- BANAVATH MANTHRU NAIK
- Bantykumarprasad
- BEGH NAZMA
- Bellam Subhash
- Bhanu Ganesh Lukka

Meeting ID: 905-491-421

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### Interaction with Capacitor Banks, LTCs, and Line VRs

- Voltage rise and fluctuations have a direct impact on feeder voltage profiles, which can lead to frequent operation of LTCs, line VRs, and voltage-controlled capacitor banks.
- This may cause additional step-voltage changes. Due to typical delays associated with the control methodology of these devices (e.g., 30–90 s), minute-based step-voltage variations may be experienced.
- In addition, more frequent operation shortens the expected life cycle of these devices and increases maintenance requirements. In the special case of using line-drop compensation (LDC) for LTCs or line VRs,

Sukumar is presenting

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GoToMeeting REC

Talking: Sukumar View Everyone

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- Akash
- AKHIL Vardhan (Off)
- Akula Vishnu Priya
- ANAND KUMAR MYLA
- Aruna
- ASK
- Atmakuri Gayathri
- BANAVATH MANTHRU NAIK
- Bantykumarprasad
- BEGH NAZMA
- Bellam Subhash
- Bhanu Ganesh Lukka
- BHARATH KUMAR N
- Bhuvanachandra Kaseedu

Meeting ID: 905-491-421

Copy Meeting Link

### Power quality issues

- Instead of using dedicated custom power devices the converter used for the photovoltaic generator itself can be used to solve the power quality problems, making them multifunctional converters.

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