

# Addressing Challenges in the Renewable Sources' Integration in Distribution Networks and System Stability



## Suresh Chandra Srivastava

Director, IIT Kanpur-LaTrobe University Research Academy, and  
Distinguished Visiting Professor  
Indian Institute of Technology Kanpur, India

**Abstract:** Most of the countries across the globe are deploying large number of renewable sources for electricity generation to address global environmental concerns and depletion of fossil fuel resources. Solar Photo Voltaic (SPV) and wind plants form a major part of the growth of renewables which are converter interfaced to the grid at distribution or transmission level. These sources have variable outputs depending on time of day or weather conditions and require energy storage system or flexible generation support for continuity of supply. Most of the renewable sources, specifically SPV, do not have inertia and pose challenge to maintaining system stability under their large deployment. Proper Operation of Smart Distribution Systems integrating renewable sources and storage will require deployment of Advance Distribution Management Systems and Distribution System Operator (DSO) platform.

This key note lecture will discuss the prompting reasons for growing penetration of renewable sources and highlight associated challenges. It will briefly describe some of the approaches to integrate solar PV into the system and its impact on system inertia causing stability challenges. It will also present some of the research work carried out at IIT Kanpur on inertia estimation and methods to improve the system stability.

**About Speaker:** Prof. Srivastava, Ph.D. from IIT Delhi India, worked at Engineers India Limited New Delhi, a consultancy organization, for 12 years before joining Department of Electrical Engineering at IIT Kanpur in November 1988, where he became 'Professor' in December 1995. He also served as Head of Electrical Engineering Department, Dean R&D, and Deputy Director at IIT Kanpur. During 2008-2009, he was a 'Visiting Research Professor' at Mississippi State University, USA, and Visiting Faculty at AIT Bangkok during 1996-97. He held 'P.K. Kelkar' and 'Ministry of Labor and Employment' Chair Professor positions at IIT Kanpur. After superannuation, he served as Director, IIT Kanpur-La Trobe University Research Academy and Distinguished Visiting Professor at IIT Kanpur from January 2021 till November 2023. At present he is associated with the SIIC-FIRST Noida office as 'Project Director'.

His research interests include Power System Security, Synchrophasor Applications, Electricity Market, Microgrids and Smart Grid. He has supervised theses of 31 Ph D and 65 Masters students and published more than 300 research papers. He has been PI/co-PI to about 24 sponsored research and consultancy projects including India lead to an Indo US project 'UI- ASSIST' on Smart Grid and Storage. He has served in the governing council and expert committee of several government organizations and utilities in India. He is Life Fellow of the Institute of Electrical and Electronics Engineers (IEEE), Fellow of Indian National Academy of Engineering, Institution of Engineers (India), Institution of Electronics and Telecommunication Engineers (IETE), and Indian Academy of Mathematical Modelling and Simulation (IAMMS).