

## Short CV:



ILHAMI COLAK was born in 1962 in Turkey. He received his diploma in Electrical Engineering from Gazi University, Turkey in 1985. Then he did his MSc in Electrical Engineering in the field of *Speed Control of Wound Rotor Induction Machines Using Semiconductor Devices* at Gazi University in 1991. After that he received his MPhil at Birmingham University in England by preparing a thesis on *High Frequency Resonant DC Link Inverters* in 1991.

Finally he got his PhD at Aston University in England on *Mixed Frequency Testing of Induction Machines Using Inverters* in 1994. He became an assistant professor, an associate professor and a full professor in 1995, 1999 and 2005 respectively.

He has published more than 225 papers in different subjects including electrical machines, drive systems, machine learning, reactive power compensation, inverter, converter, artificial neural networks, distance learning, automation, renewable energy sources and smart grids. More than 86 of his papers have been cited in SCI database of Thomson Reuters. His papers have received more than 445 citations. He supervised 19 MSc students and 13 PhD students. He is member of IEEE, IES, IAS, PELS and PES. He is also a member of PEMC Council. He has organised 54 international conferences and workshops. Last ten years, he has been concentrated his studies on renewable energy and smart grids by publishing papers, journals ([www.ijrer.org](http://www.ijrer.org)) and organizing international IEEE sponsored conferences ([www.icrera.org](http://www.icrera.org)). He is also the Editor-in-Chief of International Engineering Technologies (<http://dergipark.ulakbim.gov.tr/ijet>), and one of the editors of Journal of Power Electronics (<http://www.jpels.org>). He has 1 international and 3 national patents. He also spent around 3 years at European Commission Research Centre (JRC) as an expert in the field of smart grid in Netherlands. He is currently holding positions of Vice Rector and Dean of Engineering And Architecture Faculty of Istanbul Gelisim University.

[icolak@gelisim.edu.tr](mailto:icolak@gelisim.edu.tr); [ilhcol@gmail.com](mailto:ilhcol@gmail.com)  
<http://w3.gazi.edu.tr/~icolak/english.htm>

**Title: A survey on the contributions of power electronics to smart grid systems**

## Abstract:

The smart grid (SG) as a research area is advancing dealing with a wider range of topics such as power systems, energy generation and telecommunication. The conventional utility grid is used to operate in a passive mode absorbing energy from the substations and delivering it to the customers. This approach is well developed but the needs of the state-of-the-art technology require a bidirectional flow of power and data. Nevertheless, smart grid systems provide more flexible, reliable, sustainable, secure and two-way communication service. Especially, integration of renewable energy sources, electrical vehicles and distributed generations (DG) into network can be achieved in an efficient way in smart grid systems. Moreover, control and monitoring capabilities, automatic

configuration of the grid, and active involvement of consumers in energy production extend the importance of smart grids. All these positive aspects of smart grids have been attained by integration of power electronics and telecommunication technologies with the grid. This talk deals with contributions of power electronics to SG in the context of generation, conversion, distribution, and control of power. The recent power electronic devices and systems adapted to SG are also introduced in detail with several power control methods.

Moreover, the renewable energy sources (RESs), which are an extensively studied topic of power engineering and their integration to smart grid, are also surveyed in terms of DG units, control and management features. Thus, a particular section is dedicated to RES utilization in SG covering almost all aspects of a monotype and hybrid energy plants. Finally, the talk is carried on by reviewing the most recent and comprehensive articles to highlight the importance of power electronics in a logical way in the smart grids for readers.