

Ramesh Bansal
Editor

Handbook of Distributed Generation

Electric Power Technologies, Economics
and Environmental Impacts

 Springer



Contents

Part I DG Technologies

- 1 **Distributed Renewable Energy Technologies** 3
Henerica Tazvinga, Miriam Thopil, Papy B. Numbi
and Temitope Adefarati
- 2 **Non-renewable Distributed Generation Technologies:
A Review** 69
Temitope Adefarati, Numbi Bubele Papy, Miriam Thopil
and Henerica Tazvinga

Part II Wind Power Systems

- 3 **Large-Scale Wind Generation Development in the Mexican
Power Grid: Impact Studies** 109
Arturo R. Messina, Rafael Castellanos, Claudia M. Castro,
Emilio Barocio and Armando Jiménez Zavala
- 4 **Load Flow Analysis with Wind Farms** 149
Pradeep Kumar and Asheesh K. Singh
- 5 **Sensor-Less Estimation of Rotor Position in a Doubly
Fed Induction Machine** 171
G. Saravana Ilango, C. Nagamani, M.A. Asha Rani,
M. Jaya Bharata Reddy and A. Karthikeyan
- 6 **Wind Turbine Standards and Certification:
Indian Perspective** 205
Rajiv Singh, Asheesh Kumar Singh and Padmanabh Thakur
- 7 **Egyptian Grid Code of Wind Farms and Power Quality** 227
Shady H.E. Abdel Aleem, Almoataz Y. Abdelaziz
and Ahmed F. Zobaa

8	Integrating an Offshore Wind Farm to an Existing Utility Power Network via an HVDC Collection Grid: Alternative Topology	247
	Kabeya Musasa, Michael Njoroge Gitau and Ramesh Bansal	
Part III PV Systems		
9	Steady-State Analysis of Unbalanced Distribution Networks with High Penetration of Photovoltaic Generation	285
	Kalpesh Joshi and Naran Pindoriya	
10	Distributed Solar-PV Generation: Impact on Voltage Control and Stability	317
	Lasantha Meegahapola and Tim Littler	
11	Techno-economic Evaluation of Grid-connected Solar Photovoltaic Power Plant for Rural Banks	343
	Rajashekar P. Mandi	
12	Indirect Matrix Converter for Distributed Generation Application: An Experimental Study	375
	Rahul Kumar Garg, Kavita Yadav, Vinod Kumar and Monika Vardia	
13	An Experimental Study on Zeta Buck-Boost Converter for Application in PV System	393
	Neeraj Priyadarshi, Kavita Yadav, Vinod Kumar and Monika Vardia	
Part IV DG Modelling, Operation, Control, Protection		
14	Modelling, Design, and Control of Smart DC Microgrid for Integration of Various Non-conventional Distributed Generators	409
	Mahesh Kumar and S.N. Singh	
15	Effects of DG Operating Power Factor on Its Location and Size by Using GA in Distribution Systems	459
	Bindeshwar Singh, R.P. Payasi and Janmejy Sharma	
16	Protection Issues in Microgrids and Multi-microgrids	503
	Sachit Gopalan, Victor Sreeram, Yateendra Mishra and Herbert Iu	
17	Power Management and Protection of Distribution Systems with Distributed Generations	549
	Yuan Liao	
18	Protection of Distribution Systems Integrated with Distributed Generation	583
	Adeyemi Charles Adewole, Raynitchka Tzoneva and Alexander Apostolov	

Part V Miscellaneous: Power Electronics, Reliability, Economic Aspects, Energy Storage and Management	
19 Power Electronic Applications, Grid Codes, Power Quality Issues, and Electricity Markets for Distributed Generation	631
Akshay Kumar Rathore and Prasanna Udupi Rajagopal	
20 Reliability Evaluation and Enhancement of Microgrid Incorporating the Effect of Distributed Generation	685
Debomita Ghosh, Sanchari Deb and Dasmanta Kumar Mohanta	
21 Economic Aspects of Distributed Generation	731
Ponnaganti Pavani and Sri Niwas Singh	
22 Solar PV System with Energy Storage and Diesel Generator	749
Rajashekar P. Mandi	
23 Intelligent Energy Management Strategy Considering Power Distribution Networks with Nanogrids, Microgrids, and VPP Concepts.	791
Jackson J. Justo	
Index	817