

Preface

Strategic research agendas worldwide on electricity transmission and distribution networks emphasize that by 2030, electricity networks will continue to function in a manner that optimizes cost and environmental performance without giving up traditionally high security and quality of supply, while hosting very large and further increasing penetration of renewable and distributed (dispersed) generation. Stimulation of local production of renewable energy requires the emergence of more intelligent transmission and distribution networks with a view to accommodate variable generation from multiple sources and a growing demand for renewable energy. Electricity wholesale competition and the deregulation of retail electricity markets with the energy value chain becoming bidirectional are models that have been internationally adopted in an effort to achieve the maximum economic benefits and energy savings. Finally, energy efficiency is by far the greatest opportunity for the power industry in the current energy market, with all the electricity market participants trying to approach it in the most effective way in order to achieve significant competitive advantages.

Taking into consideration the important changes and the reformation of the power industry that are carried out today, as previously described, the current book provides intelligent and innovative solutions that can be applied on electricity transmission and distribution networks to support these changes. Throughout the book readers have the chance to be informed: on a novel, efficient and user friendly software tool for power systems studies, on issues related to distributed (dispersed) generation and the correlation between renewable generation and electricity demand, on new methodologies which handle grid stability and control problems, on transmission and distribution networks' safety and protection issues, on energy storage and power quality, on the application of embedded systems on the transmission and distribution networks and finally on issues related to the economics of the power industry.

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Electricity Distribution

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