Preface

Although the cost of electricity has significantly decreased since the 1930s, it is still not readily available to the disadvantaged in countries and regions of poverty. One of the single most ways to reduce poverty is to find ways to reduce the cost of energy. Renewable resources can play a significant role to reduce these costs. Electricity across our world is primarily produced from fossil fueled resources. There is significant debate about the energy sources on today's fossil-fueled power plants and the affects they may be having on climate. A primary product of combustion of fossil generation is carbon dioxide, CO_2. Many of today's computer simulations suggest that as the atmospheric concentration of CO_2 increase, the earth's average temperature will continue to increase. The earth is made up of countless ecosystems. Laboratory and field studies show that most ecosystems will collapse when subjected to fast temperature changes.

In order to reduce the production of CO_2 globally, we must focus on getting the amount of CO_2 produced per unit of energy as close to zero as possible. As researchers, scientists, and engineers, we must focus on using our energy more efficiently and finding alternative energy sources that are competitive with fossil fuel energy sources. In the near term, we must find ways to mitigate CO_2 production from our existing fossil fuel plants using technologies such as carbon capture and carbon storage. Wind, solar photovoltaic (PV), and solar thermal are becoming cost competitive but can be intermittent in nature and must be coupled through the use of power electronics to existing energy systems. As the penetration of renewable resources increase, we must effectively use renewable energy when it is produced through advanced load control strategies. Low cost, energy storage technologies will continue to develop and can be used to abate renewable energy variability. Power electronics and their respective control systems is the enabling technology that will define our future energy.

This book is an excellent reference that provides insights into the world of power electronics for renewable resources. I recommend that this book be used as a resource text together with instructor-developed exercises and laboratories at both the undergraduate and graduate level. The book provides background

material for students and seasoned engineers to gain broader understanding of the application of power electronics and control systems for renewable energy applications.

William E. Kramer

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