

STAND ALONE POWER SYSTEMS DESIGN AND INSTALLATION TRAINING MANUAL

Standalone power systems are energy systems designed to operate independently from a grid source of electricity. These systems may be powered by a variety of energy sources: wind, hydro, solar, geothermal, or fossil fuels and typically comprise energy storage technology and the use of inverters.

The design and installation of a standalone power system are constrained by and therefore must be planned according to the local conditions and energy sources available. These systems are the solution for power supplies in remote locations without a grid connection, or at places where the grid itself is inherently unreliable. Because there is no assumed grid backup for a standalone power system, the design and installation must guarantee continuous power supply based on the system design.

This resource publication covers the design of a standalone power system, the renewable power sources, the storage medium, the system installation based on technology and product selection, the system economics and the system design variations, e.g. AC Bus and DC Bus systems.

Contents

Chapter 1 - Occupational Health and Safety

Chapter 2 - Electrical Basics and Circuits

Chapter 3 - Solar Energy and Photovoltaics

Chapter 4 - Solar Thermal Energy

Chapter 5 - Wind Energy

Chapter 6 - Micro Hydro

Chapter 7 - PV Modules

Chapter 8 - Geothermal

Chapter 9 - Fuel Generators

Chapter 10 - Energy Storage

Chapter 11 - Power Conversion Equipment (PCE)

Chapter 12 - General Principles

Chapter 13 - Energy Assistant

Chapter 14 - Inverter and Battery Sizing

Chapter 15 - Generator Sizing

Chapter 16 - Wiring and Protection

Chapter 17 - Modelling System Options

Chapter 18 - System Economics

Chapter 19 - Installation and Commissioning

Chapter 20 - Maintenance and Troubleshooting

Chapter 21 - Worked Examples

Chapter 22 - Case Studies

Appendices

