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Engineering IT-Enabled Sustainable Electricity Services

The Tale of Two Low-Cost Green Azores Islands

- Approaches the problem of electric power system architecture evolution.
- Helps readers develop dedicated systems-engineering based modeling and simulation tools.
- Discusses the dynamic and distributed risk management under various uncertainties, such as physical (reliability-related) and financial.
- Describes the inherent features of several possible future architectures.

Sustainable energy services to customers - a balanced choice and coordination of energy generated by traditional and alternative sources - are the subject of this new innovative book. The myriad factors involved in modeling an effective sustainable power system are overwhelming. The "Green Islands" project represents a decade of work by over a dozen researchers who have developed a model designed to utilize the potential of distributed clean resources. The key is the proper use of Information Technology (IT). Sited on two islands in the Azores, the project developed the model of careful forecasting of demand and supply, down to the minute, coordinating the output of conventional power plants, wind energy, fly wheels, hydroelectricity, demand reduction, and even plug-in electric vehicles to take full advantage of the clean resources available. The energy contingencies of the remote islands are not unique. The issues of integrating promising clean technologies, such as wind, into a complex power grid are challenging in geographically far-flung, island-scale, power systems. Model-based sensing, communications, and decision-making algorithms to coordinate adaptive load management (ALM) could enable customers to utilize just-in-time (JIT), just-in-place (JIP), and just-in-context (JIC) energy resources. The distribution of flexible and efficient energy to customers is the goal. The model the authors have developed could change the way power portfolios are built. A new perspective for optimization of green energy is presented in this book.

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