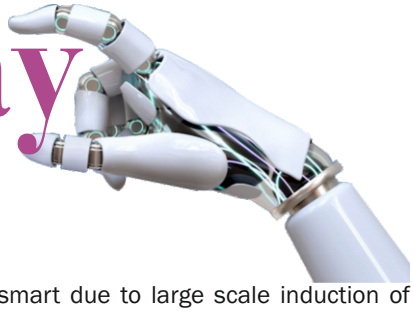
Smarting Energy Systems
The IIoT Way



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Energy management is becoming smart due to large scale induction of Industrial Internet of Things (IIoT) as a way of physical measurements, control, edge computing, connecting to clouds and interfacing to computational platforms. The smartness of the system as a whole emanates from the fact it can sense occupational loads, thermal comforts, ambient lighting, use energy mix from local sources such as solar panels and interface with load dispatch centres and tries to achieve energy consumption in a near optimal manner.

I guess that energy mix with physical measurements and control with traditional power system stability analysis are what were the core competency of power system design till recently. However, with introduction of edge computing, cloud computing and algorithmic techniques brought in the era of smart energy management. The monograph by the authors covers the algorithmic techniques in details.

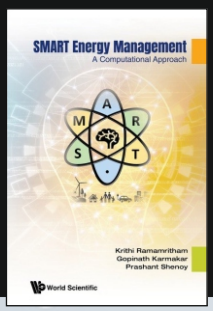
The monograph starts with an introduction to Smart Electricity Grid identifying Advanced Edge Metering, Monitoring, Control Infrastructure (AMI) in residential and industrial facilities. The reader will get adequate understanding of Phasor Management Units (PMU), Phasor Data Concentrators (PDC), communication protocols and the hierarchical control in smart grids. The next chapter introduces the key ideas behind Energy Management Systems for Buildings and brings out need for sensors sense, analysis tools and control actions as part of sense, analyze and respond. It introduces the notion of observability. Practitioners would find this chapter very interesting as it would bring out interfacing IIoTs with data collection, analysis for observability. Authors then introduce the concept of thermal comfort in a very systematic way with an overview of Building Management System and the concept of TCBM scheduling. It emphasizes a great deal on modeling aspects of Building space, HVAC systems and heat balance from physics principles.

An important learning in this chapter is the analysis aspects of feasibility of maintaining thermal comfort with TCBM scheduling of AC plants optimizing energy usage. Authors use a number of case studies to demonstrate how these concepts can be realized. The book is quite self-contained as it provides other reading materials to cover Grid Management techniques, Power System Stability Analysis and Thermal Modeling fundamentals.

Overall a good technical treatise on smart energy and must read for students in energy studies and engineering, AI specialists in using IIoTs for designing Building Management Systems and even policy makers. The book is even good for architects planning and designing electrical energy system for industry and cities; data collection through edge devices, energy consumption in building, industrial houses, locality and pushing these data through the cloud for an in-depth assessment of utilization of energy, predicting future energy requirements and energy mix for keeping the greenhouse effect under control. Of course privacy of individual and cyber security concern must be addressed.

IMPRESSIONS

- A good technical treatise on smart energy.
- A must read for AI specialists using Industrial Internet of Things (IIoT) for designing Building Management Systems.



Smart Energy Management – A Computational Approach
By Krithi Ramamritham, Gopinath Karmakar and Prashant Shenoy
World Scientific Publishing Co. Pte Ltd., Singapore

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