

1. Record Nr.	UNINA9910254196503321
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Titolo	Towards Energy Transparent Factories [[electronic resource] /] / by Gerrit Posselt
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2016
ISBN	3-319-20869-1
Edizione	[1st ed. 2016.]
Descrizione fisica	1 online resource (305 p.)
Collana	Sustainable Production, Life Cycle Engineering and Management, , 2194-0541
Disciplina	621.042
Soggetti	Energy efficiency Sustainable development Manufactures Management Industrial management Energy Efficiency Sustainable Development Manufacturing, Machines, Tools, Processes Innovation/Technology Management
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Foreword; Acknowledgments; Contents; List of Figures; List of Tables; Symbols; Abbreviations; 1 Introduction; 1.1 Present Situation and Problem Statement; 1.2 Research Objective and Problem Solving Approach; References; 2 Energy Flows in Factories; 2.1 Factory Environment; 2.1.1 Levels of Abstraction Within a Factory; 2.1.2 Functional Structure of a Factory; 2.1.3 Entities of a Factory; 2.2 Energy Flows and Energy Conversion in Factories; 2.2.1 Definition of Energy and Related Terms; 2.2.2 Energy Types at the Factory Gate; 2.2.3 Factory Internal Energy Conversion for End Usage 2.2.4 Dynamics of Energy Utilisation and Related Cost FactorsReferences; 3 Energy Management in Factories; 3.1 Energy Management from Facility and Production Perspective; 3.1.1 Energy Management from a Technical Facility Perspective; 3.1.2 Energy

Management from a Production Perspective; 3.1.3 Integrated Energy Management; 3.2 Energy Flow Data Acquisition and Automation; 3.2.1 Energy Flow Data Acquisition; 3.2.1.1 Liquid, Steam and Gas Flow Measurement; 3.2.2 Factory Automation Systems; 3.2.3 Building Automation Systems; 3.3 Review of the State of the Art and Barriers for Integrated Solutions
References
4 Approaches for Energy Data Acquisition and Monitoring; 4.1 Background for Selecting and Evaluating Existing Approaches; 4.2 Investigation of Adjacent Fields of Research; 4.3 Review of Energy and Data Acquisition and Monitoring Approaches; 4.4 Discussion and Comparison of the Review; 4.5 Derivation of Further Research Demand; References; 5 Concept for Energy Transparent Factories; 5.1 Synthesis of Requirements into Concept Specifications; 5.1.1 Energy Transparency; 5.1.2 Holistic Factory View and Relevant Entities and Flows; 5.2 Conceptual Framework
5.2.1 Factors Influencing Metering Strategies
5.2.2 Derivation of the Conceptual Framework; 5.3 Planning Tool for Metering Strategies; 5.3.1 Transparency Objectives; 5.3.2 Factory System Modelling; 5.3.3 Guided Decision Support; 5.3.4 Metering Strategy Formulation; 5.4 Toolbox for the Operation of Energy Monitoring; 5.4.1 Integrated Energy Management; 5.4.2 Energy Transparency Cockpit; References; 6 Application of Concept; 6.1 Application Case: Die Lernfabrik---A Research Lab; 6.1.1 Energy Cockpit; 6.1.2 EnyFlow---Energy Flows Made Transparent; 6.1.3 Dynamic Energy Value Stream Monitor
6.2 Application Case: Battery Lab Factory Braunschweig
6.2.1 Transparency Objective; 6.2.2 Factory System Modelling; 6.2.3 Decision Support; 6.2.4 Metering Strategy Formulation; 6.2.5 Energy Transparent Z-Folding Machine; 6.3 Application Case: Electronics Production; 6.3.1 Transparency Objectives; 6.3.2 Factory System Modelling; 6.3.3 Decision Support; 6.3.4 Metering Strategy Formulation; 6.3.5 Energy Aware Enterprise Resource Planning; References; 7 Summary and Outlook; 7.1 Summary; 7.2 Concept Evaluation; 7.3 Outlook; Reference; Appendix A: Extending Tables and Figures; Appendix B: Excursus Previous Publications of the Author

Sommario/riassunto

This monograph provides a methodological approach for establishing demand-oriented levels of energy transparency of factories. The author presents a systematic indication of energy drivers and cost factors, taking into account the interdependencies between facility and production domains. Particular attention is given to energy flow metering and monitoring. Readers will also be provided with an in-depth description of a planning tool which allows for systematically deriving suitable metering points in complex factory environments. The target audience primarily comprises researchers and experts in the field of factory planning, but the book may also be beneficial for graduate students.
