Recognized as an American National Standard (ANSI) **IEEE Std 739-1995**

(Revision of IEEE Std 739-1984)

IEEE Recommended Practice for Energy Management in Industrial and Commercial Facilities

Sponsor

Energy Systems Committee
of the
Industrial and Commercial Power Systems Department
of the
IEEE Industry Applications Society

Approved 12 December 1995

IEEE Standards Board

Approved 16 July 1996

American National Standards Institute

Abstract: This recommended practice serves as an engineering guide for use in electrical design for energy conservation. It provides a standard design practice to assist engineers in evaluating electrical options from an energy standpoint. It establishes engineering techniques and procedures to allow efficiency optimization in the design and operation of an electrical system considering all aspects (safety, costs, environment, those occupying the facility, management needs, etc.).
Keywords: break-even analysis; cogeneration; demand control; electrical energy; electric rate structure; energy audit; energy balance; energy conservation program; energy monitoring; energy-rate method; energy savings; heating, ventilating, and air conditioning (HVAC); levelized cost analysis; life cycle costing (LCC); lighting; load management; load type; loss evaluation; marginal cost analysis; metering; power bill; process energy; process modification; product energy rate; space conditioning; utility rate structure

Grateful acknowledgment is made to the following organizations for having granted permission to reprint material in this document as listed below:

ABB Power T&D Company, Inc., Bland, VA for annex Annex 5I.

Acme Electric Co., Lumberton, NC, for data used in 5.4.3, including tables 5-19, 5-20, 5-21, and 5-22.

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), Atlanta, GA, for table 5-6 from the 1992 ASHRAE Handbook—Systems and Equipment; and for table 5-18 from the 1993 ASHRAE Handbook—Fundamentals.

Butterworth Heinemann Publishers, Oxford, England, for data used in 5.4.5 from the *J&P Transformer Book*, 11th Edition, by A. C. Franklin and D. R Franklin, 1983.

Calmac Manufacturing Corp., Englewood, NJ, for data used in 5.2.12.

Commonwealth Sprague Capacitors, Inc., North Adams, MA, for tables 5-24, 5-25, and 5-26 from Publication PF-2000B, 1987.

Eaton Corporation, Kenosha, WI, for data used in 5.3.8.3.2 from Technical Bulletin No. 7[illegible]4006.

Electric Power Research Institute (EPRI), Palo Alto, CA, for table 5-7 from EPRI RP-2918-15, "Research and Development Plan for Advanced Motors & Drives," 1993; for tables 5-8 and 5-9 from EPRI TR-102639, "Drivers of Electricity Growth and the Role of Utility Demand-Side Management," 199[illegible]; and for annex Annex 5A from EPRI TR-101021, "Electrotechnology Reference Guide," Revision 2, Aug. 1992.

National Electrical Contractors Association (NECA), Inc., Bethesda, MD, for data from Electrical Design Library publications used in 5.2.1.

General Electric Co., Fort Wayne, IN, for figure 5-7 from "GE Motors: AC Motor Selection and Application Guide," GET-6812B; for data used in 5.3.8.12 from "How to Maximize the Return on Energy Efficient Motors," GEA-10951C; and for data used in table 5-23 from GEP-500J, "GE Motors Stock Catalog."

Ingersoll-Rand Company, Washington, NJ, for figure 5-1 from *Compressed Air and Gas Handbook*, 3rd edition, 1969.

Kato Engineering, Mankato, MN, Division of Reliance Electric Company, for tables 5-27 and data used in 5.5.5 from AC Synchronous Condenser Bulletin SC 8-92; and for table 5-28 and data used in 5.5.5 from AC Synchronous Motor Bulletins SM 1-94 and SM 2-93.

National Electrical Manufacturers Association (NEMA), Washington, DC, for tables 5-10, 5-11, 5-12, and figure 5-9 from NEMA MG 1-1993, Motors and Generators; for table 5-13, figures 5-5, 5-10, 5-11, 5-12, and annex Annex 5F from NEMA MG 10-1994, Energy Management Guide for Selection and Use of Fixed-Frequency Medium AC Squirrel-Cage Polyphase Induction Motors; and for annex Annex 5E from NEMA MG 11-1992, Energy Management Guide for Selection and Use of Single-Phase Motors.

Reliance Electric Co., Cleveland, OH, for figure 5-3, table 5-14, and data used in 5.3.7.6.1 from "Adjustable Speed Drives as Applied to Centrifugal Pumps," Technical Paper D-7100-1, Oct. 1981; for figure 5-4 and data used in 5.3.7.6.2 from "Fan Control for the Glass Industry Using Static Induction Motor Drives," Technical Paper D-7102, Oct. 1981; for figure 5-8 from "Motor Application," Bulletin B-2615; and for annexes Annex 5G and Annex 5H.

Schindler Elevator Corp., Morristown, NJ, for data used in 5.2.2.2.

SEW-Eurodrive, Inc., Troy, OH, for figure 5-6 and data used in 5.3.8.3.1.

Square D Company, Lexington, KY, for material reprinted in 5.5.3 from Bulletin D-412D, “Power Factor Correction Capacitor—Applications.”

State Electricity Commission (SEC) of Victoria, Energy Business Centre, Victoria, Australia, for data used in 5.2.3 from “Electricity for Materials Handling”; for data used in 5.2.4 from “Ultra-Violet Heating at Work in Industry”; for data used in 5.2.5 from “Infrared Heating at Work in Industry”; for data used in 5.2.6 from “Resistance Heating at Work in Industry”; for data used in 5.2.7 from “Radio Frequency Heating of Dielectric Materials”; for data used in 5.2.8 from “Tungsten Halogen Heating”; for data used in 5.2.9 from “Induction Heating and Melting for Industry”; for data used in 5.2.10 from “Induction Metal Joining, Productivity and Energy Efficiency”; for data used in 5.2.11.1 from “Electric Steam Raising”; for data used in 5.2.14, for figure 2, and for annex Annex 5C from the “Compressed Air Savings Manual.”

Trans-Coil, Inc., Milwaukee, WI, for the table in 5.5.1.2 from a “Guide to Power Quality.”

Most of Chapter Chapter 6, including figures and tables, was originally published in a different form in *The Dranetz Field Handbook for Electrical Energy Management*, copyright 1992, Dranetz Technologies, Inc., and is reprinted with permission from Dranetz Technologies. All rights reserved.

First Printing
November 1996
SH94387

The Institute of Electrical and Electronics Engineers, Inc.

345 East 47th Street, New York, NY 10017-2394, USA

ISBN 1-55937-696-1

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Introduction

(This introduction is not a part of IEEE Std 739-1995, IEEE Recommended Practice for Energy Management in Industrial and Commercial Facilities.)

IEEE Std 739-1984, IEEE Recommended Practice for Energy Conservation and Cost-Effective Planning in Industrial Facilities, was the precursor to this revision. That publication was born out of a need to convey conservation techniques to electrical engineers, designers, and operators. Much had been written for mechanical and architectural engineers at that point in time, but little had been written and disseminated to electrical engineers.

This new version has changed in several ways and has added new material that is the result of a decade of research and innovation by IEEE and others. The most obvious change is the title of this standard, “IEEE Recommended Practice for Energy Management in Industrial and Commercial Facilities.” The title shows a recognition of the need to manage a valuable resource—electrical energy. The title change also shows an expansion of scope. The scope expansion resulted when the parent committee sponsoring the work changed to the Energy Systems Committee. The Energy Systems Committee is one of five main technical committees in the Industrial and Commercial Power Systems Department of the IEEE Industry Applications Society. This new sponsorship expanded the focus of this recommended practice to include commercial facilities.

We are thankful to those who have given time and effort to the birthing of this recommended practice and who are no longer members of this committee. In particular, John Linders, Mel Chiogioji, Art Willis, H. L. (Sonny) Harkins, and Terry McGowan should be remembered as pioneers in the establishment of this recommended practice.

This IEEE recommended practice continues to serve as a companion publication to the following other recommended practices prepared by the IEEE Industrial and Commercial Power Systems Department:

- IEEE Std 141-1993, IEEE Recommended Practice for Electric Power Distribution for Industrial Plants (IEEE Red Book).
- IEEE Std 142-1991, IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems (IEEE Green Book).
- IEEE Std 241-1990, IEEE Recommended Practice for Electric Power Systems in Commercial Buildings (IEEE Gray Book).
- IEEE Std 242-1986 (Reaff 1991), IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (IEEE Buff Book).
- IEEE Std 399-1990, IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis (IEEE Brown Book).
- IEEE Std 446-1995, IEEE Recommended Practice for Emergency and Standby Power Systems for Industrial and Commercial Applications (IEEE Orange Book).
- IEEE Std 493-1990, IEEE Recommended Practice for the Design of Reliable Industrial and Commercial Power Systems (IEEE Gold Book).
- IEEE Std 602-1986, IEEE Recommended Practice for Electric Systems in Health Care Facilities (IEEE White Book).
- IEEE Std 1100-1992, IEEE Recommended Practice for Powering and Grounding. Sensitive Electronic Equipment (IEEE Emerald Book).

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IEEE Recommended Practice for Energy Management in Industrial and Commercial Facilities

Chapter 1

Overview

1.1 Scope

This IEEE recommended practice was conceived in the early 1970s shortly after the oil embargo. The purpose was to publish an engineering guide for use in electrical design for energy conservation. The purpose of this recommended practice continues to be one of providing a standard design practice to assist engineers in evaluating electrical options from an energy standpoint. Hence, it is a recommended practice for energy management in design and operation of an electrical system.

This recommended practice is not intended to be one to set minimum values for regulatory (law making) purposes. The intent is rather to establish engineering techniques and procedures to allow efficiency optimization in the design and operation of an electrical system considering all aspects (safety, costs, environment, those occupying the facility, management needs, etc.). Other national standards are mentioned where applicable for reference by the reader. State and local governments usually adopt some or all of these national standards, which makes them law, and on occasion, the governing body prepares its own standard(s).

1.2 General discussion

IEEE Std 739-1995, IEEE Recommended Practice for Energy Management in Industrial and Commercial Facilities (commonly known as the IEEE Bronze Book) is published by the Institute of Electrical and Electronics Engineers (IEEE) to provide a recommended practice for electrical energy management in industrial and commercial facilities. It has been prepared by engineers and designers on the Energy Systems Committee of the IEEE Industrial and Commercial Power Systems Department (ICPS) with the assistance of the Production and Application of Light Committee (PAL).

This recommended practice will probably be of greatest value to the power-oriented engineer with some design or operation experience with industrial and commercial facilities. It can be an aid, however, to engineers and designers at