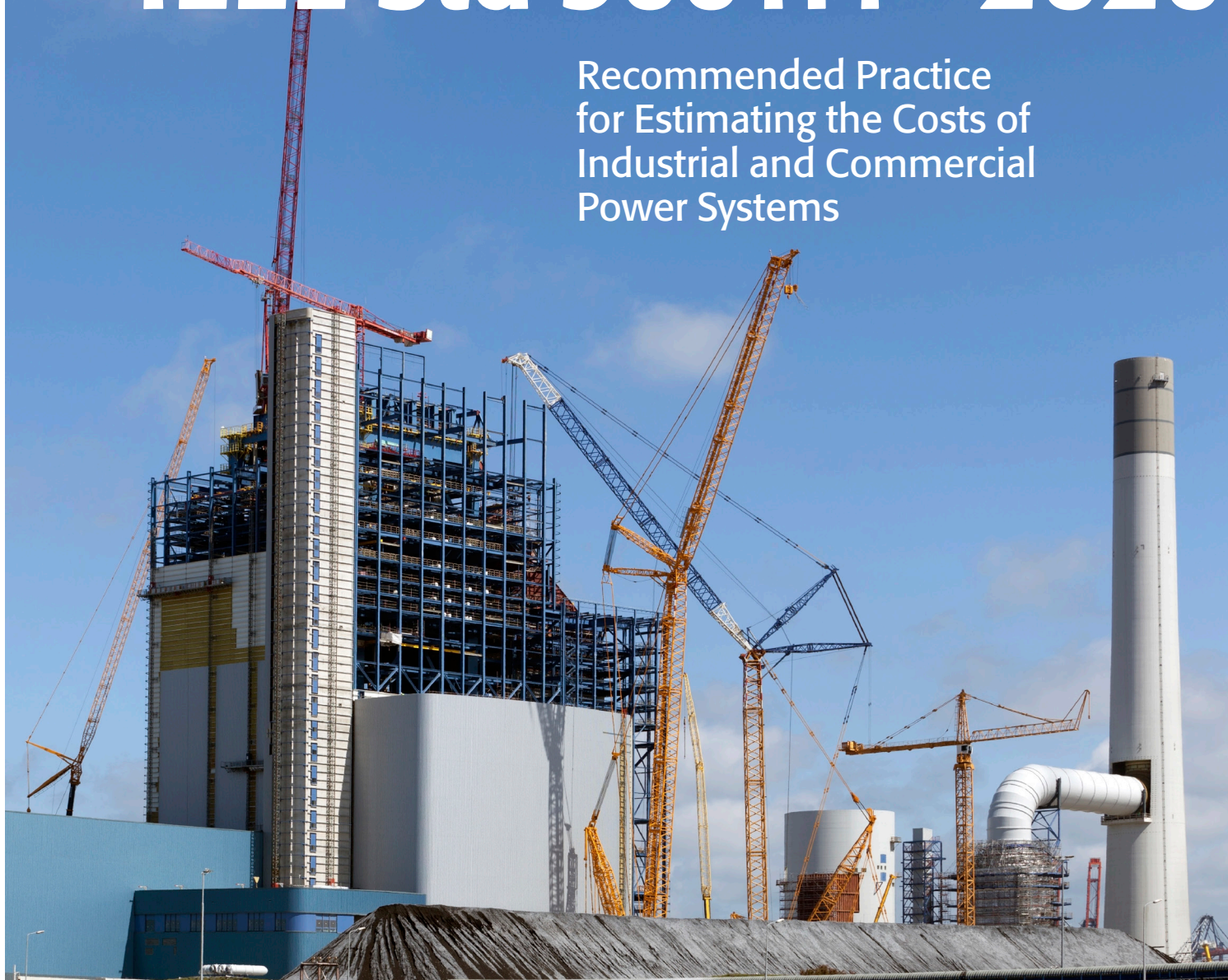


IEEE Std 3001.4™-2020

Recommended Practice
for Estimating the Costs of
Industrial and Commercial
Power Systems



IEEE Recommended Practice for Estimating the Costs of Industrial and Commercial Power Systems

Sponsor

**Industrial and Commercial Power Systems Standards Development Committee
of the
IEEE Industry Applications Society**

Approved 5 March 2020

IEEE SA Standards Board

Abstract: Described in this recommended practice are methods for estimating the costs of industrial and commercial power systems, both new and those undergoing expansion or modernization. This recommended practice is restricted to the development of the relative capital cost of industrial and commercial power distribution systems. While this document briefly points out considerations related to total cost or true cost, as well as some technical considerations, other standards and references should be referred to for a thorough analysis of these aspects of power distribution systems. This recommended practice is likely to be of greatest value to the power-oriented engineer with limited experience in this area. It can also be an aid to all engineers responsible for the electrical design of industrial and commercial power systems.

Keywords: costs, cost estimating, estimating, IEEE 3001.4, industrial and commercial power systems, net present value, relative capital cost

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Introduction

This introduction is not part of IEEE Std 3001.4–2020, IEEE Recommended Practice for Estimating the Costs of Industrial and Commercial Power Systems.

IEEE 3000 Series®

This recommended practice was developed by the Industrial and Commercial Power Systems Standards Development Committee of the IEEE Industry Applications Society as part of a project to repackage IEEE’s popular series of “color books.” The goal of this project is to speed up the revision process, eliminate duplicate material, and facilitate use of modern publishing and distribution technologies.

When this project is completed, the technical material included in the 13 “color books” will be included in a series of new standards. Approximately 60 additional “dot” standards, organized into the following categories, will provide in-depth treatment of many of the topics formerly covered in the color books:

- Power Systems Design (3001 series)
- Power Systems Analysis (3002 series)
- Power Systems Grounding (3003 series)
- Protection and Coordination (3004 series)
- Emergency, Stand-By Power, and Energy Management Systems (3005 series)
- Power Systems Reliability (3006 series)
- Power Systems Maintenance, Operations, and Safety (3007 series)

In many cases, the material in a “dot” standard comes from a particular chapter of a particular color book. In other cases, material from several color books has been combined into a new “dot” standard.

The material in this recommended practice largely comes from IEEE Std 141™-1993, IEEE Recommended Practice for Electric Power Distribution in Industrial Plants, (*IEEE Red Book™*).

IEEE Std 3001.4™

This publication provides a recommended practice for the electrical design of commercial and industrial facilities. It is likely to be of greatest value to the power-oriented engineer with limited commercial or industrial plant experience. It can also be an aid to all engineers responsible for the electrical design of commercial and industrial facilities. However, it is not intended as a replacement for the many excellent engineering texts and handbooks commonly in use, nor is it detailed enough to be a design manual. It should be considered a guide and general reference on electrical design for commercial and industrial facilities.

Tables, charts, and other information that have been extracted from codes, standards, and other technical literature are included in this publication. Their inclusion is for illustrative purposes; where technical accuracy is important, the latest version of the referenced document should be consulted to assure use of complete, up-to-date, and accurate information.

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IEEE Recommended Practice for Estimating the Costs of Industrial and Commercial Power Systems

1. Scope

This recommended practice describes how to estimate the costs of industrial and commercial power systems, both new and those undergoing expansion or modernization. This recommended practice is restricted to the development of the relative capital cost of industrial and commercial power distribution systems. While this document briefly points out considerations related to total cost or true cost, as well as some technical considerations, other standards and references should be referred to for a thorough analysis of these aspects of power distribution systems. This recommended practice is likely to be of greatest value to the power-oriented engineer with limited experience in this area. It can also be an aid to all engineers responsible for the electrical design of industrial and commercial power systems.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

AACE 18R, Cost Estimate Classification System—As Applied in Engineering, Procurement, and Construction for the Process Industries, AACE International.¹

3. Definitions, abbreviations, and acronyms

3.1 Definitions

For the purposes of this document, the following terms and definitions apply. The *IEEE Standards Dictionary Online* should be consulted for terms not defined in this clause.² Regarding terms used for finance and investment, e.g., *rate of return*, *cost of money*, *internal rate of return*, *payback rate*, *return on investment*, etc., refer to definitions by the Downes and Goodman dictionary [B3].³

detailed estimate: The definitive amount of individual components, resources, and duration to execute the project.

¹AACE International publications are available online at <https://web.aacei.org/>.

²*IEEE Standards Dictionary Online* is available at: <http://dictionary.ieee.org>.

³The numbers in brackets correspond to those of the bibliography in Annex C.