
**Technical guidelines for the
evaluation of energy savings of
thermal power plants**

*Lignes directrices techniques pour l'évaluation des économies
d'énergie des centrales électriques thermiques*

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO 50045:2019](https://standards.iteh.ai/catalog/standards/iso/aa912b29-67c3-454d-9ae8-49d6ca0c7b5b/iso-50045-2019)

<https://standards.iteh.ai/catalog/standards/iso/aa912b29-67c3-454d-9ae8-49d6ca0c7b5b/iso-50045-2019>



iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO 50045:2019](https://standards.iteh.ai/catalog/standards/iso/aa912b29-67c3-454d-9ae8-49d6ca0c7b5b/iso-50045-2019)

<https://standards.iteh.ai/catalog/standards/iso/aa912b29-67c3-454d-9ae8-49d6ca0c7b5b/iso-50045-2019>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Symbols, units and abbreviations	4
5 Evaluation of energy savings	5
5.1 General.....	5
5.2 Principles.....	6
5.3 Evaluation indexes.....	7
6 Unit component efficiency	8
6.1 Boilers.....	8
6.1.1 Boundary.....	8
6.1.2 Boiler energy balance.....	8
6.1.3 Boiler efficiency calculations.....	11
6.1.4 Others.....	12
6.2 Steam turbine/generator efficiency.....	12
6.3 Gas turbine efficiency.....	13
6.3.1 General.....	13
6.3.2 Simple cycle gas turbine systems.....	14
6.3.3 Combined cycle power plants.....	14
7 Calculation of evaluation indexes	16
7.1 Fuel equivalent.....	16
7.2 Fuel equivalent consumption rate.....	16
8 Analyses and performance evaluation	16
8.1 Procedure for evaluation.....	16
8.2 Evaluation of energy savings.....	18
8.2.1 Determination of energy savings income.....	18
8.2.2 Analyses for financial benefits.....	19
9 Reporting	20
9.1 Project overview.....	20
9.2 Current status and energy consumption of equipment.....	20
9.3 Analysis of influencing factors.....	21
9.4 Analysis of energy-savings potential.....	21
9.5 Suggestions and measures for energy-savings.....	21
Bibliography	22

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by ISO/TC 301, *Energy management and energy savings*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

ISO 50045:2019

<https://standards.iteh.ai/catalog/standards/iso/aa912b29-67c3-454d-9ae8-49d6ca0c7b5b/iso-50045-2019>

Introduction

This document provides a general and practical framework for evaluating energy savings of thermal power plants, including steam power plants based on the Rankine cycle, gas turbine plants and combined cycle systems. These power plants mainly comprise one or several thermal power generating units (TPGUs) to produce electricity only or both electricity and heat (i.e. cogeneration facilities and combined heat and power systems) by burning coal, oil products, natural gas and/or other fuels.

This document covers principles, procedures, evaluation indexes and calculation methods when determining the potential of energy savings of an existing TPGU before (an) energy performance improvement action(s) (EPIAs) or evaluating the contract guarantees of its energy savings after the EPIA(s) (e.g. energy performance contracting).

This document can be used by any interested party that intends to evaluate energy savings of a thermal power plant.

The relationship of this document with related standards and the Plan-Do-Check-Act cycle is shown in [Figure 1](#).

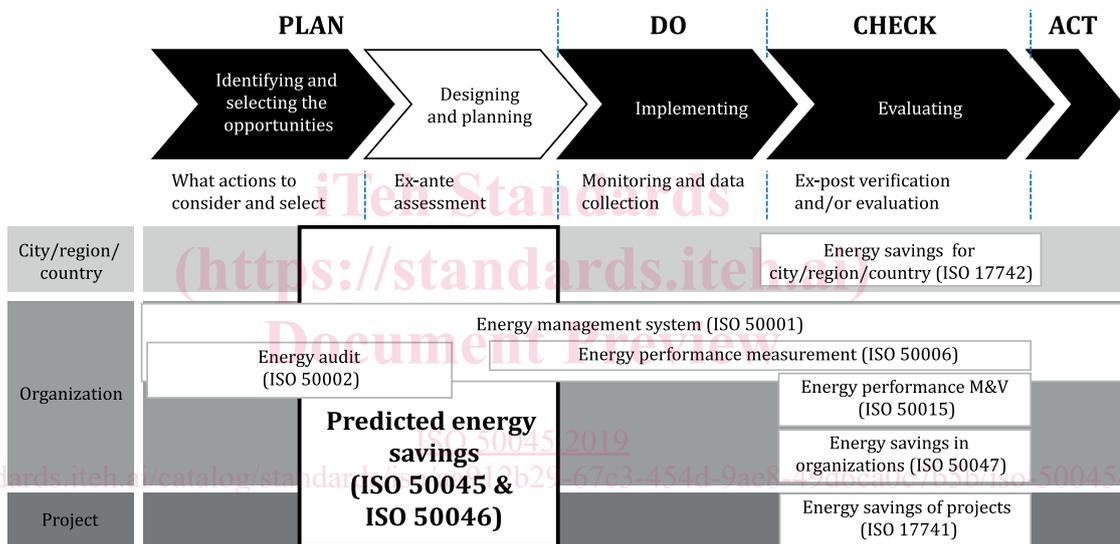


Figure 1 — General process for iterative improvement