
**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*



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

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](#).

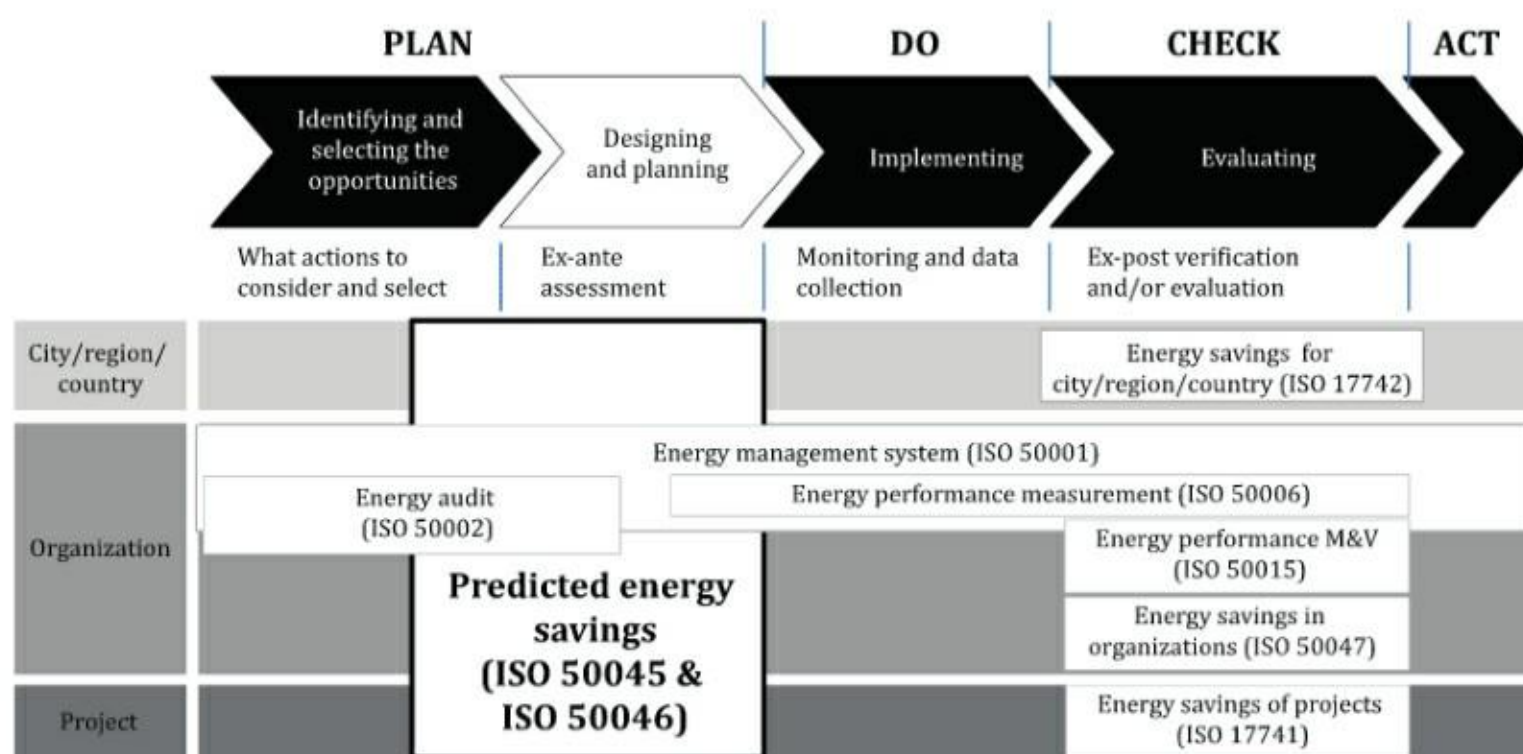


Figure 1 — General process for iterative improvement