

Australian/New Zealand Standard™

Energy audits

Part 1: Commercial buildings



AS/NZS 3598.1:2014

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee EN-001, Energy Auditing. It was approved on behalf of the Council of Standards Australia on 9 September 2014 and on behalf of the Council of Standards New Zealand on 21 August 2014.

This Standard was published on 2 October 2014.

The following are represented on Committee EN-001:

Association of Building Sustainability Assessors
Australian Chamber of Commerce and Industry
Australian Industry Group
Australian Institute of Refrigeration Air Conditioning and Heating
Bureau of Steel Manufacturers of Australia
Consult Australia
Department of Industry (Australia)
Energy Efficiency and Conservation Authority of New Zealand
Energy Efficiency Council
Energy Management Association, New Zealand
Institution of Professional Engineers New Zealand
Office of Environment and Heritage, NSW
Sustainability Victoria

Additional Interests:

Property Council of Australia

Keep us Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at www.saiglobal.com.au or Standards New Zealand website at www.standards.co.nz and looking up the relevant Standard in the online catalogue.

For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

This Standard was issued in draft form for comment as DR AS/NZS 3598.1.

Australian/New Zealand Standard™

Energy audits

Part 1: Commercial buildings

Originally published in Australia as part of AS 3598—1990.
Previous and first joint edition, as part of AS/NZS 3598:2000.
Partially revised in part and redesignated as AS/NZS 3598.1:2014.

COPYRIGHT

© Standards Australia Limited/Standards New Zealand

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Australia) or the Copyright Act 1994 (New Zealand).

Jointly published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001 and by Standards New Zealand, Private Bag 2439, Wellington 6140.

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EN-001, Energy Auditing, to supersede, in part, AS/NZS 3598:2000, *Energy audits*.

Energy audits are an integral part of the energy management process. They determine how efficiently energy is being consumed, identify energy and cost saving opportunities, and highlight potential improvements in building services and occupant comfort. In most cases, implementing energy audit recommendations will achieve notable cost savings.

This Standard will assist organizations to decide on the appropriate type of audit for their commercial buildings, provide a guide when commissioning energy audits and present a uniform basis for preparing and comparing energy audit proposals for commercial buildings. It also aims to establish best practice for energy auditors, to support the establishment of energy management systems and contribute to the quality of existing energy and other management systems.

This Standard covers the general requirements for energy audits of commercial buildings and related operations. Requirements for other types of operation are provided in the following Standards:

- (a) AS/NZS 3598.2, *Energy audits, Part 2: Industrial and related activities*.
- (b) AS/NZS 3598.3, *Energy audits, Part 3: Transport related activities*.

In the preparation of this Standard reference was made to the following:

- (i) ISO 50002, *Energy audits—Requirements with guidance for use*.
- (ii) ISO 50015, *Energy management systems—Measurement and verification of energy performance of organizations—General principles and guidance*.

Acknowledgement is made of the assistance received therefrom.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

CONTENTS

	<i>Page</i>
FOREWORD.....	4
1 SCOPE.....	5
2 OBJECTIVES	5
3 APPLICATION.....	6
4 REFERENCED DOCUMENTS	6
5 DEFINITIONS	7
6 WHEN TO UNDERTAKE AUDITS	11
7 ENERGY AUDIT REQUIREMENTS	11
8 ENERGY AUDITOR REQUIREMENTS	12
9 ORGANIZATION'S ENGAGEMENT WITH THE AUDIT.....	13
10 AUDIT TYPES	16
11 DETAILED REQUIREMENTS FOR AUDIT TYPES.....	17
APPENDICES	
A MAIN AUDIT SPECIFICATIONS AND VARIATIONS FROM THE AUDIT TYPE	28
B PERFORMING AN ENERGY AUDIT	29
C CONTENT OF AN AUDIT REPORT EXECUTIVE SUMMARY.....	41
D SUMMARY OF TYPICAL ENERGY AUDIT DELIVERABLES.....	43
E ENERGY AUDITOR COMPETENCIES	46
F PRE-AUDIT CHECKLIST FOR THE ORGANIZATION	48
G AUDIT PROCESS FLOW CHART	50
H GUIDANCE	51
I EXAMPLES	59
BIBLIOGRAPHY.....	71

FOREWORD

Commercial building energy audits are investigations of energy use for a defined building or group of buildings, such as an office building, hotel or hospital campus. They enable the identification of energy use and costs, from which energy cost and consumption control measures can be implemented and reviewed. An energy audit is an important step for an organization, regardless of its size, type or area of operation. Organizations may commission energy audits to improve their energy performance, reduce energy consumption and achieve financial and environmental benefits, including greenhouse gas (GHG) emissions abatement.

An energy audit is best undertaken within the context of an energy management system that complies with an appropriate industry Standard, such as ISO 50001, *Energy management systems—Requirements with guidance for use*.

This Standard defines the attributes of an appropriate energy audit to enable the organization commissioning the audit and the energy auditor selected to conduct the audit to reach a common understanding of the audit's scope, process and deliverables. It states the minimum requirements for energy audits and corresponding obligations within the energy auditing process necessary for compliance with the Standard.

This Standard recognizes that there are differences in approach to energy auditing in terms of scope, boundary and objective, but seeks to harmonize common aspects of energy auditing in order to bring more clarity and transparency to the market for energy auditing services.

This Standard does not address the requirements for auditing an organization's energy management system, which are covered by ISO 50003*, *Energy management systems—Requirements for bodies providing audit and certification of energy management systems*.

* To be published.

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard Energy audits

Part 1: Commercial buildings

1 SCOPE

This Standard sets out minimum requirements for commissioning and conducting three prescribed types of commercial building energy audits that identify opportunities for cost effective investments to improve energy performance. These energy audits encompass all forms of energy used in commercial buildings and are undertaken by appropriately competent personnel either internal or external to the organization.

Requirements for each specified type of audit are designed to meet the organization's business needs, and provide sufficient analytical rigour to provide a degree of confidence in the results that is appropriate to meet these business needs.

Energy consumption in a commercial building is generally linked to the supply of comfort services, activities in the building and the use of utilities to support those activities, such as lighting, lifts or pumps. Energy audits in buildings may include the whole building or parts of the building or a specific technical system such as an HVAC system.

Requirements for industrial site energy audits are provided in AS/NZS 3598.2, while requirements for transport fleet energy audits are specified in AS/NZS 3598.3. Where auditing is to be carried out on an essentially commercial building that includes some industrial processes, the energy auditor may choose to apply AS/NZS 3598.2 to these industrial activities. If auditing warehousing sites as part of a distribution chain the energy auditor may choose to refer to AS/NZS 3598.3 for this activity.

The energy audit process is presented as a simple chronological sequence, but this does not preclude repeated iterations of certain steps. It applies to buildings operated by commercial, industrial, and public-sector organizations, but not individual private dwellings. In most cases, implementing energy audit recommendations will achieve notable cost savings.

This Standard does not deal with energy audit program/scheme properties such as program administration, training of energy auditors, and energy auditors' tools.

2 OBJECTIVES

The objectives of this Standard are to—

- (a) set out the process for organizations and auditors to follow when undertaking energy audits to identify opportunities for cost effective investments to improve energy performance;
- (b) assist organizations to decide which of the three defined types of audit is appropriate for their needs and to compare energy audit proposals;
- (c) provide auditors with a uniform basis for preparing energy audit proposals;
- (d) establish best practice for energy auditors to provide effective and ethical service;
- (e) place the energy audit in the context of an energy management system by specifying pre- and post-audit activities for the organization, and suitable reporting requirements; and
- (f) complement existing energy, business and quality management systems, such as ISO 50001, AS/NZS ISO 14001 and AS/NZS ISO 9001.