



energy efficiency
COUNCIL

Your quick reference guide to energy auditing

The Australian/New Zealand Standard 3598:2014

Make informed
investment
decisions



Capture financial
returns from
energy savings



Improve your
productivity



Reduce your
environmental
impact



If you are getting an energy audit, make sure it is Standard compliant. Why?

A level playing field for procurement

The Standard defines clear expectations for each audit type, covering:

- What data is needed
- What analysis is required
- The necessary level of detail and accuracy in identified energy efficiency measures
- The information that needs to be presented in the report so you can make investment decisions

The standard states these requirements clearly, which means you can cross check your audit report to make sure you have received what you asked for. This also means that you will be comparing like-for-like offers from energy auditors during the procurement process.

Clear definition of best practice energy audit process

In the past, it has been challenging for audit customers to assess the quality of their audit report. The 2014 Standard defines a series of best-practice processes that ensure the auditor undertakes an appropriate level of investigation and analysis, which helps ensure the quality of the audit's recommendations.

Outcomes focused

A Standard compliant audit will set you on the path to reducing your energy consumption by identifying opportunities for improvement that fit within your budget, timelines and business objectives.

Clearly defined choices of audit type

The Standard defines three types of audits and provides guidelines about the best application of each. Each audit type has clear attributes so you can determine which type is best suited to your needs.

Finding the best energy auditor for your site

To find the best energy auditor for your site, you should ask the following questions:

Do they have a working knowledge of AS/NZS 3598:2014?

All energy audits should comply with AS/NZS 3598:2014. Your energy auditor needs to be familiar with the Standard, preferably by:

- Undertaking the right training. The Energy Efficiency Council runs a training program for energy auditors designed to assist them to deliver Standard compliant audits.
- Having previously completed actual energy audits that are compliant with the Standard. Ask your consultant for references on past work.
- Otherwise demonstrating familiarity with – and commitment to use – the Standard as the basis of their audit. Make sure that your consultant understands the Standard so that they can deliver a high-quality energy audit.

Do they understand all the major energy uses within your site?

Most sites use energy in many different ways, and no individual auditor will be an expert in all of them. Key skill areas required may include:

- Air-conditioning
- Lighting
- Compressed air
- Insulation/glazing
- Industrial process heat
- Other industrial processes

For many sites, the majority of energy will be consumed by one or two of these energy uses, so it will be essential that your energy auditor has skills in those areas. For larger and more complex sites, it is often beneficial for the auditor to have a team that includes members with additional expertise.

What other technical and general skills will they bring to your audit?

An energy audit is not just about identifying savings measures; it is about evaluating the potential benefits and capital costs of those savings measures. That means an auditor must have a diverse range of technical and general skills, including:

Communication – ability to clearly communicate verbally on-site, and in a written report

Analysis – ability to undertake the detailed analysis required for energy audit savings calculations

Design – ability to bring together practical conceptual design solutions for energy efficiency measures

Capital cost estimation – ability to consider all the components required to build up a realistic capital cost estimate that you can rely on when making implementation decisions

Innovation – ability to “think outside the square” to challenge current practices, technologies and processes

Project delivery and management – Large audits can involve significant project management challenges. More generally, previous experience in implementing savings measures will can dramatically increase the practicality of measures being recommended. Most of these skills can be demonstrated by reference to previous project work, reports and outcomes.



Determining the right audit type for your site

It's important to make sure you undertake the right type of audit so you are provided with information and recommendations that are relevant to your business. AS/NZS 3598:2014 sets out three distinct types of audit:

Basic energy audit

A simple, cost effective, high level audit, best utilised for small sites or when budgets are tight. It will provide you with broad estimates of energy savings opportunities so you can begin improving your energy efficiency. Some companies commission a basic energy audit as a first step before committing to a detailed energy audit.

Detailed energy audit

The standard 'go to' for a site-wide energy audit. It will provide you with specific recommendations with a medium level of accuracy – enough to underpin informed investment decisions on a range of available energy conservation measures.

Precision sub-system audit

This is a specialised audit you can commission if you need to do a 'deep dive' on a particular sub-system that uses a lot of energy on your site. It will provide you with precise information on specific energy saving measures related to that sub-system.

Our Quick Reference Guide (overleaf) allows you to compare the attributes of the three audit types so you can determine the right level of audit for your site and your budget.

Determining the right audit type for your site

Compare the attributes of the three defined audit types across the requirements of the Standard.

	TYPE 1 Basic energy audit	TYPE 2 Detailed energy audit	TYPE 3 Precision subsystem audit
Overall Intent	Simple and cheap, broad brush energy audit.	Standard model for a site-wide energy audit.	Detailed audit focused on a particular subsystem on a site.
Suitable site types/situations	Small sites; sites with limited analysis budgets; where preliminary investigation is required to scope whether a Type 2 or 3 audit is justified.	All sites; sites that require a comprehensive review and analysis of energy saving opportunities; where investment decisions require recommendations based on specified financial criteria.	Larger and more complex sites where sub-metering is required to determine energy use of a subsystem, typically to support a major investment in that sub-system.
Depth of investigation	Scoping study; costs and savings based on rules of thumb.	Detailed audit; costs and savings for specific measures.	Detailed audit; costs and savings for specific measures related to a subsystem and informed by additional sub-metering data.
Site visit	Inspect site, interview key staff members and supervisors.	Inspect site, interview key staff members and supervisors, gain detailed understanding of site operation.	Inspect site, interview key staff and supervisors, determine monitoring plan, gain detailed understanding of site operation.
Data collection	Available site level data.	The most detailed data available without installation of logging equipment.	Monitoring and data gathering for the audited system for a period long enough to account for a normal range of variation in energy use.
Annual energy end-use breakdown (How is your energy being used?)	Resolution down to end-uses of 20% total site consumption or larger.	Resolution down to end-uses of 10% total site consumption or larger. For industrial sites, minimum resolution is the smaller of 10% and 0.1PJ/28GWh.	Resolution down to end-uses of 10% total audited subsystem consumption or larger. For industrial sites, minimum resolution is the smaller of 10% and 0.1PJ/28GWh.
Analysis of daily consumption profiles (When is your energy being used?)	High level review to check for anomalies, where data available.	Analysis by end-use of separate 24 hour profiles for each energy source for typical operating and non-operating days and periods.	Analysis by end-use of separate 24 hour profiles for each energy source for typical operating and non-operating days and periods.
Establishment of Energy Use Performance Indicators (Set business metrics to evaluate your energy use.)	Required.	Required.	Required.
General accuracy of calculations and estimates	"Broad" Rule of thumb, generic, indicative, not necessarily customised to site conditions.	"Medium" Site specific and reconciled to available site data.	"Higher" Site specific and reconciled to available site data.
Accuracy of calculations for energy efficiency measure	At least 80% of measures below 2 year payback quantified to broad accuracy. At least 50% of measures above 2 year payback quantified to broad accuracy. Remaining measures qualitatively described.	All savings measures below 4 year payback quantified to medium accuracy. At least 50% of measures above 4 year payback quantified to medium accuracy. Balance of measures to broad accuracy. Measures to be in logical implementation sequence.	For the audited system: All savings measures below 4 year payback quantified to higher accuracy. All savings measures above 4 year payback quantified to a medium accuracy. For the wider site, other than the audited system: At least 50% of measures quantified to medium accuracy. All measures: Measures to be in logical implementation sequence.
Treatment of energy tariffs for savings calculations	Average unit cost; qualitative assessment of demand impact.	Simplified time of use tariff rates with separate assessment of peak demand costs.	Simplified time of use tariff rates with separate assessment of peak demand costs.
Capital costs	Broad estimate derived from typical paybacks or from rule of thumb costs.	Built up cost including contractor costs, design costs, commissioning costs, builder costs and margins.	Built up cost including contractor costs, design costs, commissioning costs, builder costs and margins, to accuracy required for client budgeting purposes.
Energy management improvement recommendations	Brief commentary.	Comments and recommendations.	Not required, but desirable in relation to the audited subsystem.
Summary table of measures	Required, including cost, cost savings, energy savings and payback for each quantified measure.	Required, including cost, cost savings, energy savings, demand savings, non-energy savings and payback for each measure.	Required, including cost, cost savings, energy savings, demand savings, non-energy savings and payback for each measure.

General

Requirements to comply with AS/NZS 3598:2014

Why undertake an energy audit?



Make informed investment decisions

An energy audit will provide you with a clear overview of all savings opportunities on your site. That way, you can select the investments that best suit your site and your budget.



Capture financial returns from energy savings

Energy efficiency is an investment that can deliver an excellent financial outcome, but investments need to be properly targeted. If you are considering investing in energy efficiency, an energy audit is your first step.



Improve your productivity

Energy efficiency is the ratio of useful service delivered to energy used. This means that as part of an energy audit, you will be assessed on how productively your business uses energy. In some cases, audits will identify changes that improve overall productivity as well as making direct energy savings.



Reduce your environmental impact

Financially prudent energy efficiency projects often deliver big environmental benefits. Few investments compare to energy efficiency in terms of delivering an environmental outcome and meeting the expectations of tenants, investors, customers and employees.



AS/NZS 3598.1:2014
Commercial Buildings



AS/NZS 3598.2:2014
Industrial and Related Activities

For more information visit the Standards Australia website
www.standards.org.au

Produced by the Energy Efficiency Council in partnership with the NSW Office of Environment & Heritage.

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Office of Environment & Heritage



AS/NZS 3598:2014 - Energy audits

In 2014, Standards Australia released a major update to the Australian/New Zealand Standard for energy audits. The update – led by a highly skilled panel of energy auditors and energy users with expertise across all sectors – focused on upgrading the Standard to ensure it supports the delivery of consistent, high quality audits that support businesses to make informed decisions on energy efficiency.

To achieve this, the Standard is now presented in three parts:



AS/NZS 3598.1:2014 Commercial buildings



AS/NZS 3598.2:2014 Industrial and related activities



AS/NZS 3598.3:2014 Transport and related activities

This quick reference guide focuses on the first two parts of AS/NZS 3598 – **Commercial buildings** and **Industrial and related activities**.

For more information visit the Standards Australia website www.standards.org.au

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