
Industrial Alliance for Reducing Energy consumption and CO2 emissions (IND-ECO)

Leather and footwear industries Work Package 2 - Inventory and benchmarking Task 4: Energy audit and benchmarking

A practical guidance to plan and carry out an energy audit

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Introduction :

- **Foreword**
- **Related INDECO Energy Management Tools**
- **Related international Standards**

Foreword

The “practical guide to plan and carry out an energy audit” is to support technicians to allocate appropriate resources for the energy audit according to the audit objective and to properly organize and plan audit activities.

This guide is an “Energy Management Tool” and is to be considered part of the deliverable D2.1 “Inventory plan and resources” of the INDECO IEE Project .

Related INDECO Energy Management Tools

The guide shall be used together with the EMT developed within the INDECO IEE Project:

- Set of organizational tools related to international standards such as ISO 50001 and ISO 14064
- Check-list for energy auditing – Tanneries
- Check-list for energy auditing – Footwear”
- Energy audit template

Related international Standards

The listed international Standards should be considered when dealing with an energy audit:

- ISO 19011:12: Guidelines for auditing management systems
- EN 15900:10: Energy efficiency services
- ISO 50001:11: Energy management systems: requirements with guidance for use, § 4.6.3 “Internal audit of the EnMS”

No specific international Standard exist for energy audits

Planning the audit:

- Objectives
- Scope
- Competences
- Documents
- Audit plan

Define audit objectives

Before preparing the energy audit plan, audit objectives shall be clearly agreed upon with the audit client. Objectives should be shared in writing. Examples of audit objectives:

- Identify and quantify energy uses and consumptions
- Identify opportunities for improvement
- Assess changes in energy consumptions compared with an energy baseline
- Assess effectiveness of improvement projects
- Identify improvements of the monitoring system

An audit may have more than one objective.

Define the audit scope

The audit scope can:

- Be limited inside the boundaries of an installation
- Include (or not) energy uses for transports
- Be extended (or not) to energy uses of suppliers
- Include/exclude energy uses of plants that are inside an installation being managed by third parties

The period of time to be considered should also be defined.

Any aspect regarding the audit scope shall be discussed and clearly agreed upon in advance with the audit client.

Define the audit scope

It is recommended to define those activities that can be outlined within the audit conclusions but are not part of the audit itself and should be covered by an additional assignement. Examples:

- define costs of improvement projects
- estimate the pay-back time of projects
- selecting suppliers

Selecting competences

According to the energy audit objectives and scope, competences of the audit team shall be defined as well as the members that can guarantee the required competence. Auditors should be contacted in advance and the audit plan should be shared with them before sending it to the client.

Selecting competences

Normally, the following are required:

- Energy management expert
- Management systems auditor

According to specific requirements for the audit, the following may be required:

- Specialist of the most relevant energy consuming equipments included into the audit scope (e.g.: boilers, cogeneration, heating distribution, lighting, etc.)
- Suppliers of equipments, plants, etc.

Documents to be considered

The list of the documents to be considered for the audit shall be agreed upon with the client.

Some general documents (or information) may be useful to prepare the audit plan and asked in advance for that.

The client should be asked to collect documents before the on-site audit: it is very useful to spare as much time as possible. It is recommended to analyse relevant documents before the on-site audit; this should be discussed with the client and documented into the audit plan.

Documents to be considered

Relevant documents may include:

- invoices, bills
- measured data on energy consumption
- technical data on equipments and installation (power, date of construction, etc.)
- manuals
- projects, drawings, technical reports
- contracts with energy and other suppliers
- records (e.g. Maintenance)

Preparing the energy audit plan

The audit plan should define:

- The dates of the audit
- The location for each audit phase
- The role of each auditor (tema leader, auditor, technical expert)
- The auditors for each audit phase and location
- The representatives of the clients required in each audit phase (persons if known or functions)
- Activities to be carried out (on site inspections, documents review, interviews, etc.)
- Documents to be available
- Locations to be visited

Preparing the energy audit plan

The audit plan shall be sent in advance to the client.

A sound audit planning makes the audit more effective, reducing time losses.

The client perceives clear ideas and reliable competence.

Any misunderstanding is prevented

Auditing and reporting:

- Evidence collection
- Managing the audit team
- Reporting

Evidence collection

The auditor has to identify the data and information to be acquired as audit evidence.

Inspections, interviews are good to identify the documents to be collected (records, photos, documents, etc.)

The audit evidences may be collected immediately or later (e.g., during the following audit day).

When the document, record, photo, etc. cannot be acquired, precise information shall be recorded in an audit minute or check-list to be referred to into the audit report.

Managing the audit team

The audit team leader should address the activities of each member of the team taking into account the audit plan, the competence and any event or problem occurring during the audit. Unforeseen activities may be:

- required in-depht analysis
- extra or integrative inspections, interviews or documents review

Managing changes to the audit plan

If any changes in the audit plan occurs, the audit team leader shall:

- arrange the plan in order to achieve the audit objectives
- agree with the client upon the changes
- keep records of the changes

Reporting

It is recommended to report to the client audit outcomings during the audit itself in order to be able to discuss any aspect and to collect all relevant information before the end of audit

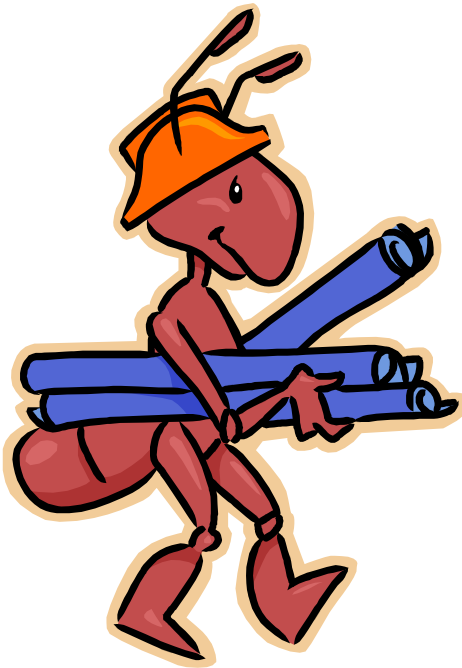
It is important to communicate to the client all audit results during the closing meeting as well as the following actions

All audit findings and conclusions shall be documented into the audit report; the report should be coherent with the conclusions communicated during the closing meeting

Related Energy Management Tools (EMT)

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TY very much
*And have
a good business
with your energy audits!*