

Partner name: UNIZAG FSB

ERASME: EneRgy Audits in SMEs
Intelligence Energy Europe
IEE/11/113/SI2.615927



COMMON TRAINING PROGRAM

Editor: Tomislav Novosel, UNIZAG FSB



CONTENTS

CHAPTERS FOR THE TRAINING PROGRAM FOR THE ERASME TRAINING COURSE ...	2
TIMETABLE FOR THE TRAINING COURSE.....	3
1. INTRODUCTION	5
2. PROCESS EQUIPMENT	6
3. RENEWABLE ENERGY SOURCES.....	7
4. REGULATIONS CONCERNING ENERGY AUDITS IN SMES AND/OR INDUSTRY	7
5. NATIONAL AND EUROPEAN FUNDING MECHANISMS	8
6. PRE-AUDIT	8
7. WALKTHROUGH AUDIT.....	9
7.1. Checklist	9
7.2. The report	9
8. THE ERASME SME AUDIT	11
9. USEFUL MATERIALS AND CONCLUSION	12

CHAPTERS FOR THE TRAINING PROGRAM FOR THE ERASME TRAINING COURSE

Total hours: 20

Training course: 5 days X 4 hours

1. Introduction
 - Duration: 30 minutes
2. Process equipment
 - Duration: 3 hours 30 minutes
3. Renewable energy sources and cogeneration
 - Duration: 2 hours
4. Regulations concerning energy audits in SMEs and/or industry
 - Duration: 1 hours
5. National and European funding mechanisms
 - Duration: 2 hours
6. Pre audit
 - Duration: 1 hour
7. Walk through audit
 - Duration: 4 hours
8. The ERASME SME energy audit
 - Duration: 4 hours 30 minutes
9. Communication aspects, to motivate the client to invest.
 - Duration: 1 hour
10. Useful materials and conclusion
 - Duration: 30 minutes

The division of hours is only informational. The exact division should be handled according to the situation in the individual county and should be adapted to fit the needs of the local auditors.

TIMETABLE FOR THE TRAINING COURSE

Day 1

16.00. – 16.15. Registration

16.15. – 16.30. Introduction

16.30. – 18.00. Process equipment

18.00. – 18.15. Brake

18.15. – 20.00. Process equipment

Day 2

16.15. – 18.00. Renewable energy sources and cogeneration

18.00. – 18.15. Brake

18.15. – 19.00. Regulations concerning energy audits in SMEs and/or industry

19.00. – 20.00. Pre-audit

Day 3

16.15. -18.00. National and European funding mechanisms

18.00. – 18.15. Brake

18.15. – 20.00. Walkthrough audit

Day 4

16.15. – 18.00. Walkthrough audit

18.00. – 18.15. Brake

18.15. – 20.00. The ERASME SME energy audit

Day 5

16.15. – 18.00. The ERASME SME energy audit

18.00. – 18.15. Brake

18.15. – 19.30. Communication aspects, useful to motivate the client to invest

19.30. – 20.00. Useful materials and conclusion

The timetable is only a suggestion. The exact timetable can be handled differently if you so desire.

1. INTRODUCTION

This chapter will introduce the participants to the ERASME project. A short description of the general idea and the purpose of both the training and the project itself should be given here.

Topics to discuss:

- Duration of the project: 30 months, since April 2012
- Goals:
 - Train 15-20 auditors per region
 - Conduct 50 “walkthrough” audits in SMEs
 - Promote energy audits in SMEs
 - Formalize the training process
- Explain the task to the participants
 - 20 hour training
 - Exam
 - Free first phase audit

It is important to explain to the participants that this is a great opportunity for them to meet potential employers and business clients. Emphasize both the responsibilities and opportunities that this project brings, especially the fact that the free first phase audit is both vital for their education and for the contact with the SMEs.

The ERASME Agreement between each national ERASME partner and all ERASME energy auditors will be clarified in its key elements:

1. The free-of-charge training course, including the project work part, where trainees will perform at least 1 pre-audit assisted by the trainer.
2. The engagement of ERASME partners in offering 2-3 additional opportunities for pre-audits in selected SMEs.

3. The right of the ERASME auditor to manage the possible second phase with the SMEs where he has performed the pre-audit, negotiating a contract for a full ERASME audit, a financing consulting and if requested the application to a financing opportunity. The economic conditions will be within the standard costs defined by the ERASME partner.
4. The possible accreditation/certification of the training course if the ERASME partner succeeds in its negotiation with the relevant training authorities, or in obtaining credits as University credits or as professional continuous training credits.
5. The right of the ERASME energy auditor to continue his professional activity as energy auditor using the approach and tools developed by the ERASME project.
6. The obligation to the ERASME energy auditor to provide copy of the reports, supplied to the clients, to the national ERASME partner,

A description of the chapters and the duration of each segment of the course should also be given here as well as a description of the test and evaluation of the participants.

2. PROCESS EQUIPMENT

In this chapter we will give the participants a general overview of the most common pieces of process equipment they will most likely come across in the SMEs. A short description of possible energy saving measures will be presented according to the energy audit guide mentioned in the ERASME handbook. The function and design of the equipment won't be handled here because of the time constraint.

Link to the energy audit guide

<http://www.oregon.gov/ENERGY/CONS/Industry/docs/AuditGuide.pdf?ga=t>

Pictures of the equipment will also be shown to familiarize the participants with them.

Equipment to be discussed:

- electric motors

- efficiency questions, regulation, proper maintenance, variable speed drive, proper use...
- fans and pumps
 - proper maintenance, pressure settings, throttling, bypass, variable speed drive...
- compressed air systems
 - oversized equipment, regulation, variable speed drive...
- steam systems
 - temperature, regulation, monitoring...
- refrigeration systems
 - regulation, suction pressure, distribution of load...

3. RENEWABLE ENERGY SOURCES

A short description of the most common decentralised energy sources (renewable energies and cogeneration) will be given to the participants. There won't be a lot of detail about the function and the design of the equipment or the energy transformation processes. The basic terminology necessary to accomplish a feasibility study will be explained.

- Solar
 - Insulation, load factor, necessary equipment...
- Biomass
 - Acceptable fuels, storage and transportation, efficiency...
- Cogeneration
 - Heat recovery, heat production and demand, efficiency...

4. REGULATIONS CONCERNING ENERGY AUDITS IN SMES AND/OR INDUSTRY

A basic description of regulations governing energy audits in SME-s, energy performance of buildings and the use of renewable energy on a national and European level will be given. This

part of the course shouldn't go into too much detail about the particular laws and regulations, but should give a general overview of the legislations.

Topics to discuss:

- National laws and regulations
- European laws and regulations

5. NATIONAL AND EUROPEAN FUNDING MECHANISMS

Examples of national and European funding mechanisms will be given and described in this chapter. Procedures to apply for financial help and the necessary paperwork will be described. It would be beneficial if real world examples and success stories could be given.

Examples of mechanisms:

- Commercial banks
- Regional development banks
- Revolving Funds
- National funds
- European funds and programs
- ESCos/EPC contracting

6. PRE-AUDIT

We will list equipment that the participants should bring to a SME they will be auditing and we will present possible sources for the information on different industry sectors (BREFs...). We will also talk about the initial contact with the SME, what questions to ask beforehand and what data to ask for (primarily consumption data). Finally, the method of the pre-audit results presentation to the client will be suggested.

Topics to discuss:

- Initial questions
 - Number of employees, type of industry, size of plant...

- Consumption data
- Necessary tools
- Preparation
 - BREFs...

7. WALKTHROUGH AUDIT

7.1. Checklist

In this chapter we will present the checklist devised for the on-site part of the first phase of the audit, the walkthrough audit. We will explain how to use it in the data gathering process and later when they will write the report.

A lot of emphasis will be put on what needs to be considered during the walkthrough audit, this should be followed with examples. For example:

- types of lighting being used in a factory plant, is it too bright, can it be replaced with energy efficient models
- do electric motors use variable speed drives, can they be installed, would it cause problems
- are compressors constantly running at partial load, can they be turned off, can a control system be installed...

7.2. The report

The chapters of the report will be listed and explained here. It will include the following chapters:

- Identification
- Introductory elements to the Energy Audit
- Executive summary
- Contacts of the client
- Summary presentation of the project funding the energy audit
- Presentation of the company and its premises
- Modes of utilization of the structure
- Summary description of the facilities

- Previous energy consumption/production data and possible benchmarks
- Energy survey by end use
- Monitoring and targeting suggestion
- Energy action plan
- Focus on at least one key action proposed for further study
- Conclusion and proposal for next steps
- References

Every chapter will be explained in short. A lot of emphasis will be put on the “Energy action plan” chapter as this will probably be the most interesting part to the potential investor. We must assume the participants have a working knowledge of economy but we should still remind them how to calculate the economic aspect of the investments. A template of the report will be presented and distributed to the participants.

The Energy Action Plan may report indicative figures for the required amount of the specific investments, but these figures can also be omitted, if they can generate problems in the presentation of the results to the client. In any case the Action plan has to provide to the client a hypothesis of the overall energy and money saving, in percentage and absolute terms, which can be achieved by its implementation.

The Report will be in large part standardized, and it is intended that the pre-audit preparation, including walkthrough, should not exceed a full work-day. The Report has to be presented to the client by the author, in a specific meeting, to be agreed in the first visit; in that occurrence the energy auditor will propose the continuation of the work, implementing the second phase based on the full audit, and present an economic offer for this service.

Topics to discuss:

- Checklist
- Report
 - Form of the report
 - Action plan

8. THE ERASME SME AUDIT

In this chapter we will present the form of the audit and all the chapters it is supposed to have, namely:

- Contents
- Project Background
- Executive Summary
- 1 Introduction & General Description
- 2 Energy Performance of the Business
- 3 Previous Data & Benchmarks
- 4 Monitoring & Targeting Approach
- 5 Survey
 - 5.1 Building Fabric & Insulation
 - 5.2 Heating & Hot Water
 - 5.3 Lighting (indoor and outdoor)
 - 5.4 Electrical Equipment
 - 5.5 Refrigeration systems
 - 5.6 Steam systems
 - 5.7 Renewable Electricity and Co-generation Options
 - 5.8 Improvement of energy supply contracts conditions
- 6 Recommendations
 - 6.1 Suggested Action Plan
 - 6.1.1 Action plan: no cost measures
 - 6.1.2 Action plan: low cost measures
 - 6.1.3 Action plan: capital cost measures
 - 6.2 Table of Costs & Savings of Measures
 - 6.3 Targeting
 - 6.3.1 Knowledge of the energy consumption
 - 6.3.2 CO2 emissions
- 7 Raising Awareness
- 8 Proposals for Action Plan implementation

- At least one action described and quantified in details
- Suggestion of financial opportunities..

Special emphasis will be put on the “Action plans” in which the auditors are supposed to list all of the investment options classified first by the cost of the investment in three categories: no cost, low cost and capital cost and then by the return of investment period. This will be the most important part of the training and the mentioned chapters will probably be most interesting to the owners of the SMEs.

Most of these chapters can be found in audits for buildings that the participants have already written so it won't be necessary to go into too much detail for all of them. The chapters for the full energy audit as well as a short description can be found in the ERASME handbook.

It is also important to explain how to write a high-quality feasibility study for the suggested energy saving measures and if possible to give an example of one.

In countries where an official incentive system is available, for subsidizing energy audits in SMEs, the energy auditor will follow the national procedure and support the client in recovering the corresponding costs.

Topics to discuss:

- Report
 - Form of the report
 - Monitoring and targeting
 - Action plans
 - Table of cost and savings
 - CO₂ emissions
 - Action plan implementation

9. USEFUL MATERIALS AND CONCLUSION

In this chapter we will shortly list outside materials that could be useful for the creation of the energy audit like the BESS checklists and the EINSTEIN software tool. We won't spend a lot of

time on them, just give a short overview of what is available and let the participants decide if they want to use any of them.

Topics to discuss:

- BESS
- EINSTEIN
- Conclusion