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The implementation of an energy audit according to the requirements of **EDL-G § 8 resp. DIN EN 16247** consists of 7 Phases as follows: (1) Initial contact, (2) Kick-off meeting, (3) Data collection including preliminary examination of documentation, (4) on-site audit, (5) analysis, (6) report, (7) final meeting. Each phase will be explained in detail below.

1 INITIAL CONTACT

1.1 Request for information

For the determination of basic conditions of the proposed energy audit the customer should provide information about:

- objectives, requirements and expectations related to the audit,
- area of application physical and organizational boundaries of the audit,
- requested timeframe for the implementation of the audit,
- required resources for the implementation of the audit,
- requirements for the information to be collected and
- existing experiences with management systems.

For support TÜV NORD CERT has developed questionnaire (Rfl form) which can be send to the customer.

1.2 Evaluation of the proposal

Based on the information delivered by the client beforehand, esp. on the basis of the information included in the Rfl form, TÜV NORD CERT carries out a contract review to determine whether the service can be provided under the given boundary conditions esp. with regards to

- Availability of qualified personnel,
- possible situations of conflicts of interest,
- Necessity of additional measurements.

1.3 Submission of the proposal

Upon a successful contract review a detailed financial calculation will be carried out. At this point both requirements of DIN EN 16247-1 and specific requirements of TÜV NORD must be taken into consideration. Besides, the client shall be obligated to deliver organizational and technical support to the audit team before work is started.

2 KICK-OFF MEETING

A Kick-off meeting shall be performed before the main audit takes place. To ensure the feasibility of the audit, the following points must be coordinated:

1. Adequacy of the pre-determined boundary conditions to the audit (esp. locations, facilities and energy source processes)
2. Nomination of one or more persons being responsible for the support of the energy audit from the client's side.
3. Review of existing information (energy data and influencing factors each with regards to level of detail, representativeness and accuracy)
4. If required, the energy data and its format has to be provided and determined by the company in addition to the existing data.
5. Information about previous inspections in the company concerning energy, energy efficiency and energy tariffs, etc
6. Practical implementation of the on-site audit (appointments, choice of the locations to be audited, etc.)
7. Special requirements (confidentiality, reporting requirements, terms of the final meeting, etc.)

A kick-off meeting can be organized in form of a personal meeting on-site or by using modern communication media, such as telephone conference or video conference. It must be guaranteed that all of the above-mentioned aspects are coordinated, are clearly understood by all parties and are to be notified in writing. The audit team leader can decide if a meeting has to take place on-site or not.

The interval between kick-off meeting and an energy audit should not be longer than 3 months. If within the limits of a kick-off meeting, it turns out that the parameters differ significantly from those assumed for the offer preparation, TÜV NORD shall adjust the original price provided. This price adjustment shall be performed based on the actual situation and in agreement with the customer.

3 DATA COLLECTION INCLUDING PRELIMINARY EXAMINATION OF DOCUMENTATION

After a kick-off meeting TÜV NORD CERT makes a detailed planning of the audit execution. At this point the following issues must be defined: (1) locations to be inspected, (2) timing of the audit, (3) determination of the personnel and other resources that are required for the audit.

At the same time the company collects and submits additional data as determined during the kick-off meeting, such as information about systems, processes and devices of energy consumption and quantifiable parameters, which affect energy consumption. This information has to be promptly presented to the auditor in the agreed form, for example as digital data, not later than one week before the on-site audit is started.

As preparation for the on-site audit the audit team acquaints itself with the available data and conducts first analyses, which are deemed appropriate to support an efficient audit process.

4 ON-SITE AUDIT

After all the necessary Information is successfully collected, the auditor will visit the pre-determined sites of the customer that have to be inspected.

The aims of the on-site audit are primarily:

- to discuss disagreements and/or mistakes, which had been identified during the pre-check of the documentation submitted;
- to verify all considered energy consumers;
- to determine domains and processes which may need additional information;
- to study operational procedures, user behavior and also their influence on the energy consumption and energy efficiency;
- to examine related evidence provided, e.g. electricity and gas bills, logbooks, gas receipts, etc;
- to adjust the provided information with the data of measurement devices where required, such as power meter or gas meter;
- to make first suggestions of energy efficiency improvements, if possible.

The audit starts with an opening meeting where all participants of the audit introduce themselves and the auditor explains procedure and purposes of the audit.

Within the on-side audit the auditor examines and evaluates the compliance with requirements according to DIN EN 16247-1 and applicable local legislation such as EDL-G.

The task of the auditor is to check the practical implementation of the system for the improvement of energy efficiency, to evaluate if it complies with the EDL-G-requirements and to make a verification of the on-site conditions with the data submitted. It can be achieved by consulting employees, by inspection of a valid documentation, notes, measurement reports, invoices, etc. and by inspection of the relevant locations.

The audit doesn't contain any additional metrological determination by TÜV NORD CERT. If during the energy audit it turns out, that additional measurements might be necessary for the assessment of relevant consumers of energy; those must be determined and handed in later separately.

5 ANALYSIS

An analysis phase serves to determine the current situation concerning the actual energy related performance as well as the identification and evaluation of improvement opportunities. The auditor prepares a breakdown of the energy consumption on the consumption and supply side, as well as adjustment factors that can be used for the formation of appropriate key indicators (ENPIs).

In particular on the basis of key figures submitted and on the basis of corresponding comparative data, possibilities of improvement of the energy efficiency will be derived.

Afterwards, according to specified criteria, these possibilities of improvement will be evaluated especially regarding their profitability. If appropriate, a life cycle costs analysis will be generated in particular for this procedure.

Further a concluding evaluation of the achieved results takes place esp. with regard to the reliability and appropriateness of data, to the method of calculation which has been used, and to the assumptions that were made.

6 REPORT GENERATION

The report combines the results of the assessment steps that have been completed. It includes a summary, general background information, documentation of the energy audit and a list of possibilities to improve the energy efficiency with the help of:

- a. recommendations and plans for implementation,
- b. assumptions which have been used for the calculation of savings,
- c. information about applicable contributions and benefits,
- d. appropriate cost-effectiveness analysis,
- e. suggestions for the measurement and detection methods for the estimation of cost savings after the recommended actions would be implemented
- f. possible interdependencies with the other suggested recommendations and
- g. Conclusions.

7 FINAL MEETING

The energy audit ends with a final meeting. As participants of this meeting are to be at least the energy representative of the company, who had made an application, and normally some senior managers responsible for the energy related departments of the company.

During the final meeting an auditor team leader explains positive and negative results of the audit and hands over the report. If any serious shortcomings were identified, those should be addressed during the final meeting.

The final meeting can be organized in form of a personal meeting on-site or by using modern communication media such as telephone conference or video conference. It must be guaranteed that all of the above-mentioned aspects are coordinated, are clearly understood by all parties and are to be notified in writing. The audit team leader can decide if a meeting has to take place on-site or not.

8 SPECIFIC ASPECTS

8.1 Audit of a company with more than one location in one country

The verification of a company with several locations can be based on representative, random examinations in consideration with appropriate legal requirements (such as the instruction sheet for energy audits of BAFA).

8.2 Audit of a company with locations in different countries

If a company has several locations in various countries, it must be considered that the national general conditions can vary from one country to another (like the different implementation methods of EED into the national law).