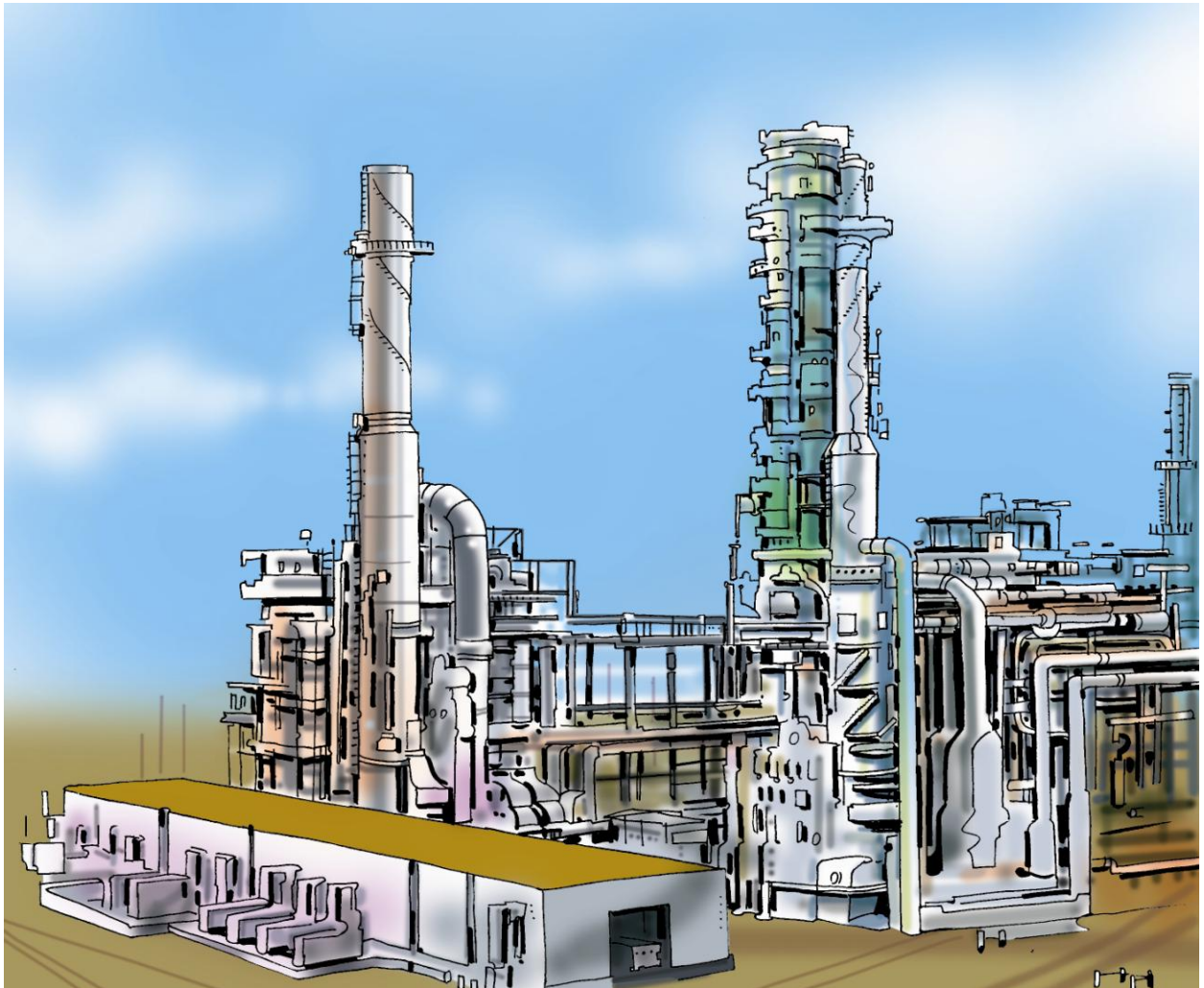




GUIDELINE FOR APPLICATION FOR ENERGY AUDITOR ACCREDITATION



Sri Lanka Sustainable Energy Authority

Guideline for Application for Energy Auditor Accreditation

1.0 Energy Auditing

An energy audit is an investigation of all facets of historical and current energy use of an existing facility or organization with the objective of improving energy utilization efficiency. This involves comprehensive measurements of energy parameters, detailed analysis of energy flows into and out of main equipment and sub systems of the facility, in order to identify and quantify areas of energy wastage. This is followed by estimation of the extent of savings achievable through several interventions including improvements to facility design & installation, operation and management. Energy Audit is a key component in any organization's drive to reduce energy costs and also for abatement of greenhouse gas emissions contributing to sustainable development.

2.0 Energy Auditor

As an energy audit involves a systematic study undertaken on major energy consuming areas, it should be performed by a team led by a competent professional. Qualified personnel competent to perform these tasks are designated as Energy Auditors. The responsibilities and duties of Energy Auditor include the followings:

- Carry out detailed energy audits
- Quantify energy consumption and establish baseline energy information
- Construct energy and material balance
- Perform efficiency evaluation of energy & utility systems
- Compare energy norms with existing energy consumption levels
- Identify and prioritize energy saving measures
- Analyse the technical and financial feasibilities of energy saving measures
- Recommend energy efficient technologies and alternate energy sources
- Communicate the findings of the study through comprehensive reports, presentations, etc.
- Provide assistance for implementation of recommended interventions

3.0 Qualifications for Being Accredited as an Energy Auditor

To apply for accreditation as an Energy Auditor, the applicant should be

- a) a Graduate in Engineering (B.Sc. Engineering) of a Higher Educational Institution or other similar qualification as may be recognized by Sri Lanka Sustainability Authority (SLSEA) and has ten years work experience in the field of energy management;

or

- b) a Graduate in Engineering or Science of a Higher Educational Institution, with a post graduate diploma or a Masters degree in Engineering or energy management and has seven years work experience in the field of energy management

In addition to the above educational qualifications, the applicant should have followed a comprehensive training programme complying with the details in Section 6.0 of this document and should have carried out at least 10 energy audits substantially covering both thermal and electrical aspects.

4.0 Assessment Procedure

Applications for energy auditor accreditation will be called by SLSEA once a year. Applications prepared according to the format given in Annex 1 should be forwarded to the Director General of SLSEA along with the following documents.

- (a) Copies of certificates of relevant educational and professional qualifications
- (b) A copy of the certificate of the training programme, adequacy of which as defined in Section 6.0, as approved by SLSEA
- (c) Executive summaries of at least 10 energy audits carried out in organizations with energy consumption of at least 500,000 kWh or 4500 TOE per annum, with the endorsement of those organizations (In the event of inability to get endorsement, sufficient proofs for the involvement in energy audits should be submitted.)
- (d) Comprehensive report demonstrating the knowledge, skills and experience in energy auditing
- (e) Service letters from the employers in connection with the experience required
- (f) A copy of the receipt obtained from SLSEA for the payment of application fee of LKR 10000.00.

Once the application is submitted with all the required documents, the applicant should undergo an assessment in the form of an interview. The successful candidates will be issued a Certificate of Accreditation as an Energy Auditor, as per Energy Managers/Energy Auditors regulations gazetted on 20.07.2011. Application format is available for download at the following link.

www.energy.gov.lk

The assessment procedure is detailed as a flow chart in Annex 5.

5.0 Continued Assessment

Accredited Energy Auditors are required to maintain and enhance the expertise through active involvement in energy auditing, energy management capacity development activities and training on continued basis. At the end of each 3-year period after certification, Energy Auditors are required to submit performance review reports to SLSEA in the format as in Annex 2. Any applicant who fails to demonstrate his/her capacity as energy auditor as assessed by the review report may be given an opportunity to face an interview conducted by a panel appointed by the Board of Management of SLSEA. Failure in reviews may lead to cancellation of Certificate of Accreditation. The assessment procedure is detailed as a flow chart in Annex 5.

6.0 Energy Auditor Training Programmes

Energy auditor training programmes recognised by SLSEA in energy auditor accreditation should cover the subject areas given in Annex 4 with at least 60 hrs of training, including a practical session of a detailed energy audit of 20 hrs. Institutes conducting training programmes for energy auditors should register the respective training programmes with SLSEA in order that the completion of such training will be considered as recognized training in the energy auditor accreditation process. Registration of training programmes can be done by submitting the application in Annex 3 along with a fee of LKR 25000.00. In case that the training programme has not been registered with SLSEA, the recognition of the training institution and the relevancy of the programme will be assessed by SLSEA on case by case basis, for which a non refundable administrative fee of LKR 5000.00 will be charged from the applicant over and above the application fee.

7.0 Annual fee

All Accredited Energy Auditor should pay an annual fee of Rs. 2500.00 as the annual subscription fee.

Encl. Annexes

Annex 1 – Application for Energy Auditor Accreditation

Annex 2 – Performance Review Report

Annex 3 – Application for Registration of Training Courses on Energy Management

Annex 4 – Syllabi for Energy Auditor Training

Annex 5 – Assessment Procedure for Accreditation

Annex 6 – Continued Assessment Procedure

Annex 1

APPLICATION FOR ENERGY AUDITOR ACCREDITATION

1. NAME :

2. ADDRESS :

3. TELEPHONE NUMBER :

4. NATIONAL ID NUMBER :

5. EMAIL :

6. EDUCATIONAL QUALIFICATIONS (PROFESSIONAL)

DEGREE/DIPLOMA ETC.	RESULTS	INSTITUTE

7. WORK EXPERIENCE

ORGANIZATION AND DURATION OF WORK	DESIGNATION	TYPE OF WORK CARRIED OUT

8. DETAILS OF ENERGY AUDITS CARRIED OUT

ORGANIZATION	TYPE OF ENERGY AUDIT (ELECTRICAL/THERMAL)	IDENTIFIED ELECTRICAL AND THERMAL ENERGY SAVING POTENTIAL AS A PERCENTAGE

NOTES :

1. APPLICANT SHOULD SUBMIT COPIES OF THE EDUCATIONAL /TRAINING CERTIFIATES ALONG WITH THE APPLICATION
2. APPLICANTS SHOULD SUBMIT THE EXECUTIVE SUMMARIES OF THE ENERGY AUDITS CONDUCTED, SIGNED BY THE CEO OF THE CONDUCTING ORGANIZATION.
3. IF THE APPLICANT IS ELIGIBLE FOR ACCREDITATION HE /SHALL BE AWARDED AN ACCREDITATION CERTIFICATE WHICH MAY BE REVOKED IF THE APPLICANT FAILS EXAMINATIONS AND PERFORMANCE REVIEWS CONDUCTED BY SRI LANKA SUSTAINABLE ENERGY AUTHORITY.

DATE :

SIGNATURE OF APPLICANT :

Annex 2**PERFORMANCE REVIEW REPORT**PERSONAL INFORMATION

1. NAME :

2. ADDRESS :

3. TELEPHONE NUMBER :

4. ACCREDITATION NUMBER :

5. EMAIL :

6. EMPLOYMENT INFORMATION FOR THE PAST 3 YEARS

PERIOD	ORGANIZATION	DESIGNATION

7. SUMMARY OF ENERGY AUDITS CARRIED OUT BY THE ENERGY AUDITOR

ORGANIZATION	IDENTIFIED ENERGY SAVING OPPORTUNITIES	ESTIMATED SAVING (Rs.)

8. LOCAL TRAINING/EDUCATION RECEIVED BY THE ENERGY AUDITOR

DURATION	COURSE TITLE AND ORGANIZATION	BRIEF DESCRIPTION OF THE COURSE CONTENTS

9. FOREIGN TRAINING/EDUCATION RECEIVED BY ENERGY AUDITOR

DURATION	COURSE TITLE , ORGANIZATION AND COUNTRY	BRIEF DESCRIPTION OF THE COURSE CONTENTS

10. WRITE A BRIEF REPORT ON ENERGY SAVING OPPORTUNITIES IN ESTABLISHMENTS YOU HAVE CONDUCTED ENERGY AUDITS DURING THE LAST 3 YEARS.

DATE :

SIGNATURE OF APPLICANT :

Annex 4 :

SYLLABI FOR ENERGY AUDITOR TRAINING

1) Energy and Environment (2 hrs)

Emissions associated with energy use especially combustion of fossil fuels
Adverse effects on environment
Indoor air pollution
Urban air pollution
Global environmental issues – Climate change
Options for mitigation
International level initiatives
Notational level initiatives: Emission standards

2) Energy Management (1 hr)

Importance of energy management
Energy management program: Set-up and implementation
Energy accounting, monitoring, evaluation and reporting

3) Energy Accounting And Economics (3 hrs)

Principles of financial evaluation

- Basic financial components
- Analysis techniques
 - Simple payback period and life cycle cost method
 - Time value of money, interest formulas and tables
 - Present worth project life
 - Net present value and annual cost method
 - Present worth method and economic performance measures
 - After tax cash flow analysis and depreciation methods
 - Internal rate of return and impact of fuel escalation rates

Energy accounting / reporting

Point of use costs and efficiency measures

4) Electrical Distribution Systems (3 hrs)

Definitions and measurements of electrical parameters

Demand and energy load factors

Real power and reactive power

Three phase systems

Power factor correction and peak demand reduction

Rate structure and analysis of motors & motor drives

Power quality and harmonics

Energy auditing of electrical systems

Standby generation

5) Lighting (3 hrs)

Light source, choice of lighting, luminance requirements, and energy conservation avenues

Light sources, efficiency and Efficacy

Lamp life strike and restrike

Lumens and footcandles

Zonal cavity design method and inverse square law

Coefficient of utilization and room cavity ratios

Lamp lumen depreciation and light loss factors

Dimming and lighting controls

Color temperature and color rendering index

Visual comfort factor and reflectors

Ballasts and ballast factor

Lighting retrofits and IES lighting standards

6) Building Envelope, HVAC System and Control (6 hrs)

Thermal resistance and heat transfer coefficients

Insulation and vapor barriers

Solar heat gain and solar shading

Thermally light facilities and thermally heavy facilities

Conduction heat loads and psychrometric chart

Air heat transfer and water heat transfer

Heating, ventilating, and air conditioning (HVAC)

Affinity laws and performance rating (COP, EER, kW/ton)

HVAC Economizers

HVAC equipment types and air distribution systems (Reheat, multizone, VAV)

Degree days and heat transfer energy consumption estimates

Vapor compression cycle and absorption cycle

Cooling towers and air & water based heat flow

Basic controls and PID controls

Distributed control and central control

Optimization controls and reset controls

Building control strategies and communication protocols

Expert systems and artificial intelligence

Self-tuning control loops and energy information systems

7) Steam Generation and Distribution (4hrs)

Steam Generation

- Fuels and their properties
- Principle of Combustion
- Combustion Control
- Boilers and their operations & maintenance
- Steam Distribution Systems
- Parameters effecting system operation

- Steam circuits
- Insulation
- Steam leaks and steam traps
- Condensate systems

Energy Conservation in Steam Systems

8) *Electric Motors, Pumps, Blowers and Compressors (4hrs)*

AC induction motors and AC synchronous motors

DC motors and high efficiency motors

Load factor, slip, power factor and efficiency

Motor speed control and variable frequency drives

Motor selection criteria

Motor management software

Classifications of fluid machinery

Performance characteristics of pumps, fans and blowers

Fan & pump laws and variable flow systems

Fluid flow system performance

Energy conservation options in pumps, fans and blowers

Air compressors

Compressed air distribution system components

Air compressor controls and air leaks

Energy conservation options in compressed air systems

9) *Dryers, Furnaces and Kilns (2 hrs)*

Kilns and Furnaces: Classification, general fuel economy measures in furnaces, excess air, heat distribution, temperature control, draft control, waste heat recovery

Industrial Dryers: Classifications, mechanisms of drying, performance characteristics, energy saving measures

Insulation and Refractories: Insulation-types and applications, economic thickness of insulation, heat savings and application criteria, refractory-types, selection and application of refractories, heat loss

10) *Waste Heat Recovery and Cogeneration (4hrs)*

Waste heat recovery boilers and thermal systems

Industrial energy management

Fuel choices

Steam systems and steam tables

Heat exchangers, turbines and pumps

Topping cycles and bottoming cycles

Fuel selection

Prime movers and operating strategies

Thermal Storage

- Design strategies and operating strategies
- Storage media advantages and limitations
- Chilled water storage and ice storage
- Sizing volume requirements
- Full storage systems and partial storage systems

11) Measuring Equipment and Techniques (3 hrs)

Role of audits and audit equipment

Energy management measures

Combustion analysis and combustion analyzers

Power and Electricity measurement

Temperature and humidity measurement

Pressure and air velocity measurement

Light level measurement

12) Energy Codes and Standards (3 hrs)

Green Buildings USGBC

Sustainable design and LEED certification

ASHRAE 90.1 Energy cost budget method LEED EB

Certified, Silver, Gold, and Platinum LEED NC

LEED CI LEED CS

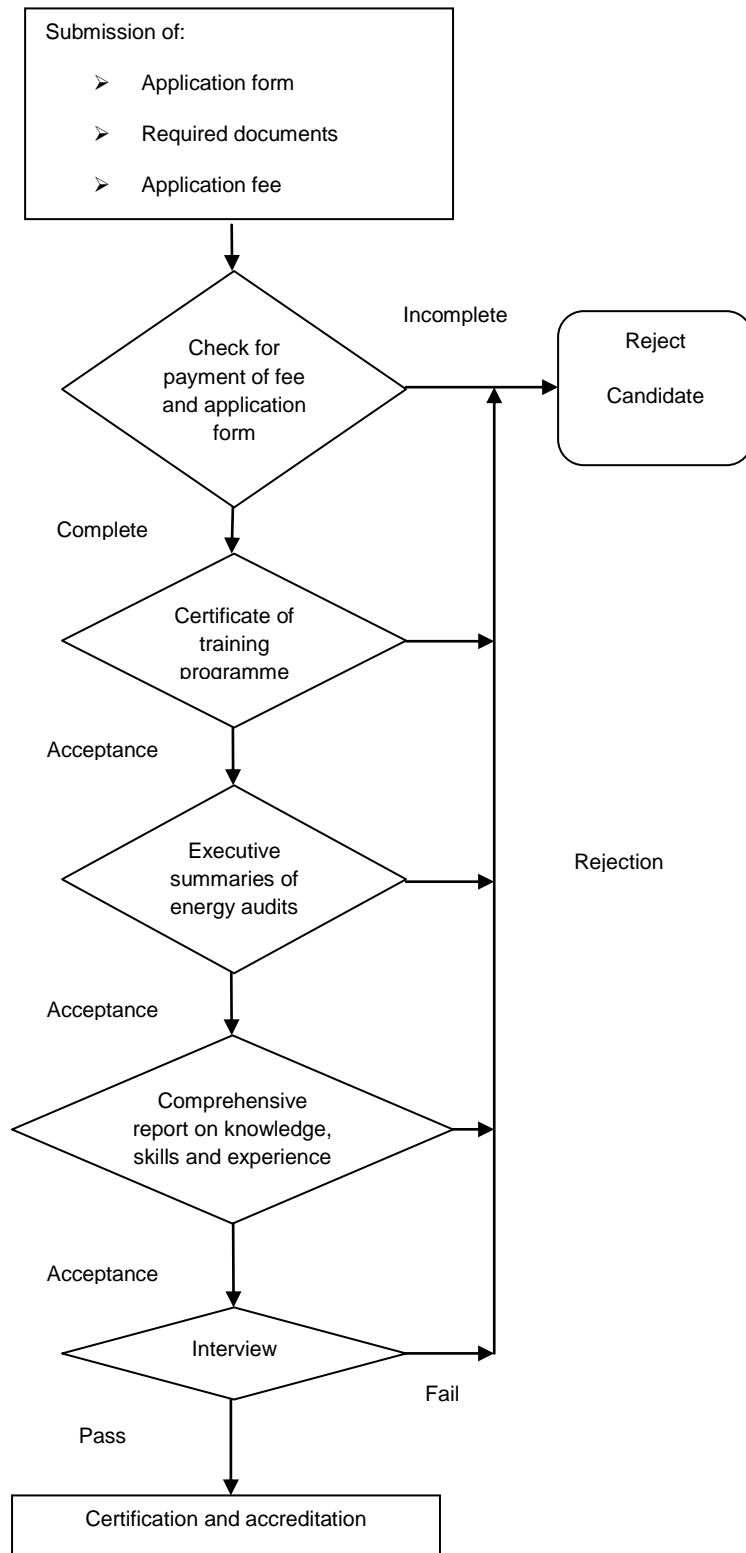
ENERGY STAR Rating

ISO 50001

National Standards

Annex 5

ASSESMENT PROCEDURE FOR ACCREDITATION



Annex 6

CONTINUED ASSESMENT PROCEDURE

