



Draft

Energy Audit Regulations for the Government of Bangladesh 2016

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THE ENERGY AUDIT REGULATIONS-2016

**Sustainable and Renewable Energy Development Authority
Power Division
Ministry of Power, Energy & Mineral Resources
2016**

In exercise of the powers conferred by Section 27 read with sub-section (6) of Section 6 of the Sustainable and Renewable Energy Development Authority Act, 2012, with the previous approval of the Government, Sustainable and Renewable Energy Development Authority (SREDA) hereby makes the following regulations, namely:

CHAPTER I

PREAMBLE

1. **Short title and Commencement-** (i) These regulations may be called the **Energy Audit Regulations 2016**.

(ii) It shall come into force on the date of their publication in the Official Gazette.
2. **Definitions-** (1) In these regulations, unless the context otherwise required,
 - (a) “act” means the Sustainable and Renewable Energy Development Authority Act, 2012 (Act No. 48 of 2012);
 - (b) “accredited energy audit firm” means a firm or a body, which is enlisted with SREDA and where a number of accredited energy auditors are engaged for energy auditing within the meaning of these regulations;
 - (c) “centre” means the Energy Auditing Examination Centre (EAEC) appointed by the Authority for the purpose of holding Examination for Energy Auditing Certification (EAC) for the certification of Energy Managers and Energy Auditors;
 - (d) “authority” means Sustainable and Renewable Energy Development Authority (SREDA) constituted under the Act;
 - (e) “certificate” means the certificate issued, on being declared successful in the Examination for Energy Auditing Certification (EAC), by the Authority;
 - (f) “certified Energy Auditor” means a person who has been issued a certificate under regulation 10;
 - (g) “committee” means Examination and Accreditation (E&A) Committee, constituted under regulation 15;
 - (h) “designated consumer” shall have the same meaning as defined by the Act;

- (i) "energy audit report" means the report of energy audit submitted under regulation 31 and signed by the energy auditor;
- (j) "Energy Manager" means the Certified Energy Auditor appointed by the Designated Consumer for performing the specified energy management functions in their facility;
- (k) "examination" means the Examination for Energy Auditing Certification (EAC), conducted by the Authority or the centre appointed by the Authority, for certification of energy manager and energy auditor;
- (l) "form" means Form appended to these regulations, which are subjected to changes from time to time with the approval of the Authority.
- (m) "graduate Engineer" means a person who has obtained a graduation degree in Engineering from an University recognized by the Government or other Universities affiliated by the University Grants Commission or any degree recognized by the Government as equivalent or has obtained a graduation degree in Engineering or equivalent from a foreign University or College or Institution recognized by the Government, and under such conditions as may be laid down for the purpose, from time to time,
- (n) "post-graduate in Engineering" means a person who has obtained a post-graduate degree in Engineering from an University recognized by the Government or other Universities affiliated by the University Grants Commission or any degree recognized by the Government as equivalent or has obtained a post-graduate degree in Engineering or equivalent from a foreign University or College or Institutions recognized by the Government, and under such conditions as may be laid down for the purpose, from time to time;
- (o) "post-graduate" means a post-graduate of an University recognized by the Government or other Universities affiliated by the University Grants Commission or any degree recognized by the Government as equivalent or has obtained a post-graduate degree or equivalent from a foreign University or College or Institution recognized by the Government, and under such condition as may be laid down for the purpose, from time to time;
- (p) "prescribed" means prescribed by the Authority;
- (q) "register" means a Register of Certified Energy Managers and Energy Auditors maintained by the Authority under sub-regulation (1) of regulation 11;
- (r) "rules" means the Energy Conservation Rules-2016 under the Act;

(s) “specific energy consumption” means the average of energy consumed per unit of product or product-mix for the completed financial year.

(t) “schedule” means the Schedule appended to these regulations;

(2) Words and expressions used in these regulation and not defined, but defined in the Act, shall have the meaning respectively assigned to them in the Act.

CHAPTER II

CERTIFICATION OF ENERGY MANAGER & ENERGY AUDITOR

3. **Certified Energy Auditor-** (1) A person shall be designated as a Certified Energy Auditor, if he/she-

(i) has passed the Examination of Energy Auditing Certification (EAC) Energy Auditor, conducted by the Authority or the designated centre appointed by the Authority; and

(ii) has been issued a certificate by the Authority to that effect.

4. **Role of Energy Auditor: -**

(1) Each Certified Energy Auditor shall be eligible to conduct the energy audit activities in small and medium level energy consumed industry or the designated consumers, during their voluntary phase in such manner as may be prescribed by regulations from 31 to 34. Besides these audit activities, a Certified Energy Auditor shall also be eligible to be appointed as Energy Manager in the establishment of designated consumers.

(2) It shall be the Accredited Energy Auditor accredited under regulation 16, not the Certified Energy Auditor, who shall be allowed to conduct the mandatory provision of energy audit in designated consumers under these regulations. Provided that, subject to the provision of the regulation 26, the Certified Energy Auditor can also conduct energy audit for designated consumers.

5. Eligibility for appearing in the Examination for Energy Auditing (EEA) -

Energy Auditor: (1) A candidate shall be eligible for appearing in the Examination of Energy Auditing Certification (EAC)” as Energy Auditor, who is-

- (a) a graduate Engineer (Bachelor of Engineering in mechanical, electrical and/or electronics) with two years of work experience in power and energy application; or
- (b) a post-graduate Engineer (Master of Engineering in mechanical, electrical and/or electronics) with two years of work experience in power and energy application; or
- (c) a graduate Engineer in mechanical, electrical and/or electronics with post-graduate degree in Management with two years of work experience in power and energy application;
or

(2) The Authority may, time to time, review the eligibility criteria for the candidates of Energy Auditor and may bring changes, if necessary, considering the context of the situation.

6. Conducting of Examination. –

(1) For the purpose of certification of Energy Auditor, the Authority shall, either by itself or through a designated Energy Auditing Examination Centre (EAEC), conduct and administer the examination.

(2) If the Authority thinks fit to conduct and administer the examination through designated Centre, the Authority shall fix the selection criteria to select suitable centre and earmark the responsibility thereof. In fixing the selection criteria the following issues should be looked into-

- (i) institutional capacity in conducting such examination;
- (ii) logistic and infrastructure facility in conducting the examination;
- (iii) expert manpower to prepare question and marking the answer script;
- (iv) capacity and track record for providing standard quality of training for the candidates appearing in the examination;
- (v) any other criteria set by the Authority from time to time.

(3) Upon approval of conducting examination, the Centre, shall enter into a contract with the Authority with validity of five years and renewable after every five years on an application made to the Authority. The Centre shall collect fee from each participant willing to sit for certification and

transfer the revenue collected from such activity to the Authority after deducting the necessary expenditure as well as fee of the Centre, as prescribed by the Authority.

- (4) The Authority may cancel the approval of Centre for conducting examination, on account of-
- (a) any commission or omission amounting to professional misconduct of the institution; or
 - (b) any act amounting to fraud; or
 - (c) failure to conduct the examination in appropriate manner: or
 - (d) impose excess fee or money upon the examinee, which is not permissible by the Authority; or
 - (e) fails to pay/transfer the revenue collected by conducting certification exams to the Authority on a date stipulated for payment; or
 - (f) any other reason for the greater interest of the public,
- (5) The Authority or the Centre shall, by publication in the newspaper and in the website, notify the date, time and place where such examination shall be conducted.
- (6) The medium of examination shall be in English.

7. Application for admission in the Examination. –

- (1) A person who is eligible to appear in the Examination of Energy Auditing Certification (EAC), shall seek admission for such examination by making an application to the Authority or the Centre in prescribed form (Form I).
- (2) Each application shall be accompanied with the following fees in favour of Chairman, SREDA , namely:-
- (a) Prescribed application fee -
 - (b) Certification fee (including Examination fee) as determined by the Authority -
- (3) A prospectus containing scheme and modalities of the Examination of Energy Auditing Certification (EAC) including eligibility, syllabus (specified in the Schedule-I) and reference materials for such examination, shall made available by the Authority or the Centre at least three months before the actual date of examination.
- (4) For the Certification of Energy Auditors, the candidate has to appear in four papers written examination i.e. Paper-1,2,3 & 4.

(5) The Authority shall review the contents of the syllabus from time to time and could make necessary changes in the syllabus and prospectus to that effect accordingly.

8. Admission for Examination. -

(1) The Authority, or the designated centre, as the case may be, shall, after scrutiny of application form and being satisfied that the applicant is eligible to appear for the Examination of Energy Auditing Certification (EAC), admit him for the examination by issuing him an admission card stating the place, date and time of the examination at least fifteen days before the date of the examination.

(2) Where on scrutiny of the application under sub-regulation (1), an applicant is found ineligible to appear in the examination, his application shall be rejected for reasons to be recorded in writing.

9. Passing of Examination. –

(1) A candidate shall be declared to have passed the Examination of Energy Auditing Certification (EAC) if he secures a minimum of 70 % (seventy percent) marks in each paper for the examination.

(2) If a candidate is unsuccessful in any paper, he shall be allowed to take a maximum of three attempts per paper within six consecutive examinations on payment of supplementary fee, as determined by the Authority, per paper in favour of Chairman, SREDA.

10. Certification. –

For the purpose of certification of Energy Auditor, the Authority shall issue a certificate to the person who has passed the Examination of Energy Auditing Certification (EAC) in prescribed form (Form II) and shall be designated as Certified Energy Auditor.

11. Maintaining Register. -

The Authority shall maintain a Register of Certified Energy Auditor in Form III and include the name of persons to whom certificates have been issued under regulation 10 in the said register.

12. Validity of Certification. –

The certification made under regulation 10 shall be valid for a period of 5 (five) years and renewable after every 5 (five) years on an application made to the Authority in Form IV.

Provided that, no such renewal shall be made unless the Certified Energy Auditor has attended a refresher training course conducted by the Authority or the Centre or training institutions affiliated by the Authority, as the case may be, and has produced a certificate of participation issued in that behalf.

13. Cancellation of Certification. –

- (1) The Authority may cancel the certification of an Energy Auditor on any of the ground for-
- (a) any commission or omission amounting to professional misconduct;
 - (b) any misrepresentation of facts, data or reports on energy consumption;
 - (c) any act amounting to fraud;
 - (d) failure to attend the refresher course:

Provided that no such cancellation shall be done by the Authority, without giving an opportunity of being heard to such Energy Auditor.

(2) The Authority, upon receiving the complaint under sub-regulation (1), shall send the complaint to the Examination and Accreditation (E&A) Committees, formed under regulation 15, for its disposal.

(3) On cancellation of certification of Certified Energy Auditor under sub-regulation (1), his/her name shall be removed from the Register, as referred to in regulation 11 and thereafter shall not be eligible to be appointed as Energy Manager by the designated consumer. Similarly, the Certified Energy Auditor shall not be eligible to perform any energy audit for any energy consumer.

(4) On cancellation of certification of Certified Energy Auditor, the name of the Energy Auditor shall be notified to the Designated Consumers and also cause to publish in the official website of SREDA.

14.- Issue of duplicate certificate. -

(1) In case when a certificate issued under regulation 10 has been lost by the Certified Energy Auditor, the Authority may, on an application made by him, duly supported by a copy of General Diary lodged with the concerned police station, issue a duplicate certificate or identity card, as the case may be, on payment of a fee, as determined by the Authority, in favour of the Chairman, SREDA, .

(2) In case when a certificate issued by the Authority is damaged, the Authority may on an application and on surrender of damaged certificate issue a duplicate certificate on payment of a fee, as determined by the Authority, in favour of Chairman SREDA.

15. Constitution of Examination and Accreditation (E&A) Committees. -

(1) There shall be an Examination and Accreditation (E&A) Committees for Certification, Registration and overall management of the EEA and the overall management of accreditation of energy auditor.

(2) The Authority shall constitute the committee, where Chairman, SREDA or his representative shall be the Chairperson with not more than six other persons to be nominated by the Authority.

(3) The Authority may constitute some other committees as and when required for smooth conducting of whole certification and accreditation process time to time.

CHAPTER III

ACCREDITATION OF ENERGY AUDITOR

16. Accredited Energy Auditor:

There shall be Accredited Energy Auditor to conduct energy audit in the establishment of designated energy consumer, in a manner as specified by this regulation. The qualification and the process of accreditation shall be regulated under the subsequent regulations of this Chapter.

17. Qualification for Accreditation of Energy Auditor:

A person shall be qualified for accreditation of energy auditor, if he/she is -

- (i) a certified energy auditor; and
- (ii) has experience of conducting five energy audits in the last three years;

18. Procedure for accreditation:

(1) For the purpose of accreditation of Energy Auditors, the Authority shall call for application from qualified person, specified in regulation 17.

(2) The application shall be made in prescribed form (Form V) accompanied by –

- (i) Copy of the certificate of Certified Energy Auditor;
- (ii) five detailed energy audit reports undertaken by the energy auditor in an individual capacity or as a leader or associate or active team member of the energy audit team;
- (iii) feedback on energy audit received from the industries where the audits were made;
- (iii) prescribed fee payable in favour of Chairman, SREDA.

19. Accreditation Committee:

(1) The Examination and Accreditation (E&A) Committees, formed under regulation 15, shall work as to grant the certificate of accreditation.

(2) The designated Centre with the overall supervision of the E&A Committee shall arrange written and oral interview to the candidates who have applied for accreditation to assess the audit experience and competence of energy auditing for designated consumers.

(3) For accreditation purpose the candidate has to appear in 5th paper. The prospectus containing the modalities of the Examination, syllabus (specified in Schedule II) and reference materials for such examination shall be made available by the Authority or the Centre at least three months before the actual date of examination.

(4) A candidate shall be declared to have passed the examination of accreditation if he/she secures a minimum of 70% (seventy percent) marks in written examination and oral interview.

(5) On the basis of assessment made under sub-regulation (4), the E&A Committee shall make recommendation to the Authority.

20. Certificate of Accreditation:

(1) The Authority may accept the recommendation of the E&A Committee and shall prepare a list of Accredited Energy Auditors as maintained under regulation 21 and a Certificate of Accreditation in prescribed form (Form VI) and shall be issued to the Accredited Energy Auditor on payment of annual accreditation fee, as fixed by the Authority.

(2) The Authority may accredit to open an Accredited Energy Audit Firm using an office in the trade name or firm name and shall issue a Certificate of Accreditation (Form VI A) to open Energy

Audit Firm, on an application made by Accredited Energy Auditor (Form VI B) along with fees, as fixed by the Authority.

(3) The application shall be accompanied by-

- (i) Name of Accredited Energy Auditors with their copy of accreditation certificates;
- (ii) Information in respect of trade name or firm name;
- (iii) Up to date trade license issued from competent authority;
- (iv) Supporting documents related to formation of company (if it is a company);
- (v) Documents in support of address of the firm/office (deed of agreement for house rent or ownership);
- (vi) Bank solvency certificate;
- (vii) Such other information or requirements as it considers necessary from time to time by the Authority,

(4) Similar to Accredited Energy Auditor, the listed accredited energy audit firm needs to pay annual accreditation fee, as prescribed by the Authority.

(5) A listed Accredited Energy Audit Firm can intake students as apprentice with an academic qualification as mentioned in Regulation 5. This experience of working in this firm shall be considered as the working experience within the meaning of Regulation 5.

(6) The number of intake of students as apprentice in any firm is limited to maximum 5 per accredited energy auditor. The firm shall have to register the students in prescribed manner as determined by the Authority within 2 months of intake. The experience of the students shall be counted from the date of registration in the Authority.

(7) The certificate of accreditation shall be valid until it is cancelled under Regulation 23.

21. Maintenance of list:

(1) The Authority shall maintain a register containing the list of Accredited Energy Auditors in Form VII.

(2) The Authority shall maintain a separate register for the listed Accredited Energy Auditor's Firm in Form VIII.

(3) The Authority shall cause to publish the list of Accredited Energy Auditors and list of offices or firms of Accredited Energy Auditors on SREDA's official website and also cause to be published in at least two national dailies.

(4) Accredited Energy Auditor shall inform in writing to the Authority for any changes in the personal or business information for the purpose of updating the list.

(5) A copy of the updated list of Accredited Energy Auditors shall be sent by the Authority to the concerned agencies of the Government and designated consumers from time to time.

22. Removal or restoration of names:

(1) The Authority may remove the name of the Accredited Energy Auditor or the Accredited Energy Audit Firm from the register of list of energy auditors if —

- (a) such certificate of accreditation has been granted on the basis of incorrect, misleading or false information; or
- (b) fails to comply with the procedure of energy auditing as laid down in this regulation; or
- (c) is guilty of professional misconduct or fraud; or
- (d) has failed to pay annual accreditation fee.

(2) Where the name of the Accredited Energy Auditor or the Energy Audit Firm, as the case may be, is removed on the grounds specified in sub-regulation (1), the Authority or the Committee formed under Regulation 15, as the case may be, may review the grounds of removal on an application made by the auditor or by the audit firm on payment of fee and may restore the name of Accredited Energy Auditor or the Firm. In case of grounds specified in clause (a) and (c) of sub regulation (1), the Authority or the Committee, as the case may be, should cautiously pass the order of restoration.

23. Cancellation of certificate of accreditation

(1) On removal of the name from the register under Regulation 22, the Authority may cancel the certificate of accreditation granted under Regulation 20.

(2) Before issuing an order of cancellation of accreditation, the Authority shall give an opportunity of hearing to the Energy Auditor holding such certificate.

(3) In case where the certificate of accreditation is cancelled, the Authority shall communicate its order to the holder of such certificate and the concerned designated consumer and shall also publish the same on its official website.

(4) The certificate of accreditation shall stand cancelled with effect from the date of publication of the order of cancellation.

(5) On cancellation of certificate of accreditation, the holder of such certificate shall surrender the same to the Authority within fifteen working days.

24. Issue of duplicate certificate

- (1) In case when an accredited energy auditor has lost the certificate of accreditation, the Authority may, on an application made in this behalf, duly accompanied by a copy of General Diary lodged with the concerned police station, issue a duplicate certificate on payment of a fee as determined by the Authority, in favour of SREDA.
- (2) In case when a certificate issued by the Authority is damaged, the Authority may on an application and on surrender of damaged certificate issue a duplicate certificate on payment of a fee, as determined by the Authority, in favour of Chairman SREDA.

25. Provision of Requesting Information to the Accredited Energy Auditor

- (1) The Authority may request Accredited Energy Auditors to furnish information—
- (a) relating to sector-wise details of energy audits conducted, and the energy saving potential identified and achieved; and
 - (b) additional information as considered necessary.
- (2) The Authority may make available the information received under sub-regulation (1) to the general public through its website or through any of its publication.

26. Special Provision:

- (1) Under special circumstances, the Authority may, for the time being, relax the enforcement of the regulation 16 and may allow the Certified Energy Auditor In lieu of Accredited Energy Auditor, to conduct energy audit in the establishment of designated consumers.
- (2) To conduct energy audit by the Certified Energy Auditors in the establishment of designated consumers under sub- regulation (1), the Authority shall issue special circular stating its reason to that effect.

CHAPTER IV

RESPONSIBILITY AND SUBMISSION OF REPORT BY DESIGNATED CONSUMERS

27. Responsibility of Designated Consumer: -

A designated consumer is obligated to-

- (i) appoint Energy Manager to their establishment from amongst the Certified Energy Auditor to carry out the energy management function in compliance with the provision sub-section (8) under Section 2 of the Act;
- (ii) comply with energy consumption norms and standards as set by the Authority;
- (iii) get energy audit conducted by an Accredited Energy Auditor or through Accredited Energy Audit Firm, as per provision contained in Sub-rule (3) of Rule 10, in such manner and intervals of time as may be specified by regulation;
- (iv) provide necessary documents to the accredited energy auditor during energy audit;
- (v) furnish report to the Authority in such form, manner and with such period, as prescribed by the regulations;
- (vi) submit correct and complete report of the Accredited Energy Auditor during the performance of audit;
- (vii) permit the auditor or the officers of the Authority to enter into their premises and cooperate the energy auditing process as referred by section 23 of the Act.

28. Submission of report:

- (1) Every designated consumer, shall submit a Baseline Report to the Authority on the status of energy consumption and energy conservation in Form IX within three months of the notification issued by the Authority.
- (2) The Authority may, time to time change the requirement of information in the form to be submitted by the designated consumers.

29. Authentication of data

Every designated consumer shall ensure that all the data furnished under Regulation 28 are duly authenticated by the Energy Manager appointed by the designated consumer, the Chief Executive or his authorized representative for the purpose before it is sent to the Authority under Regulation 28.

30. Conducting Energy Audit by the Designated Consumer (DC): -

- (1) The designated consumer shall engage Accredited Energy Auditor to perform annual energy audit in their establishment as per provision contained in clause (iii) of Regulation 27.

- (2) Every designated consumer shall have its first energy audit conducted, by an Accredited Energy Auditor within 2 (two) years of the notification issued by the Authority.
- (3) The interval of time for conducting of subsequent energy audits shall be 3 (three) years from the date of previous energy audit.

31. Compliance on Energy Audit report

- (1) Every designated consumer, within 3 (three) months of the submission of energy audit report by the Accredited Energy Auditor, shall furnish compliance report in the Form X to the Authority. -
- (2) Every designated consumer shall furnish to the Authority every year, on the progress made in consequence of the action taken as per report submitted by auditor in Form XI, within three months of the close of that year.

CHAPTER V

MANNER OF ENERGY AUDITING

32. Submission of energy report by the Accredited Energy Auditor:

Every Accredited Energy Auditor, after being engaged by the designated consumer under sub-regulation (1) of 30, shall perform energy audit in the establishment of designated consumer and submit a report in Form XII to the management of the designated consumer with a copy to the Authority.

33. Manner of energy audit:

Every energy audit under the regulation shall be conducted in the following manner: -

- (1) **Verification of data of energy use.** The accredited energy auditor shall-
- (a) verify the information submitted to the Authority under regulations 28 and 31, for the previous two years through examination of energy bills, production data, inspection of energy-using equipment, production-processes, and systems, spot measurements, discussion or interview with the officers and staff regarding operation of plants, energy management procedures, equipment maintenance problems, equipment reliability, projected equipment needs, improvements undertaken or

planned, establish validated data on annual energy consumption for the year for which energy audit report shall be prepared and submitted;

- (b) calculate specific energy consumption for the year;
- (c) disaggregate the energy consumption data and identify major energy using equipment, processes and systems.

(2) **Scope of energy audit** - The Accredited Energy Auditor jointly with the Energy Manager of the designated consumer shall -

- (a) develop a scope of work to conduct energy audit, as required under the regulations with a view to ensure adequate coverage in terms of the share of total energy use that is covered in the energy audit;
- (b) select energy intensive equipment or processes for energy auditing;
- (c) agree on best practice procedures on measuring the energy efficiency performance of selected equipment and on algorithm to estimate energy performance and energy savings;
- (d) collect energy consumption and production data for the equipment and processes covered within the scope of energy audit operating data, and schedule of operation, non-proprietary process flow charts, production level disaggregated by product, if applicable and such other historical data as may be considered essential by the accredited energy auditor for achieving the purpose of energy audit.

(3) **Monitoring and analysis.** –

The Accredited Energy Auditor shall-

- (a) verify the accuracy of the data collected in consultation with the Energy Manager;
- (b) analyse and process the data with respect to -
 - (i) consistency of collected data;
 - (ii) recommendations to reduce energy consumption and improve energy efficiency;
 - (iii) summary overview of energy consumption in facility or establishment by fuel type and by section;

- (c) conduct equipment energy performance measurements with due diligence and caution.

(4) Preparation of Recommendations. –

The Accredited Energy Auditor having regard to the overall efficiency of the production process, techno-economic viability of energy saving measures, site conditions and capacity of the designated consumer to invest for their implementation, shall prepare a list of recommendations to save energy and the list shall include-

- (a) a brief description of each recommended measure;
- (b) estimated energy saving as well as energy cost reduction potential over a reasonable technical or economic life of the measure;
- (c) any known or expected technical risk associated with each measure;
- (d) a preliminary assessment of financial attractiveness of each measure or assessment of maximum investment feasible based on the estimated energy cost saving potential over the life of the measure;
- (e) tabulated summary of recommendations listed as per their implementation schedule (short medium and long term);
- (f) where different alternatives for implementation of an energy efficiency measure are available, the Accredited Energy Auditor shall examine and discuss such options and recommend the techno-financially viable option;
- (g) where the installation or implementation of any recommended energy saving measure affects procedures for operation and maintenance, staff deployment and the budget, the recommendation shall include discussion of such impacts including their solutions.

34. Prioritisation and preparation of Action Plan

(1) The Accredited Energy Auditor jointly with the Energy Manager shall select from the energy audit report such recommended measures as are included in sub-regulation (4) of regulation 33 which in the opinion of the designated consumer are technically viable, financially attractive and within its financial means, prioritise them and prepare plan of action for their implementation and this action plan shall include—

- (a) preparation of detailed techno-economic analysis of selected measures;

(b) a monitoring and verification protocol to quantify the impact of each measure with respect to energy conservation and cost reduction for by the designated consumer of selected measures;

(c) a time schedule of energy investment plan agreed upon such as availability of finance and availability of proposed equipment.

(2) The Accredited Energy Auditor based on the activities undertaken under sub- regulation (4) of regulation 33, under sub- regulation (1) of regulation 34, shall evaluate the implementation of each recommended energy saving measure in the previous audit report and shall submit a report in Form XII to the management of the designated consumer and to the Authority.

35. Structure of the audit report. -

(1) The energy audit report structure shall be jointly decided by the Accredited Energy Auditor and designated consumer.

(2) The energy audit report shall highlight, details of specific energy consumption, list of recommendations to reduce energy consumption and associated costs with benefits, monitoring and evaluation of impact of selected measures and conclude with certification by accredited energy auditor stating that-

(a) the data collection has been carried out diligently and truthfully;

(b) all data monitoring devices are in good working condition and have been calibrated or certified by approved or authorised agencies and no tempering of such devices have occurred;

(c) all reasonable professional skill, care and diligence have been taken in preparing the energy audit report and the contents thereof are a true representation of the facts;

(d) adequate training provided to personnel involved in daily operations after implementation of recommendations; and

(e) the energy audit has been carried out in accordance with these regulations.

(3) The Accredited Energy Auditor shall highlight the strengths and weaknesses of the designated consumer in the management of energy and energy resources in the energy audit report and

recommend necessary action to improve upon method of reporting data, energy management system in detail along with their underlying rationale, and improving energy efficiency and reducing energy consumption in the designated consumer.

(4) The Accredited Energy Auditor shall sign the energy audit report under the seal of its firm giving all the accreditation details along with details of manpower employed in conducting the energy audit.

(5) The energy audit report shall include a work schedule sheet duly signed by Accredited Energy Auditor and Energy Manager of the designated consumer.

CHAPTER VI

MONITORING, EVALUATION & REPORTING TO THE GOVERNMENT

36. Annual Report on Energy Efficiency & Conservation:

(1) As referred by Rule 13, the Authority is obligated to prepare a National Annual Report on Energy Efficiency and Conservation and submit thereon to the Government.

(2) The Authority shall compile all the reports submitted by the designated consumers under Regulation 28 of sub-regulation (1) and analyse the reports of energy audits submitted by the Accredited Energy Auditors under Regulation 32 and shall prepare an analytical report based on those documents.

(3) The report shall include:

- (a) Summaries of data on energy consumption and conservation activities in each sector, energy consumption trends, conservation plans and targets at national level, and its achievement thereon;
- (b) Status of major energy conservation programmes implemented by the Authority including accomplishments and evaluation of progress and results of these programmes;
- (c) Status on implementation of Government's programmes, including evaluation and recommendations for change in policies and programmes;

(4) The Authority shall monitor the implementation status of the energy saving options, as recommended by Accredited Energy Auditors in Energy Audit Reports, at the designated consumers.

(5) The Authority shall arrange workshop, seminars, coordination meeting with the energy consumers and initiate mechanism to incentivise energy saving in industries through energy auditing system and sensitize the designated consumers to take necessary steps in implementing the recommendation of audit report.

(6) In order to get energy data promptly and easily from the designated consumers, the Authority may develop web-based data acquisition system in SREDA.

ANNEXURES

FORM-I

[Refer Regulation 7(1)]

APPLICATION FOR

EXAMINATION OF ENERGY AUDITING CERTIFICATION (EAC)

Photograph

1. Name of the Examination: Energy Auditor
2. Name of the Applicant: (First Name) (Middle Name) (Last Name)
3. Father's Name : (First Name) (Middle Name) (Last Name)
4. Mother's Name: (First Name).....(Middle Name).....(Last Name)
5. Present Address : Village/House/Flat No. _____
Road/Block/Sector _____ Police
Station _____ Post Office
District _____ Post Code _____
Contact Number (land line) _____ (cell phone)
e-mail Address _____
6. Permanent Address: Village/House/FlatNo. _____ Road/Block/Sector_ _____
Station _____ Post Office
District _____ Post Code _____
Contact Number (land line) _____
7. Date of Birth/...../.....(dd/mm/yyyy)
8. Nationality :
9. National ID number:
10. Sex: Male () / Female ()
11. Employment Status: Employed () Self Employed () Unemployed ()
12. Present Job information (if any): Designation.....
Organization(Company)Name.....
Contact Telephone (Office).....
Fax....., Office Address:

13. Total Work Experience:Years Months
14. Written Examination
Centre preferred:
15. Academic Qualification:

Sl.No.	Name of Degree	Subjects/Branch	Year of Passing	Board/ University

16. Work Experience:

Sl. No.	Name of Employer/ Organization	. Designation	Year		Name of Work (Max. 50 characters Only)
			From	To	

17. DD. No.: Amount (Taka):Date: Bank
Name:

DECLARATION BY THE CANDIDATE

I hereby declare that all the information given in the application form and enclosures are true to the best of my knowledge. I agree to the condition that if any information or any statement is found to be incorrect, my admission to the examination would be cancelled or may liable to cancellation of my Certificate afterwards. I also abide by the examination rules and conditions as mentioned in the prospectus.

Date:

Signature with Name of the Candidate

* **Note:** supporting duplicate documents must be enclosed with the Form

Received on: Sl. No:Received by (Signature):

Examined the Filled in Form and the attached documents and found correct or liable for rejection for the following reasons:

.....

Examined by: (Name& Signature)

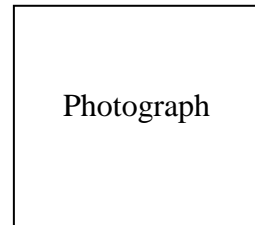
FORM-II
[Refer Regulation 10(1)]
Sustainable & Renewable Energy Development Authority (SREDA)
IEB Bhaban, Ramna, Dhaka

**CERTIFICATE FOR
CERTIFIED ENERGY AUDITOR**

Certificate Registration No.:

Examination Registration No.:

Session:



This is to certify that Mr./Mrs./Ms. Son/Daughter of
..... who has passed all the papers of the
Examination of Energy Auditing Certification (EAC) required for certification of energy auditor
held during the session of and is qualified **Certified Energy Auditor** subject to
the provisions of The Energy Audit Regulation 2016.

This certificate shall be valid for five years with effect from the date of award of this certificate and
shall be renewable subject to attending the prescribed refresher training course once in every five
years.

His/her name has been entered in the Register of Certified Energy Auditor, being maintained by
SREDA under the aforesaid regulations.

Mr./Mrs./Ms. is deemed to have qualified for
appointment as Energy Manager or have qualified for energy audit subject to the provision of
Regulation 4.

Given under the seal of the Sustainable & Renewable Energy Development Authority (SREDA),
this.....day of 20

Signature and Seal
Secretary
SREDA

FORM-III
[Refer Regulation 11]
Sustainable & Renewable Energy Development Authority (SREDA)
IEB Bhaban, Ramna, Dhaka

**REGISTER OF
CERTIFIED ENERGY AUDITORS**

As on (DD/MM/YYYY)

Photograph

A. Certification Information:

1. Name of

Certified Energy Auditor:

2. Father's name:

3. Mother's name:

4. Examination Registration No.: Session:

5. Certificate Registration No.:

6. Date of entry in the Register:

7. Date of issue of Certificate:

8. Date of re-validation of Certificate:

9. Revalidation record 1.

2.

3.

B. Postal Address:

10. Present Address:

Village/House/ Flat No. _____

Road/Block/Sector _____ Police Station _____

Post Office _____ District _____
 Post Code _____ Contact Number (land line) _____ (cell
 phone) _____ e-mail Address _____

11. Permanent Address:

Village/House/FlatNo. _____ Road/Block/Sector _____ Police
 Station _____ Post Office _____
 District _____ Post Code _____

C. Work experience:

Sl. No.	Name of Employer/ Organization	. Designation	Year		Name of Work (Max. 50 characters Only)
			From	To	

D. Personal Information:

12. Date of birth: DD/MM/YYYY

13. Nationality:

14. National ID No.:

15. Sex:

16. Academic qualification :

Sl.No.	Name of Degree/ Diploma	Subjects/Branch	Year of Passing	Board/ University

E. Remarks:

FORM-IV
[Refer Regulation 12]
APPLICATION FOR RENEWAL OF CERTIFICATION

Date:

From

Mr./Mrs./Ms.

Registration No.:

Postal Address:

To

The Chairman

Sustainable & Renewable Energy Development Authority (SREDA)

Address: 9th Floor, IEB Bhaban, Ramna, Dhaka

Subject: Renewal of Certification as Energy Auditor

Dear Sir/Madam,

This is to inform you that I have attended the refresher training course and enclose here with the certificate of participation issued in this behalf. I hereby apply for renewal of my certification as Energy Auditor.

I am enclosing the renewal fee of Taka ———by demand draft No. dated
..... in favour of The Chairman, SREDA, Dhaka .

The certificates are enclosed.

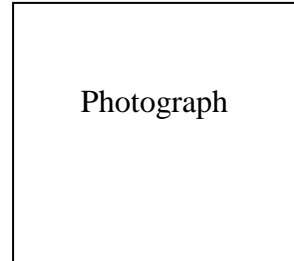
Yours faithfully,

(Signature)

(Name)

FORM V
[Refer Regulation 18]

To
The Chairman
Sustainable & Renewable Energy Development Authority (SREDA)
Address: 9th Floor, IEB Bhaban, Ramna, Dhaka



Subject: **Application for Certification of Accredited Energy Auditor.**

Dear Sir,

I am working as Certified Energy Auditor and hereby apply for Certificate of Accreditation.

2. I have requisite work experience, as specified in Regulation 17, and submit herewith the supporting documents in this connection.
3. The attested photocopies of the following documents are enclosed: —
 - (a) Certificate of Certified Energy Auditor;
 - (b) Five detailed energy audit reports of Energy Intensive Industries;
 - (c) Feedback on study reports referred to in (b) received from such energy industries.
4. I am enclosing the following application fee of Taka -----by demand draft No. dated in favour of The Chairman, SREDA, Dhaka.
5. I request you to issue the Certificate of Accreditation in favour of me.

I hereby state that information furnished above is true and correct to the best of my knowledge.

Dated this day of 20.....

Yours faithfully,

Signature
Name Designation
.....

FORM-VI A
[Refer Regulation 20(2)]
Sustainable & Renewable Energy Development Authority (SREDA)
IEB Bhaban, Ramna, Dhaka

**CERTIFICATE OF ACCREDITATION
FOR ENERGY AUDITOR FIRM**

Photograph

Certificate of Accreditation for Energy Audit Firm Registration No.:

This is hereby awarded Mr./Ms./Mrs. son/daughter of
Mr./Mrs..... for the Certification of Accredited Energy Audit
Firm in the trade/firm nameaddress.
....., after being fulfilled the necessary conditions to open a firm for energy
auditing under this trade name as per provision of the Energy Audit Regulations, 2016.

This certificate shall be valid until it is cancelled under Regulation 23.

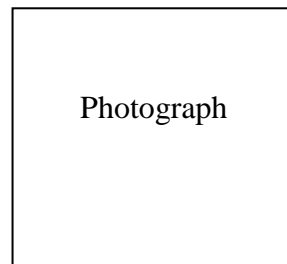
On cancellation, the certificate of accreditation shall be surrendered to the Authority within fifteen
days from the date of receipt of order of cancellation.

This name has been duly entered in to the register in the office of SREDA which shall be liable to
be removed on the grounds specified in Regulation 22.

Given under the seal of the Sustainable & Renewable Energy Development Authority (SREDA),
Power Division of Ministry of Power, Energy & Mineral Resources, this day
of, 20.....

Signature and Seal
Secretary
SREDA, Dhaka
Date:

FORM VI B
[Refer Regulation 20(2)]



To
The Chairman
Sustainable & Renewable Energy Development Authority (SREDA)
Address: 9th Floor, IEB Bhaban, Ramna, Dhaka

Subject: **Application for Certification of Accreditation to open Energy Audit Firm.**

Dear Sir,

I am an Accredited Energy Auditor with Certificate of Accreditation Registration No.:
..... Dated..... and working as energy auditor since -----

2. I want to open an Accredited Energy Audit Firm in the trade name

3. I am submitting the required documents and information as specified in sub-regulation (3) of Regulation 20 for your kind consideration.

The following documents are enclosed: —

- (a) Certificate of Certified Energy Auditor;
- (b) Certificate of Accreditation;
- (c) Basic information in respect of firm (Annexure 1);
- (d) Up to date trade license issued from competent authority;
- (e) Supporting documents related to formation of company (if it is a company);
- (f) Documents in support of address of the firm/office (deed of agreement for house rent or ownership);
- (g) Bank solvency certificate;
- (h) Other information or requirements as required by the Authority (if any),

4. I am enclosing the following application fee of Taka ———by demand draft No. dated
..... in favour of The Chairman, SREDA, Dhaka.

5. Under the above circumstances, I request you to issue the Certificate of Accreditation in the name of my Energy Audit Firm as mentioned above.

I hereby state that information furnished above is true and correct to the best of my knowledge.

Dated this day of 20.....

Yours faithfully,

Signature
Name Designation
.....

ANNEXURE 1

A. Certificate Information:

- 1. Trade name/firms name: _____
- 2. Name of Accredited Energy Auditor: _____
- 3. Father's name: _____
- 4. Date of certification as Energy Auditor: _____
- 5. Examination Registration Number of Energy Auditor _____

- 6. Certificate Registration Number of Energy Auditor _____

- 7. Certification of accreditation Registration number: _____
Date of issue of accreditation certificate: _____

- 8.. Type of firm/private/Government/ NGO etc. _____

B. Address of the Firm/Office:

- 9. Professional postal address with telephone number and e-mail address: _____

- 10. Year of establishment of the trade name/firms' name for undertaking the energy audit _____
- 11. Year of commencement of energy audit of the firm _____

12. No. of branch offices with address(if any) _____
13. Name of contact person along with designation, address, telephone, mobile and fax number along with STD codes and e-mail address _____

C Details of Associated Energy Experts

14. Number of resource persons available _____
15. I. Number of full-time energy auditors with full name _____
 II. Number of part-time energy auditors with full name _____
 III Number of apprentices students with full name _____
16. Sectors in which the accredited energy auditor/accredited energy audit firm has conducted energy audits since inception _____
17. Subject-wise expertise
 (a) Energy audit process system (list sectors) - if no energy audit has been carried out of the process system and parameters, please list nil. _____
 (b) Energy audit thermal utility system (list sectors) _____
 (c) Energy audit electrical utility system (list sectors) _____
18. Instruments available
 (a) Electrical (list the name of the instruments) (b) Thermal (list the name of the instruments) _____
19. (i) Details of training programme/ seminars/ workshops conducted during the last 3 years in the field of energy efficiency/energy audit
 (ii) _____
 (iii) _____

FORM-VI

[Refer Regulation 20(1)]

Sustainable & Renewable Energy Development Authority (SREDA)
IEB Bhaban, Ramna, Dhaka

**CERTIFICATE OF ACCREDITATION
FOR ENERGY AUDITOR**

Photograph

Certificate of Accreditation Registration No.:

This is hereby awarded Mr./Ms./Mrs. son/daughter of
.....of the
Certificate of Accreditation as Accredited Energy Auditor, after being fulfilled the necessary
conditions of becoming Accredited Energy Auditor under the provision of The Energy Audit
Regulations, 2016.

This certificate shall be valid until it is cancelled under Regulation 23.

On cancellation, the certificate of accreditation shall be surrendered to the Authority within fifteen
days from the date of receipt of order of cancellation.

This name has been duly entered in to the register in the office of SREDA which shall be liable to
be removed on the grounds specified in Regulation 22.

Given under the seal of the Sustainable & Renewable Energy Development Authority (SREDA),
Power Division of Ministry of Power, Energy & Mineral Resources, this day
of, 20.....

Signature and Seal
Secretary
SREDA, Dhaka
Date:

FORM-VII
[Refer Regulation 21(1)]
Sustainable & Renewable Energy Development Authority (SREDA)
IEB Bhaban, Ramna, Dhaka

REGISTER CONTAINING LIST OF ACCREDITED ENERGY AUDITORS

Certificate of Accreditation Registration No.:

As on (DD/MM/20YY)

Photograph

A. Information in respect of Accredited Energy Auditor

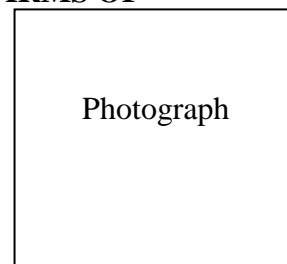
1. Name of Accredited Energy Auditor :
2. Father's name:
3. Mother's name :
4. Date of certification as Energy Auditor :
5. Examination Registration Number of Energy Auditor:
6. Certificate Registration Number of Energy Auditor:
7. Date of issue of accreditation certificate :

B. Address of the Firm/Office:

8. Professional postal address:
9. Permanent Address:
10. Remarks

FORM VIII
[Refer Regulation 21(2)]
Sustainable & Renewable Energy Development Authority (SREDA)
IEB Bhaban, Ramna, Dhaka

**REGISTER CONTAINING LIST OF OFFICES OR FIRMS OF
ACCREDITED ENERGY AUDITORS**



Serial Number: As on (DD/MM/20YY) A.

A. Certificate Information:

1. Trade name/firms name : _____
2. Name of Accredited Energy Auditor: _____
3. Father's name : _____
4. Date of certification as Energy Auditor : _____
5. Examination Registration Number of Energy Auditor _____

6. Certificate Registration Number of Energy Auditor _____

7. Certification of accreditation Registration number: _____
Date of issue of accreditation certificate: _____

- 8.. Type of firm/private/Government/ NGO etc. _____

B. Address of the Firm/Office:

9. Professional postal address with telephone number and e-mail address: _____

10. Year of establishment of the trade name/firms' name for undertaking the energy audit _____
11. Year of commencement of energy audit of the firm _____
12. _____
13. No. of branch offices with address(if any) _____
Name of contact person along with designation, address, telephone, mobile and fax number along with STD codes and e-mail address _____

C Details of Associated Energy Experts

14. Number of resource persons available _____
15. I. Number of full-time energy auditors with full name _____
II. Number of part-time energy auditors with full name _____
III Number of apprentices students with full name _____
16. Sectors in which the accredited energy auditor/accredited energy audit firm has conducted energy audits since inception _____
17. Subject-wise expertise
(a) Energy audit process system (list sectors) - if no energy audit has been carried out of the process system and parameters, please list nil. SREDA will be calling for detailed information in case agency has listed its energy audit expertise in the process systems _____
(b) Energy audit thermal utility system (list sectors) _____
(c) Energy audit electrical utility system (list sectors) _____
18. Instruments available
(a) Electrical (list the name of the instruments) (b) Thermal (list the name of the instruments) _____
19. (i) Details of training programme/ seminars/ workshops conducted during the last 3 years in the field of energy efficiency/energy audit
(ii) _____
(iii) _____

D. Remarks _____

FORM IX
(Refer Regulation 28)

**BASELINE REPORT BY DESIGNATED CONSUMER
(BASED ON ENERGY CONSUMPTION & PER UNIT OF PRODUCTION)**

for
[Client Name]

[Facility Location]

[Logo (optional)]

Prepared by

[Energy Advisor Personal Name, Professional Qualifications]
[Consulting Company]

[Logo (optional)]

Report Date: [dd mmm yy]

1.Executive Summary

The executive summary should be drawn from the detailed information provided in the full report. The executive summary should contain a brief description of the current scenario of the facility along with the following information:

- Name of the company, location of facility or building
- Existing consumption by fuel or resource type (e.g. electricity, gas, diesel, water, etc.) and GHG emission
- Summary of performance of major equipment in comparison with national or international benchmarks.
- Status and summary of positive or negative results from prior energy efficiency interventions.

Table 1. Summary of Production and Consumption.

Baseline Data		Production (MT, unit, etc.)	Electricity	Natural Gas	Diesel, HFO, etc.	Water
200x	Unit per / Year					
	Cost / Year					
...						

Table 2. Summary of Performance of Major Process

Process Name	Performance (MWh/unit of production)	Benchmark (MWh/unit of production)
1.		
2.		
3.		
...		

2.Introduction

a) Description of the facility/building

Table 3. Preliminary information about the Facility/Building.

Name of Designated Consumer	
Identification number (if issued by the authority as part of mandatory energy audit program)	
Address	
Internet Web Page	
Type of Industry	
Production quantity	Product name, production capacity and actual production quantity
Contact Person (Management)	
Number of Employees	
Working hours	Office and factory working hours
Name of Energy Manager	
Phone	
E-mail Address	
Name of reduction Manager	
Phone	
E-mail Address	

b) Description of production process

Description of production process with the main process steps. This section should also identify type of raw material used in the process, information related to manpower and other relevant information.

The energy manager should also describe any changes made within the past 5 years that has resulted in an increase or decrease in production.

3. Baseline Scenario

a) Energy supply systems

Brief description of the status of the installed energy supply systems in various zones. Particular attention should be paid to equipment's age and performance if it can be evaluated. Additionally, the following needs to be identified:

- **The quantity of each fuel:** The energy consumption data can be retrieved from the utility suppliers or metering on the site.
- **The unit cost for each fuel:** The utility suppliers will also be able to provide the unit costs. Furthermore, cost breakdown for each fuel type should also be known. For example, the day and night, or peak tariff cost rates for electricity is important for comparison with operation and energy use patterns.
- **Where and how each fuel type is used:** Identify and note where sub-metering is in place and then data can be available for specific areas, or equipment. Based on the information available describe the particular resource is being used and for what purpose.

The above information can be presented with other collected information as described above.

- **Electricity**

The company is directly supplied with electricity by the local/private electricity utility xyz via a xy kV line from the main transformer on the production site.

Electricity measurement devices: describe where meters are installed.

Between 20xx and 201x, the total electricity demand has increased by about x%. In the same period, the cost of electricity went up by around xx%.

The annual and seasonal consumption and expenses of electricity between 20xx and 201x are summarized in the table below. [The seasonal demand can be chosen for the latest year.]

Table 4. Annual Electricity demand and expense

Year	Consumption (MWh)	Expense (BDT)
200x		
...		
201X		

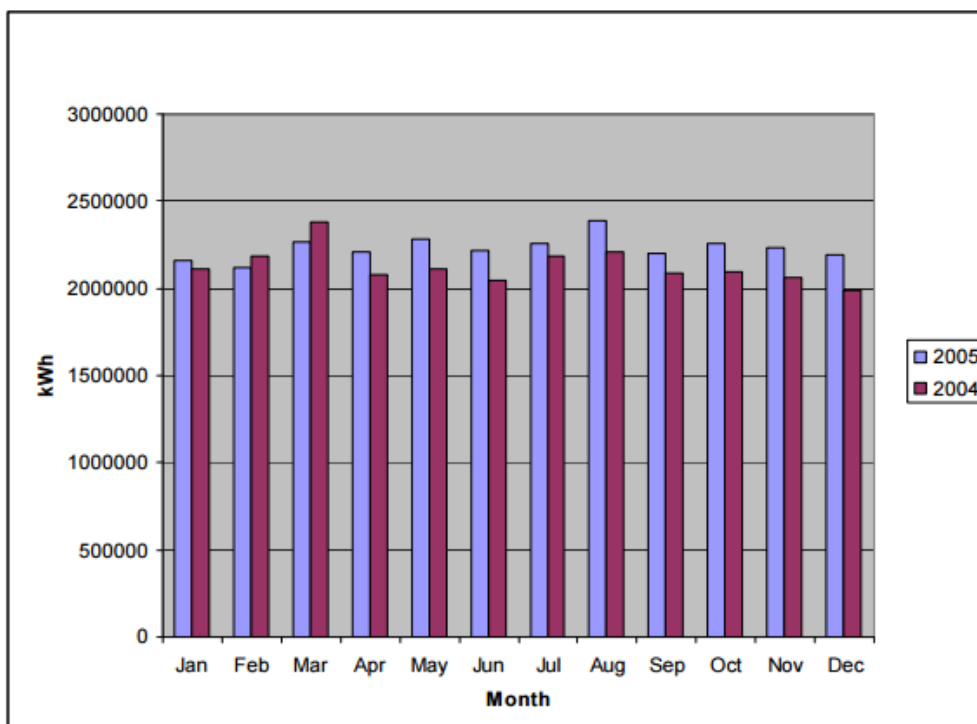


Figure 1. Facility monthly electricity consumption.

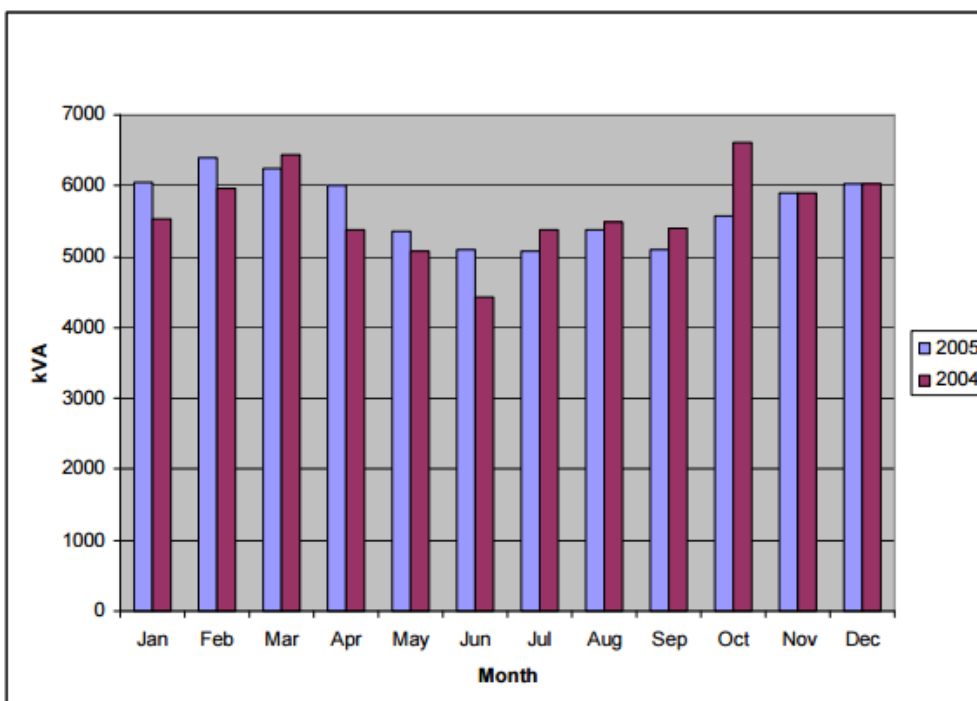


Figure 2. Facility monthly electricity demand.

- Natural Gas

The company is directly supplied with natural gas by the local/private gas utility xxx to the main connecting point on the production site.

Natural gas measurement devices:

Between 20xx and 201x, the total natural gas demand has increased by about x%. In the same period, the cost of natural gas went up by around xx%.

The annual and seasonal demand and expenses of natural gas between 20xx and 201x are summarized in the table below. [The seasonal demand can be chosen for the latest year.]

Table 5. Annual Natural Gas consumption and expense.

Year	Consumption (m ³)	Consumption (MWh)	Expense (BDT)
200x			
...			
201X			

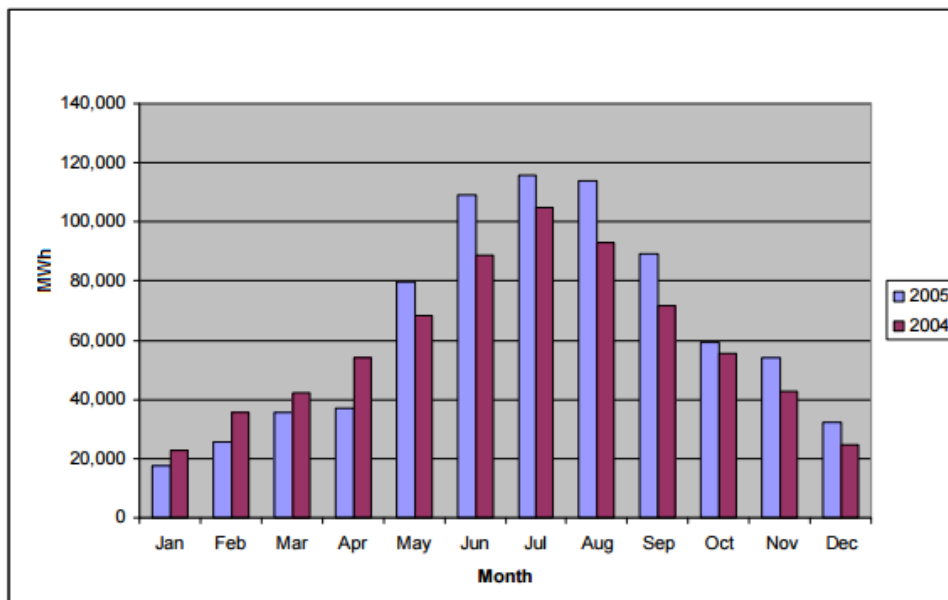


Figure 3. Seasonal Patterns of Natural Gas Use.

- **Other Fuel**

[Fill accordingly]

The electricity, natural gas, [other fuel] demand and expenses between 20xx and 201x are summarized in the table below.

Table 6. Existing Meters.

Meter	Location & Area Metered	Monitoring Requirements
[Meter Name]	[physical location for the meter and area]	Comments if it needs to be manually read and at what frequency (perhaps initially).

- **Significant energy users and areas**

Investigate all types of energy consuming plant, equipment, fixtures and fittings within the facilities. This can be done through existing metering (if installed) or through estimates. Identify different categories of plant and equipment that use energy. Typical categories are lighting, heating, pumps, compressed air etc.

- **List of Utilities**

Description of systems or equipment in the facility/building, their capacities and rating, design and operating conditions, equipment schedules, etc. including information such as the type of systems, controls, type and number of auxiliary equipment, etc. The main energy consumers at the site should be quantified for the assessment. The below tables can be used as reference:

Table 7. List of Primary Electrical Energy Consumers.

Electrical Energy Consumer	% of Total	Comments
[e.g. compressed air, chillers, motors & drives, air conditioning, space heating etc.]		

Table 8. Summary of Primary Thermal Energy Consumers

[e.g. process steam, process hot water, domestic hot water etc.]		

List of services and technologies used on site can be created, which the auditor can use to track the audit process for every zone. An example of such a matrix is shown below:

Table 9. Utility location.

Utility Zone	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone x
Lighting						
Ventilation						
Air conditioning						
Hot water						
Steam						
Compressed air						
Chillers						
Dust extraction						
Building fabric						

Motors and drives						
Fans and pumps						
Conveyor belts						
Process heat						
Distribution						
xyz						

- Overview of major energy using systems
 - (a) Boiler System
 - (b) Furnaces
 - (c) Refrigeration
 - (d) Compressed Air System
 - (e) Electric Motors
 - (f) HVAC
 - (g) Lighting System
 - (h) Other utilities/processes/systems

- Maintenance

This section should clearly present maintenance protocols during the year at various section of the facility. It should present the type of maintenance undertaken, frequency and time of such maintenance. The energy manger should identify and evaluate production losses due to down time.

- Performance Comparison

In this section, the energy manager will present where the performance of the facility stands in comparison to international best practice as well as standards set by the government.

4. Activities regarding Energy Efficiency

The following should be described in this section:

- List of earlier and ongoing initiatives to promote energy conservation in the facilities with date and outcome.

- Type of energy efficiency or energy management recommendations made by experts, implementation status and outcome (negative and positive). The outcome should also be presented in terms of cash flow to better present the benefits or losses from such activities.

Lighting

Location	Lighting Type	Description	Lighting Controls	No. Fixtures	No. Lamps per Fixture	Watts per Lamp	Ballast Factor	Annual Operating Hours	Annual Electricity Consumption		Annual Electricity Cost		Comments / Justification for Operating Assumptions
				[-]	[-]	[W]	[-]	[h]	[kWh]	[%]	[Taka]	[%]	

Motor and Drives

Location	Motor Ref	Description	Quantity	Motor Power Rating (each)	Load Factor	Annual Operating Hours	Annual Electricity Consumption		Annual Electricity Cost		Comments / Justification for Operating Assumptions
				[kW]	[%]	[h]	[kWh]	[%]	[Taka]	[%]	

Other Electrical Utilities

Location	Equipment Ref	Description	Quantity	Equipment Power Rating (each)	Annual Operating Hours	Annual Electricity Consumption		Annual Electricity Cost		Comments / Justification for Operating Assumptions
				[kW]	[h]	[kWh]	[%]	[Taka]	[%]	

Boilers

Location	Boiler Ref	Description	Boiler Thermal Rating	Boiler Efficiency	Load Factor	Annual Operating Hours	Annual Fuel Consumption		Annual Fuel Cost		Comments / Justification for Operating Assumptions
			[kW]	[%]	[%]	[h]	[kWh]	[%]	[Taka]	[%]	

Other Thermal Utilities

Location	Equipment Ref	Equipment Description	Thermal Rating	Thermal Efficiency	Load Factor	Annual Operating Hours	Annual Fuel Consumption		Annual Fuel Cost		Comments / Justification for Operating Assumptions
			[kW]	[%]	[%]	[h]	[kWh]	[%]	[Taka]	[%]	

FORM —X
[Refer Regulation 31(1)]
COMPLIANCE REPORT BY DESIGNATED CONSUMER
(BASED ON ENERGY AUDIT REPORT)

Energy Saving's Report Template

for

[Company Name]

[Facility Location]

[Logo (optional)]

Prepared by

[Energy Manager, Professional Qualifications]

Report Date: [dd mmm yy]

1.Introduction

1.1. Energy Manager/Management Team

Table 1: General data. Energy Manager

Company Name:	
Street	
Zip code / City	
State	
Contact Person (Energy Manager)	
E-mail: Mobile number:	
Additional Information	

1.2. Company Information

Table 2: General data.

Company Name	
Street	
Zip code / City	
Internet Web Page	
Industry	
Contact Person (Management)	

Phone	
E-mail Address	

1.2.1. General details and descriptions

What needs to be identified is:

- **The quantity of each fuel:** The energy consumption data can be retrieved from the utility suppliers or metering on the site.
- **The unit cost for each fuel:** The utility suppliers will also be able to provide the unit costs. Furthermore, cost breakdown for each fuel type should also be known. For example, the day and night, or peak tariff cost rates for electricity is important for comparison with operation and energy use patterns.
- **Where and how each fuel type is used:** Where sub-metering is in place data can be available for specific areas, or equipment. For example, useful information can be found in the boiler house or the compressor house log book.

Table 3: Energy Sources Overview

Energy Source	Total annual Consumption	Total annual Costs	Percentage of total Consumption	CO ₂ Emissions
1.				
2.				
3.				
...				

1.2.2. Significant energy users and areas

Investigate all types of energy consumed and energy-using plant, equipment, fixtures and fittings within the facilities. This can be done through existing metering (if installed) or through estimates. Identify the different categories of plant and equipment that use energy. Typical categories are lighting, heating, pumps, compressed air etc.

Table 4: Significant Users Energy Consumption

Type of End-User	Number of Users	Annual Energy Consumption	Operating Peak MW	Source of Energy
1.				
2.				
3.				
...				

Table 5: Process Energy Consumption

Production Process	Annual Energy Consumption	Operating Peak MW	% of total Energy Consumption	Source of Energy
1.				
2.				
3.				
...				

2. Energy Management Plan

Table 6: Planned energy efficiency measures

EEM	Savings Potential	Costs	Payback	Short-term/ middle-term/ long-term

Table 7: Management actions

Category	Short-term	Middle-term	Long-term

Responsibilities			
Strategy			
Saving Targets			
Budgets			
Staff Training			

Table 8: Action's cost and benefit

Action	Costs			Benefits		
	Short-term	Middle-term	Long-term	Short-term	Middle-term	Long-term
Responsibilities						
Strategy						
Saving Targets						
Budgets						
Staff Training						
...						

3.Current State

3.1. List of Utilities

The main energy consumers at the site should be quantified for the assessment. of summarizing Tables 2 and 3 below can be used.

Table 9: Summary of Primary Electrical Energy Consumers

Electrical Energy Consumer	% of Total	Comments
[e.g. compressed air, chillers, motors & drives, air conditioning, space heating etc.]		

Table 10: Summary of Primary Thermal Energy Consumers

Thermal Energy Consumer	% of Total	Comments
[e.g. process steam, process hot water, domestic hot water etc.]		

List with the services and technology used on site can be created on which the auditor can use to track the audit process for every zone. An example of such a matrix is shown below:

Table 11: Utilities location

Utility	Zone	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Lighting						
Ventilation						
Space heating						
Air conditioning						
Hot water						
Steam						
Hot oil						
Compressed air						
Chillers						
Dust extraction						
Building fabric						
Motors and drives						
Fans and pumps						
Conveyor belts						
Process heat						
Distribution						

3.2. Existing Meters and Data Bases

Table 12: Existing Meters

Meter	Location & Area Metered	Monitoring Requirements
[Meter Name]	[physical location for the meter and area]	Comments if it needs to be manually read and at what frequency (perhaps initially).

3.3. Current state of each utility

3.3.1. Electricity

3.3.1.1. Cost and Consumption

3.3.2. Steam

3.3.2.1. Cost and Consumption

3.3.3. Water

3.3.3.1. Cost and Consumption

3.3.4. Compressed air

3.3.5. Chilled water

3.3.6. Cooling water

3.4. Former Activities regarding Energy Efficiency

4. Energy Efficiency Measures

Table 13: EE Measures

Facility/ Equipment/ System Name	Annual Energy Consumption	Operating Peak MW	EE Measure	Investments Costs	Potential savings, kWh/a	Estimated Operating Peak MW Reduction	Payback, years
1.							
2.							
3.							
...							

4.1.1. Specific Energy Consumption

4.1.2. EEM in Boiler System

4.1.3. EEM in Furnaces

4.1.4. EEM in Refrigeration

4.1.5. EEM in Compressor Air System

4.1.6. EEM in Electric Motors

4.1.7. EEM in HVAC

4.1.8. EEM in Lighting System

4.1.9. EEM in other utilities/processes/system

FORM XI

[Refer Rule10 (3) & Regulation 31(2)]

**YEARLY PROGRESS REPORT BY DESIGNATED CONSUMER
(BASED ON IMPROVEMENT MEASURES UNDERTAKEN ON AUDIT REPORT)**

1. Annual energy report should contain at least the following data for all facilities within the establishments:
 - i. Total energy consumption (by source of energy, i.e., fuel, heat, electricity)
 - ii. Energy efficiency and productivity levels (relative to output)
 - iii. Energy reduction history (chronological)
 - iv. Activity data
 - v. Designated energy manager and her/his activities
 - vi. Energy conservation measures conducted during the reporting period
 - vii. Annual energy conservation plan (including measures and target(s))
 - viii. Medium term energy conservation plan (including measures and target(s))

2. Annual and medium-long-term plan of energy conservation measures to be implemented:
Table

Types of plan	Target setting	Non-compliance
Annual energy conservation plan and targets	12 month from the submission of the annual energy report containing the short term energy conservation measures	To be deemed non-compliant if the targets were not met for two consecutive years.
Medium term energy conservation plan and targets	Up to 36 months from the submission of the annual energy report containing the medium term energy conservation measures. The plan may be reviewed and revised on rolling basis.	To be deemed non-compliant either if the target is not met or if downward revisions of the target were to be made for more than three times during the planned term period.

FORM XII

[Refer Regulation 32 &34(2)]

ENERGY AUDIT REPORT

**(GUIDELINES FOR PREPARATION OF ENERGY AUDIT REPORT
BY THE ACCREDITED ENERGY AUDITOR)**

ENERGY AUDIT

for

[Client Name]

[Facility Location]

[Logo (optional)]

Prepared by

[Energy Advisor Personal Name, Professional Qualifications]

[Consulting Company]

[Logo (optional)]

Report Date: [dd mmm yy]

1.Introduction

1.1 Energy Auditor/Audit Team

Table 14: General data. Energy Auditor

Energy Audit Company Name:	
Street	
Zip code / City	
State	
Contact Person (Energy Auditor)	
E-mail:	
Mobile number:	
Additional Information	

4.2. Object of Energy Audit

Table 15: General data. Energy audit object

Street	
Zip code / City	
Internet Web Page	
Industry	
Contact Person (Management)	
Phone	
E-mail Address	
Contact Person (Energy Representative)	
Phone	
E-mail Address	

Contact person (Production Manager)	
Phone	
E-mail Address	

4.2.1. General details and descriptions

4.2.2. Production process description

4.2.3. Production cost components (Raw materials, energy sources, manpower, others)

What needs to be identified is:

- **The quantity of each fuel:** The energy consumption data can be retrieved from the utility suppliers or metering on the site.
- **The unit cost for each fuel:** The utility suppliers will also be able to provide the unit costs. Furthermore, cost breakdown for each fuel type should also be known. For example, the day and night, or peak tariff cost rates for electricity is important for comparison with operation and energy use patterns.
- **Where and how each fuel type is used:** Where sub-metering is in place data can be available for specific areas, or equipment. For example, useful information can be found in the boiler house or the compressor house log book.

4.2.4. Significant energy users and areas

Investigate all types of energy consumed and energy-using plant, equipment, fixtures and fittings within the facilities. This can be done through existing metering (if installed) or through estimates. Identify the different categories of plant and equipment that use energy. Typical categories are lighting, heating, pumps, compressed air etc.

5. Conclusion and Summary of Measures

The following data shows all investigated energy savings potential for the energy audit object, visualized in a table by consumption savings and in the graph for cost savings.

Table 16: EE Measures and expected payback times

Proposed EE Improvement	Description of EEM	Consumption in Baseline period, kWh/a	Consumption with EE Improvement, kWh/a	Potential savings, kWh/a	Potential savings, (cost)Taka/a	Expected Payback, a

1.						
2.						
3.						
...						

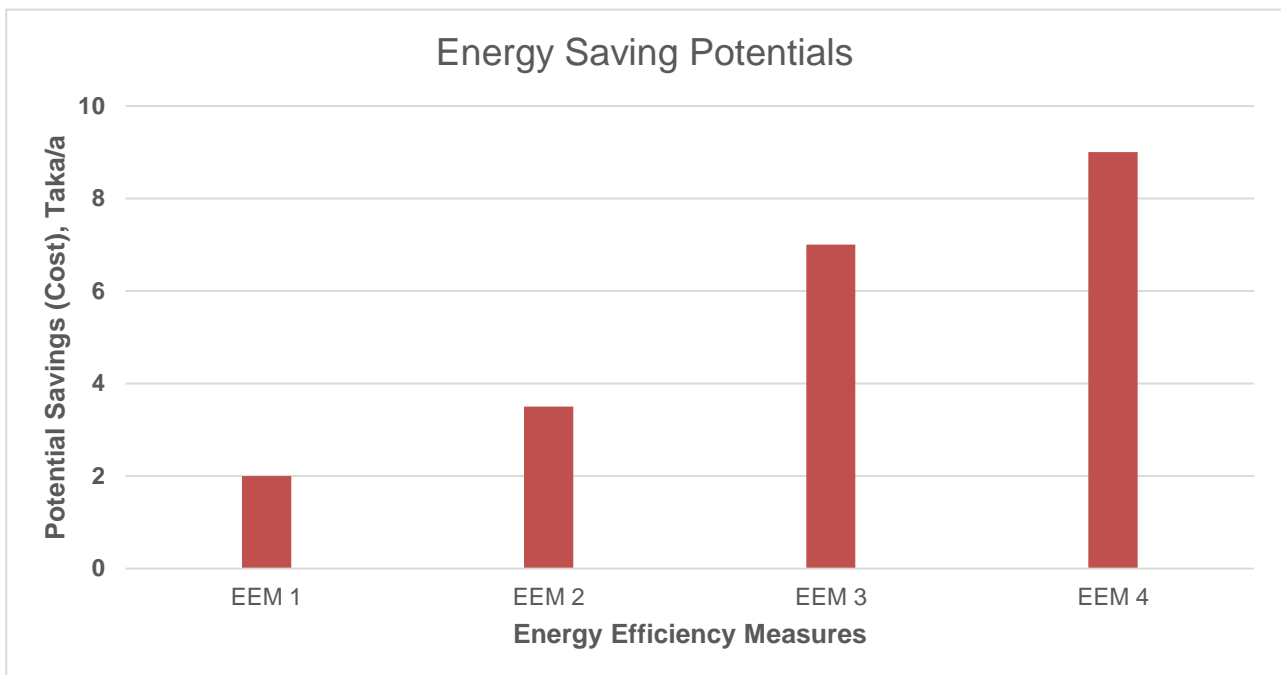


Figure 1: Saving potentials and their economic value

5.1. Short-term Measures

These measures can be implemented easily and require no great effort.

5.2. Medium-term Measures

These measures are worthwhile to implement for the energy audit object, and with long term thinking, they will be more efficient as soon as the energy-price rises.

5.3. Long-term Measures

The following potential savings will not be recommended for the existing energy audit object because of amortization time, but should be considered for the future.

6. Current State

6.1. List of Utilities

The main energy consumers at the site should be quantified for the assessment. For summarizing Tables 2 and 3 below can be used.

Table 17: Summary of Primary Electrical Energy Consumers

Electrical Energy Consumer	% of Total	Comments
[e.g. compressed air, chillers, motors & drives, air conditioning, space heating etc.]		

Table 18: Summary of Primary Thermal Energy Consumers

Thermal Energy Consumer	% of Total	Comments
[e.g. process steam, process hot water, domestic hot water etc.]		

List with the services and technology used on site can be created on which the auditor can use to track the audit process for every zone. An example of such a matrix is shown below:

Table 19: Utilities location

Utility	Zone				
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Lighting					
Ventilation					

Space heating					
Air conditioning					
Hot water					
Steam					
Hot oil					
Compressed air					
Chillers					
Dust extraction					
Building fabric					
Motors and drives					
Fans and pumps					
Conveyor belts					
Process heat					
Distribution					

6.2. Existing Meters and Data Bases

Table 20: Existing Meters

Meter	Location & Area Metered	Monitoring Requirements
[Meter Name]	[physical location for the meter and area]	Comments if it needs to be manually read and at what frequency (perhaps initially).

6.3. Current state of each utility

6.3.1. Electricity

6.3.1.1. Cost and Consumption

6.3.2. Steam

6.3.2.1. Cost and Consumption

6.3.3. Water

6.3.3.1. Cost and Consumption

6.3.4. Compressed air

6.3.5. Chilled water

6.3.6. Cooling water

6.4. Former Activities regarding Energy Efficiency

7. Energy Efficiency Measures

This chapter should include the following aspects:

1. Recommendations and implementation plans;
2. Assumptions used to calculate the savings;
3. Information on applicable subsidies and assistance;
4. Appropriate economic analysis;
5. Proposals on measurement and detection methods for it;
6. Estimation of the savings after the implementation of the recommended measures;
7. Possible Interaction with other proposed recommendations; and
8. Conclusions.

7.1.1. Specific Energy Consumption

7.1.2. EEM in Boiler System

7.1.3. EEM in Furnaces

7.1.4. EEM in Refrigeration

7.1.5. EEM in Compressor Air System

7.1.6. EEM in Electric Motors

7.1.7. EEM in HVAC

7.1.8. EEM in Lighting System

7.1.9. EEM in other utilities/processes/system

Annexes

Lighting

Location	Lighting Type	Description	Lighting Controls	No. Fixtures	No. Lamps per Fixture	Watts per Lamp	Ballast Factor	Annual Operating Hours	Annual Electricity Consumption		Annual Electricity Cost		Comments / Justification for Operating Assumptions	Opportunities for Energy Savings
				[-]	[-]	[W]	[-]	[h]	[kWh]	[%]	[Taka]	[%]		

HVAC

Location	HVAC Equipment Ref	Description	Control Strategy	Quantity	Unit Power Rating (each)	Load Factor	Annual Operating Hours	Annual Electricity Consumption		Annual Electricity Cost		Comments / Justification for Operating Assumptions	Opportunities for Energy Savings
					[kW]	[%]	[h]	[kWh]	[%]	[Taka]	[%]		

Refrigeration

Location	Motor Ref	Description	Motor Power Rating	Load Factor	Annual Operating Hours	Annual Electricity Consumption		Annual Electricity Cost		Comments / Justification for Operating Assumptions	Opportunities for Energy Savings
			[kW]	[%]	[h]	[kWh]	[%]	[Taka]	[%]		

Motor and Drives

Location	Motor Ref	Description	Quantity	Motor Power Rating (each)	Load Factor	Annual Operating Hours	Annual Electricity Consumption		Annual Electricity Cost		Comments / Justification for Operating Assumptions	Opportunities for Energy Savings
				[kW]	[%]	[h]	[kWh]	[%]	[Taka]	[%]		

Other Electrical Utilities

Location	Equipment Ref	Description	Quantity	Equipment Power Rating (each)	Annual Operating Hours	Annual Electricity Consumption		Annual Electricity Cost		Comments / Justification for Operating Assumptions	Opportunities for Energy Savings
				[kW]	[h]	[kWh]	[%]	[Taka]	[%]		

Boilers

Location	Boiler Ref	Description	Boiler Thermal Rating	Boiler Efficiency	Load Factor	Annual Operating Hours	Annual Fuel Consumption		Annual Fuel Cost		Comments / Justification for Operating Assumptions	Opportunities for Energy Savings
			[kW]	[%]	[%]	[h]	[kWh]	[%]	[Taka]	[%]		

Other Thermal Utilities

Location	Equipment Ref	Equipment Description	Thermal Rating	Thermal Efficiency	Load Factor	Annual Operating Hours	Annual Fuel Consumption		Annual Fuel Cost		Comments / Justification for Operating Assumptions	Opportunities for Energy Savings
			[kW]	[%]	[%]	[h]	[kWh]	[%]	[Taka]	[%]		

SCHEDULE-1
[Refer Regulation 7(3)]

**SULLABUS FOR THE EXAMINATION OF
ENERGY AUDITING CERTIFICATION (EAC)
(PAPER- 1, 2, 3 & 4)**

1. Paper I: Energy Management and Audit

- Energy Management & Audit: Definition, energy audit, need, types of energy audit. Energy management (audit) approach, benchmarking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel and energy substitution, energy audit instruments and metering, precautions, thermography, smart metering.
- Financial Management and Financial Analysis: Financial analysis techniques: simple payback period, return on investment (ROI), net present value, internal rate of return, sensitivity and risk analysis, financing options, fixed and variable costs, interest charges, discounted cash flow methods, factors affecting analysis.

2. Paper II: Energy Efficiency in Thermal Utilities

- Fuels and Combustion: Introduction to fuels, properties of fuel oil, coal and gas, storage, handling and preparation of fuels, principles of combustion, combustion of oil, coal and gas. Agro - residue/biomass handling, preparation and combustion.
- Boilers: Types, combustion in boilers, performances evaluation, analysis of losses, feed water treatment, blow down, energy conservation opportunities. Boiler efficiency calculation, evaporation ratio and efficiency for coal, oil and gas. Soot blowing and soot deposit reduction, reasons for boiler tube failures, start up, shut down and preservation, Thermic fluid heaters, super critical boilers.
- Steam System: Properties of steam, assessment of steam distribution losses, steam leakages, steam trapping, condensate and flash steam recovery system, identifying opportunities for energy savings. Steam utilization, Performance assessment more details, installation, thermo-compressor, steam pipe insulation, condensate pumping, steam dryers
- Furnaces: Classification, general fuel economy measures in furnaces, excess air, heat distribution, temperature control, draft control, waste heat recovery. Forging furnace

heat balance, Cupola, nonferrous melting, Induction furnace, performance evaluation of a furnace, hot air generators.

- Insulation and Refractories: Insulation -types and application, economic thickness of insulation, heat savings and application criteria, Refractory – types, selection and application of refractories, heat loss. Cold insulation.
- Fluidized Bed Combustion FBC boilers: Introduction, mechanism of fluidize and bed combustion, advantages, types of FBC boilers, operational features, retrofitting FBC system to conventional boilers, saving potential. Biomass based fluidized bed combustion boilers - application and operation, Atmosphere Fluidized bed combustion boilers, Circulating Fluidized bed combustion boilers, Pressurized Fluidized bed combustion boilers.
- Cogeneration: Definition, need, application, advantages, classification, saving potentials. heat balance, steam turbine efficiency, tri-generation, micro turbine.
- Waste Heat Recovery: Classification, advantages and applications, commercially viable waste heat recovery devices, saving potential.
- Heat Exchangers: Types, networking, pinch analysis, multiple effect evaporators, condensers, distillation column, etc.

3. Paper III: Energy Efficiency in Electrical Utilities

- Electrical system: Electricity billing, electrical load management and maximum demand control, power factor improvement and its benefit, selection and location of capacitors, performance assessment of PF capacitors, distribution and transformer losses. Star labelled distribution transformers, Demand side management, Assessment of transmission and distribution efficiency, losses due to harmonics and voltage unbalance, Maximum demand controllers, automatic power factor controllers, energy efficient transformers.
- Electric motors: Types, losses in induction motors, motor efficiency, factors affecting motor performance, rewinding and motor replacement issues, energy saving opportunities with energy efficient motors. Star labelled energy efficient motors, squirrel cage and slip ring and their characteristics, motor history sheet (new, first rewind, second rewind), Star operation, voltage unbalance, energy efficient motors, soft starters with energy saver, variable speed drives.
- Compressed Air System: Types of air compressors, reciprocating vs screw, compressor efficiency, efficient compressor operation, Compressed air system

components, capacity assessment, leakage test, factors affecting the performance and savings opportunities, Air Driers.

- Heating, ventilation, air conditioning (HVAC) and Refrigeration System: Introduction to Psychometrics, Vapour compression refrigeration cycle, refrigerants, coefficient of performance, capacity, factors affecting Refrigeration and Air conditioning system performance and savings opportunities. Vapour absorption refrigeration system: Working principle, types and comparison with vapour compression system and saving potential, heat pumps and their applications, section on ventilation system, ice bank system, performance assessment of window and split room air conditioners, Star labelled pumps, cold storage refrigeration, humidification system.
- Fans and blowers: Types, performance evaluation, efficient system operation, flow control strategies and energy conservation opportunities. Pressure drop calculation.
- Pumps and Pumping System: Types, performance evaluation, efficient system operation, flow control strategies and energy conservation opportunities. Energy conservation in boiler feed water pump, pumping systems for municipal drinking water, and sewerage, agriculture pump sets.
- Cooling Tower: Types and performance evaluation, efficient system operation, flow control strategies and energy saving opportunities assessment of cooling towers. fan less cooling tower, natural draft cooling tower, cooling water treatment.
- Lighting System: Light source, choice of lighting, luminance requirements, and energy conservation avenues. Light Emitting Diodes (LEDs), metal halides, fluorescent tube lights, Compact fluorescent lamps (CFL), labelling scheme, high efficiency street lighting, electronic ballast, occupancy sensors, energy efficient lighting controls.
- Diesel/Natural gas Power Generating systems: Factors affecting selection, energy performance assessment of diesel conservation avenues. Waste heat recovery.

4. Paper IV: Energy Performance Assessment for Equipment and Utility systems

- Boilers: performance terms and definitions, testing methods: direct and indirect, factors affecting performance, data collection, boiler terminology.
- Co-generation, Turbines (gas, steam): performance terms and definitions, testing procedure, measurements and data collection, calculations.
- Heat Exchangers: methodology of heat exchanger performance assessment.

- Electric Motors, Variable Speed Drives: efficiency testing, determining motor loading, performance evaluation.
- Fans and Blowers: terms and definitions, testing methods, factors affecting performance.
- Water Pumps: terms and definitions, testing methods, factors affecting performance.
- Compressors: terms and definitions, testing methods, factors affecting performance.
- HVAC systems: terms and definitions, testing methods, factors affecting performance.

SCHEDULE-2
[Refer Regulation 19(3)]

**SYLLABUS FOR THE EXAMINATION OF
ENERGY AUDITING CERTIFICATION (EAC)
(PAPER-5)**

Paper V: Monitoring and Measurements

Energy Monitoring and Targeting: definitions, elements and structure of M&V, system requirements, data information analysis, defining the energy baseline, identification of monitoring and measuring points, etc.