



Certified Energy Auditor™ Instructions & Application Handbook

Note: All applicants must take a required approved preparatory seminar before sitting for the exam.
Registration for seminars is separate. Applications received without first registering for a seminar will not be processed.

The following information is contained in this booklet:

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Part A: Information for Applicants

CERTIFIED ENERGY AUDITOR™ (CEA®)

Please read through the following important information before submitting your **CEA Application found in part B** of this booklet.

1. SCOPE

The Certified Energy Auditor (CEA) is an individual who evaluates and analyzes how energy is being used in a facility, identifies energy conservation opportunities and makes recommendations where consumption can be reduced or optimized.

2. CEA OBJECTIVES

- To raise the professional standards of those engaged in energy auditing.
- To improve the practice of energy auditing by encouraging energy auditors in a continuing program of professional development.
- To identify persons with acceptable knowledge of the principles and practices of energy auditing related disciplines and laws governing and affecting energy auditors through completing an examination and fulfilling prescribed standards of performance and conduct.
- To award special recognition to those energy auditors who have demonstrated a high level of competence and ethical fitness for energy auditing.

3. ELIGIBILITY

Candidates are required to acknowledge completion of a minimum of 2 hours of Safety Training within the last three years and participation in five commercial audits within the last three years. Two of the audits are a minimum of 10,000 sq. ft. Also, the audits have been of at least two different building types. In addition, candidates must also meet one the following prerequisites in order to sit for exam:

A Four-Year Engineering or Architecture degree or Professional Engineer (P.E.) or Registered Architect (R.A.) or active CEM® with at least three years of experience in energy auditing and/or participating in a team doing energy assessments

OR

A Four-Year non-Engineering degree with at least four years of experience in energy auditing and/or participating in a team doing energy assessments

OR

A Two-Year Technical degree with at least five years of experience in energy auditing and/or participating in a team doing energy assessments

OR

Ten years or more verified experience in energy auditing and/or participating in a team doing energy assessments

*****Acceptable experience is full-time direct energy auditing work or participating in team energy assessments. Higher education, part-time internships, and research positions are not acceptable*****

4. STATEMENT OF NON-DISCRIMINATION

AEE endorses the principles of equal opportunity. Eligibility criteria for examination and certification as a Certified Energy Auditor are applied equally to all individuals regardless of age, race, religion, gender, national origin, veteran status, sexual orientation, or disability.

5. STATEMENT OF IMPARTIALITY

AEE's CEA Certification Department adheres to principles of impartiality in all its dealings. The CEA Department shall act impartially towards all applicants, candidates, and certificants.

6. THE REQUIRED BODY OF KNOWLEDGE / STUDYING FOR THE EXAM

The effective practice of energy auditing requires an in-depth knowledge of a wide variety of subjects. All applicants must take a required approved preparatory seminar before sitting for the certification exam. For certification purposes, however, the candidate must also demonstrate to the satisfaction of the Certification Board the knowledge and ability to apply the essentials of energy auditing. To aid candidates in preparing for the examination, the Certification Board makes available a bibliography of suggested reference materials and a study guide (Refer to Part C of this booklet).

The most effective way to “study” for the exam is to practice – practice solving problems, practice working within the exam’s time constraints, and studying the materials covered in the exam.

There are many things you can do to help yourself prepare for the exam.

- Review the reference books and videos
- Practice the study guide in Part C of this application packet
- Review the body of knowledge included in Part C of this application packet
- Practice basic algebra calculations

7. PROCEDURES

The first step in the CEA certification process is to register for a required approved preparatory seminar. After seminar registration has been completed, the certification application should be completed. Since certification is based on education, audit experience and passing the examination, it is important that the applicant understands the eligibility requirements, and has attained the prerequisite to qualify for certification.

The application should be received by the certification department four weeks prior to the desired exam date if the applicant feels confident he/she has the necessary prerequisite for certification. Once the application is complete and the CEA exam is passed, all applications are sent to the CEA Board for final approval. Only after Board approval is certification granted. Should applicants have questions about the experience prerequisite for certification, he/she can have his/her application reviewed by the CEA Board prior to taking the exam. If this is the case, a **completed application** (including official college transcripts and employment) must be received by AEE at least eight weeks prior to desired exam date, and the applicant must request in writing that he/she would like an initial review of his/her application by the CEA Board.

It is very important that all applicants give clear and complete details concerning energy audit experience so that the CEA Board can have a clear understanding of the applicant’s energy auditing experience.

Based on the eligibility requirement, the number of years of required experience to be verified will vary. Past employers may need to be complete the employment verification form. If you are self-employed or are a principal owner of a company, three client verifications are required in the place of employment verification. **All employment verification and/or client verification forms should be completed by the reference, employers and/or clients before sending to AEE. AEE does not send requests to references. Candidates applying with an active CEM® certification do not need to submit college transcripts. Once forms are received by AEE, we may contact employers and/or clients to confirm and verify the information on the form is correct.**

Remote Testing Information:

Your application along with exam fee should be approved by AEE prior to sitting for the exam. You will receive a letter once AEE has approved your application. At that time, you may log in to the testing center website to begin the exam scheduling process. Please do not contact the testing center regarding the status of your application. Once the application is complete and exam is passed, all applications are sent to the CEA Board for final approval. Only after this approval is certification granted. For more information on Remote Testing Center Procedures and locations, visit www.aeecenter.org/certification/remotetestinginstructions.

8. THE APPLICATION & POINT SCORING EVALUATION

The Application Form provides an organized method for documenting professional and educational background, achievements and community service.

The Personal Data Form is divided into the following three parts:

Division I – Education

Division II – Professional Registration (i.e. PE, Registered Architect, CEM®)

Division III – Experience/Employment in Energy Auditing

The applicant is requested to list on the Application Form all pertinent information in these categories for evaluation by the CEA Board. All applicants must complete the application; a resume does not replace the four-page application.

The two areas of evaluation shall receive points as follows:

Application Form Data	Maximum Score 1400 points	Minimum Score Required 700
CEA Examination	Maximum Score 1036 points	Minimum Score Required 703
Total Required:	Maximum Score 2436 points	Minimum Score Required 1403

To be awarded the CEA designation, candidates must achieve the minimum total of 700 points on the CEA Application Data and the minimum score of 703 points on the CEA examination individually for a minimum total of 1403 points.

If a candidate has failed to acquire sufficient points to be recommended for CEA, the candidate may be re-examined at a subsequent examination period and/or resubmit an updated Application Form. Examination

scores will be kept on file by the Certification Director for a period of 3 years. Applicants have 3 years to follow up and complete his/her CEA file; after 3 years, applicants must resubmit the application and retake the CEA exam.

It is essential that candidates devote considerable time and effort to completing the Application Form since certification by the CEA Board can be based only on the information provided. Inaccurate and/or incomplete data will only be a liability for the applicant. Documentation should be attached to the Application to substantiate the information presented.

8. APPEALS POLICY

An appeal is a formal request for reconsideration of an adverse decision made by the CEA Board or its representatives related to an individual's achievement of a certification. Candidates may appeal the results of eligibility determination or the examinations within 60 days of the date of the results. The appeals process and an application for submitting an appeal is as follows:

- If a candidate has a problem with AEE's determination of their eligibility or with the examination, they should first send an email to the CEA Director to request reconsideration of an adverse decision.
- If the candidate is unsatisfied with the CEA Director's reconsideration of the adverse decision, they must request an appeal form from the CEA Director. Once the Appeals Form has been completed, it must be forwarded to the CEA Director, who will forward the appeal to the Appeals Board
- Upon receiving the appeal, the Appeals Board has forty-five (45) days in which to consider the appeal. Candidates will be notified of the Appeals Board's decision after forty-five (45) days.

9. FEES:

APPLICATION FEE

A fee of \$400.00 dollars is payable with the filing of the application. This includes the CEA application fee (\$200.00) and first-time CEA examination fee (\$200.00). *No application or examination fee refunds are allowed.*

RETESTING FEE

For each re-examination held with live seminar in USA/Canada, a fee of \$100.00 will be required. For each re-examination held at a Remote Testing Center location in USA/Canada, a fee of \$150.00 will be required. *No refunds allowed.*

RENEWAL FEE

Three-year renewal fee: \$300.00

Reinstatement fee: \$350.00

No refunds allowed.

10. INCOMPLETE APPLICATIONS

Incomplete applications will remain on file with the Certified Energy Auditor Certification Department for a period of three (3) years. After three years, application materials will be destroyed.

11. THE CEA EXAMINATION

The applicant must complete a four-hour exam. Live Seminar dates and locations are available on our website at www.aeecenter.org/certification/cea. Applicants must register separately to attend the associated live seminar. An Examination Administrator will proctor the examination. This Administrator may be an Association associate, an educator, an approved testing expert or agency, or whomever the Certification Director deems appropriate based on pre-approval. The examination questions are based on the body of knowledge accessible in Part C of this application. **The exam is Open Book!** Because of the diversity of background and experience of Energy Auditors, the examination has 10 different subject sections, all of which are mandatory. The exam consists of multiple choice. You must bring a hand calculator to the exam since the CEA exam does not allow computers, tablets, or cell phones to be used during the test. Grading is accomplished by members of the Certification Department and the CEA Board. Candidates are notified of exam results by email within 30 days of the exam date.

The CEA Examination contains the following mandatory subjects:

Body of Knowledge	Percent of Exam
Developing an Audit Strategy & Plan	12 - 18 %
Utility Analysis, Renewable Opportunities	11 - 17 %
Data Collection & Economic Analysis	11 – 17 %
Lighting Systems	7 - 10 %
HVAC & Heating Systems	16 - 24 %
Motors, Drives & Compressed Air	7 - 10 %
Ventilation Systems	4 - 6 %
Domestic Hot Water Systems	4 – 5 %
Building Envelope	3 – 5 %
Water Conservation	3 - 4 %

12. LANGUAGE

The Certified Energy Auditor Exam when administered in the United States is only offered in English.

13. AMERICANS WITH DISABILITIES ACT

Special arrangements may be provided to candidates with a disability (as defined by Title III of the Americans with Disabilities Act) who submit with their certification application, a written explanation of their needs along with appropriate medical documentation. An ADA request form is available on the CEA website – www.aeecenter.org/certification/CEA.

14. RESCHEDULING EXAMS

While application and exam fees are nonrefundable, a candidate may reschedule taking a live exam at any time for any reason. Candidates taking the exam at a Remote Testing Center, if you need to reschedule your confirmed exam date or location, please contact AEE prior to rescheduling. **A \$50 rescheduling fee payable to AEE will be assessed for each reschedule of your Remote Testing Center exam.**

15. INCLEMENT WEATHER

If any candidate is unable to arrive at a designated exam site because of inclement weather, terrorist acts, a natural disaster, or other unforeseen emergencies beyond control of the candidate as determined by AEE, the candidate will be allowed to take a future examination without being charged a re-examination fee.

If for any reason the exam is unable to be administered, then the examination will be rescheduled within a reasonable period of time. Candidates may take the exam at a future administration without being charged a re-examination fee. Candidates will be responsible for their own associated expenses for future testing.

16. TEST ADMISSION PROCEDURES

Candidates must report to the test location on time. Sign-in begins 30 minutes to one hour before the posted exam time. Candidates must present a government-issue photo ID when checking in to take the exam. Candidates who arrive more than thirty minutes late or without a photo ID will NOT be permitted to enter the test center, and their examination fees will be forfeited. Distribution of test materials, and testing instructions will begin within five minutes of the posted start time of the exam. The total testing time is four hours. Additional time has been allotted for instructions. You can expect to leave the testing center at approximately 4.5 hours after the posted start time for the exam. There are no scheduled breaks.

17. TESTING SITE RULES

The following are rules enforced at all test administrations. Candidates found not to be in compliance with these standards will immediately be removed from the exam and their test papers collected. The incident will be reported to the CEA Certification Director.

- All candidates must have proper photo ID in order to be admitted to the test center.
- Candidates are admitted only to their assigned test site at their assigned time
- Candidates arriving more than 30 minutes after the posted test time will not be allowed to take the exam. Extended time will not be provided to those who begin the exam after the posted start time. Those taking the exam at a live testing site will have to reschedule. Those taking the exam at a remote testing center will have to reschedule and pay a \$70 rescheduling fee before they will be able to reschedule to take the exam, if it is rescheduled more than 48 hours prior to the exam date.
- No guests are permitted in the examination rooms
- The exam is open book and calculators are REQUIRED.
- Use of laptops, cell phones, recording devices, PDAs, or other wireless capable devices is not permitted during the exam.
- No unauthorized material is allowed in the exam room.
- No device capable of taking images is allowed in the exam room.
- Talking, comparing answers, or exchanging reference materials during the exam is not permitted.
- While testing, it is the candidate's responsibility to keep their testing materials in their own space and out of sight of fellow examinees. An examinee that is found looking at another examinee's answer sheet will be automatically disqualified, dismissed, and reported. A retake of the exam will not be permitted for six months
- Absolute silence must be maintained in the exam room
- Upon request, students will be excused for bathroom breaks, but only one person at a time may leave the room during the exam. The exam booklet must be left in the testing room in the closed position, with the answer sheet turned over so that the answers are not visible.

- The exam booklet, answer sheets, and blue book may not be taken from the exam room and must be turned in to the proctor immediately upon completion of the exam.
- If taking the exam at a live testing site, use a number 2 pencil when filling in your answer sheet. If you erase an answer, please do so completely.
- Scoring is based on the number of correct answers. Because there is no penalty for wrong answers, it is to your advantage to answer every question in each section. If a question is difficult, you may decide to come back to the question after you have completed all of the questions with which you are familiar.
- The exam will be 4.0 hours. An announcement will be made every hour, when 30 minutes remain, and a ten minute warning will also be provided.

18. EXAMINATION IRREGULARITIES

Any problems, suspected incidences of cheating, alleged inappropriate examination administration, environmental testing conditions severe enough to cause disruption of the process, or other irregularities related to test administration should be addressed to the onsite proctor or to the CEA Director. All such matters will be reported, investigated, and subject to further action based upon policies and procedures adopted by AEE.

19. HANDLING OF TESTS

AEE will take all available precautions to ensure the appropriate and secure handling of completed tests. In the rare and extreme case in which the tests become lost or unreadable, candidates will be required to undergo retesting, without being charged a re-examination fee. Candidates will be responsible for their own travel-associated expenses for future testing.

20. NOTIFICATION OF RESULTS

Candidates are notified via email of their examination results within 30 days of the test administration. Candidates who successfully complete the examination and whose credentials and application entitle them to certification will be notified by letter and be granted an AEE Certified Energy Auditor certification. Candidates who did not successfully complete the examination will be notified via email and given a diagnostic report on the reason for their failing.

21. RETESTING

In the event that a candidate fails his or her first attempt to pass the CEA exam, AEE requires a waiting period of at least 60 days between the first and second attempt to pass that same exam. Additionally, before any candidate's third attempt or any subsequent attempt to pass the exam, the candidate is required to wait for a period of at least 60 days from his or her last attempt to pass the exam. Candidates must submit a retesting form, which is provided at www.aeecenter.org/certification/CEA. In the event that the candidate passes the CEA exam, the candidate is prohibited from retaking the same certification exam.

22. MAINTAINING CERTIFICATION

The continuing education of Energy Auditors is essential to cope with the rapidly changing field of energy auditing. A CEA must accumulate ten professional credits every three years and submit a completed Renewal Form to the Certification Renewal Director to remain certified. CEA renewal notices are mailed in the 3rd year of certification six months prior to the expiration date, which falls on December 31 of that year.

Professional credits for recertification can be accumulated at any time within the three year period. For example, Energy Auditors receiving a CEA certification in 2015 must file a record of ten professional credits with the Certification Renewal Director by December 31, 2018 in order to receive a CEA certificate for another 3-year period. ***Credits are not maintained by AEE during the three year period. It is the responsibility of the individual to maintain a record of credits accrued and submit this information at the time of renewal.***

Activities for CEA Renewal Credits

- Continued employment in energy auditing activities:
2 credits per year
- Continuing education (CEU's) / professional activities (seminars or conferences) including but not limited to auditing, IAQ, and health & safety:
2 credits per CEU, college credit hour or 10 contract hours for seminar
- Awards presented and/or papers published involving energy auditing:
2 credits each

23. RETIRED CERTIFICATION STATUS

A CEA, upon retiring and reaching the age of sixty-five, will be designated as “CEA – Retired,” will no longer be required to pay renewal fees, and will no longer be listed in our directory of actively practicing CEAs. No further reporting is necessary except to notify the Certification Renewal Director of meeting the age requirement by sending a copy of the retired CEA's Driver's License.

24. REINSTATEMENT OF CEA

Certified Professionals who do not acquire sufficient CEA maintenance points to be recertified on the recertification date will be dropped from active certifications and notified in writing of suspension from using the CEA designation. They will also no longer be listed as a CEA in any AEE publication. A lapsed CEA has the following options to reinstate:

1. Resubmit to the certification process and successfully meet the criteria for certification by personal data information and examination or,
2. Acquire make-up points at a cumulative total equal to 3.5 per year for every year since date of expiration. This option is available one-time only. Certifications that have lapsed more than three renewal cycles must retake the CEA exam.

25. REQUEST FOR DUPLICATE CERTIFICATE

Any certified professional may request additional copies of his or her certification document. Requests must be made in writing to AEE and may be made at any time. The fee of \$20 must be included with the request. The request for a duplicate certificate form can be found at www.aeecenter.org/certification/CEA.

26. USE OF CEA DESIGNATION

The certificate mark and logo are the property of AEE. Permission to use the certification mark or logo is granted to certified persons at the discretion of the AEE's CEA Board, for permissible uses only. As a Certified Energy Auditor™ (CEA®), the Energy Auditor may use the designation with his/her name on organization letterheads, business cards, certain internet listings and forms of address. The Energy Auditor may be required to surrender the certificate in the event that it is revoked or suspended

Certification is for individuals only. The CEA designation may not be used to imply that an organization, company or firm is certified. AEE does not endorse or recommend any individual CEA, product or service. Improper usage of CEA or AEE logo may result in suspension. If you have questions about usage of the CEA designation, please contact AEE.

Sample Correct Usage (Signature or Business Card):
John A. Smith, P.E., C.E.A. / Mary Jones, B.E.P., C.E.A.

Web Usage:

John A. Smith is an individual member of the Association of Energy Engineers ([AEE](#)) and is a [Certified Energy Auditor™](#) (CEA®).

Incorrect Usage:

ABC Company is Certified by AEE.

Correct Usage:

- ABC Company has many Certified Energy Auditors -CEAs® on its staff.
- ABC Company is looking for a Certified Energy Auditor candidate for a position.
- John Smith, President of ABC Company, is an individual member of the Association of Energy Engineers and is a Certified Energy Auditor (CEA), Certified Carbon Reduction Professional (CRM) and Certified Sustainable Development Professional (CSDP).
- ABC Company is a Corporate Member of the Association of Energy Engineers (AEE) and has five current Certified Energy Auditors (CEA) on staff including.....

John Smith is an individual:



Link to www.aeecenter.org/certification

Corporate Member of:



Link to www.aeecenter.org

27. CEA STAMP

As the CEM designation becomes a requirement for more jobs and projects, AEE is pleased to announce the availability of an official stamp that will authenticate your status as a CEA in good standing. The stamp will include your name, your CEA ID number, and the expiration date of your CEA. Stamp is self-inking with dark blue ink. Download the order form at www.aeecenter.org/ceastamp

Price: \$50 (includes shipping)/ Electronic Version: \$15 (only available as an add-on to \$50 stamp)



Part B: CEA® APPLICATION

Seminar Type: ☐ Live ☐ Online ☐ On-demand (On Demand attendees must send a copy of Completion Certificate to fseskin@aeecenter.org before CEA application can be processed)

Seminar Name / Date / Location: _____

Exam Type: ☐ Live ☐ Remote Testing

Exam Date / Location: _____
(Complete Date/Location for live exam only)

NOTE: The following information is to be filled out as completely as possible. Please read the “Information for Applicants” very carefully, and follow instructions for completing and forwarding forms. It is important that the AEE Certification Board have substantiating data for each criteria indicated in the application. APPLICATIONS MUST BE ACCOMPANIED BY THE \$400.00 FILING AND EXAMINATION FEE IN ORDER TO BE CONSIDERED. **THIS APPLICATION DOES NOT AUTOMATICALLY REGISTER YOU FOR THE REQUIRED TRAINING SEMINAR.** PLEASE COMPLETE SEPARATE SEMINAR REGISTRATION. To view a list of training providers, visit www.aeecenter.org/CEA/training.

Mail application and payment to:

AEE – CEA Certification Dept.
3168 Mercer University Drive
Atlanta, GA 30341
OR fax to: 770-447-4354

Payment enclosed \$ _____ Ck# _____
Credit Card#: _____ CVV# _____
Amex _____ Visa _____ MasterCard _____ Discover _____
Expiration Date: _____
Billing Address: _____
City: _____ State: _____ ZIP code: _____
Signature: _____

Personal Data (Please print or type)
Full legal name as it will appear on certificate:

File Number: _____ (AEE Internal Use Only)

Mr. ☐ Ms. ☐ Last Name: _____ Legal First Name: _____ Middle Initial: _____

Job Title: _____

Firm Name: _____

Address: _____

City: _____ State: _____ ZIP code: _____ Country: _____

Phone: _____ Fax: _____ Business E-mail: _____

Residence Address: _____

City: _____ State: _____ ZIP code: _____ Country: _____

Phone: _____ Personal E-mail: _____

Address Requested for Correspondence: ☐ Business ☐ Residence
E-mail Address Requested for Correspondence: ☐ Business ☐ Personal

Active CEM's will not be required to provide copies of College Transcripts/PE License. You will only need to submit this 4 page signed application and the Employment Verification Form(s).

I am a current Certified Energy Manager (CEM®): ☐yes ☐no

If yes, please include CEM Number and Expiration date: _____

DIVISION I – EDUCATION (MAXIMUM 350 POINTS FOR DIVISION I)

List in chronological order the name and location of each college or university from which you have earned a degree; also list other appropriate training.

Points are based on degree obtained and substantiating documentation submitted. **Please arrange for Official College Transcripts where degree was issued to be forwarded to AEE, but do not delay filing of application for this reason.**

Note: If there is a possibility that the name that appears on your transcript may be different from the name that you currently use (ie. your maiden name), please provide that name here:

Name & Location Of Institution	Years From - To	Date Graduat ed	Degree Received	Field In Which Degree Was Issued

DIVISION II – PROFESSIONAL REGISTRATION (MAXIMUM 350 POINTS FOR DIVISION II)

I am a Professional Engineer: ☐yes ☐no

I am a Registered Architect: ☐yes ☐no

If you answered yes to any of the above, complete the following and **enclose copy registration. Registration must indicate that license is currently in force.** Points are based on substantiating documentation submitted.

State	Registration No.	Date	Now in Force
			<input type="checkbox"/> yes <input type="checkbox"/> no
			<input type="checkbox"/> yes <input type="checkbox"/> no
			<input type="checkbox"/> yes <input type="checkbox"/> no
			<input type="checkbox"/> yes <input type="checkbox"/> no
			<input type="checkbox"/> yes <input type="checkbox"/> no

Have any states revoked or suspended your registration? ☐yes ☐no

If yes, please explain: _____

DIVISION III – EXPERIENCE RECORD

(MAXIMUM 700 POINTS - 350 points for 3 years of full-time energy auditing experience; 50 points per year thereafter)

Applicant should forward one copy of the Employment Verification Form to each employer for those periods which apply to Certification Eligibility. *Forms may be completed by immediate superiors or personnel officers and must be returned directly to AEE.* Please complete the following in chronological order and list the most recent employer first. Include a description of job functions held for those periods of employment, which qualify you for specific category of certification as applied for. This form may be copied if additional space is needed.

Date: From-To (mm/yy – mm/yy)	Employer Name & Address	CONCISE STATEMENT OF ENERGY-RELATED WORK PERFORMED
TITLE OF POSITION		
Date: From-To (mm/yy – mm/yy)	Employer Name & Address	CONCISE STATEMENT OF ENERGY-RELATED WORK PERFORMED
TITLE OF POSITION		
Date: From-To (mm/yy – mm/yy)	Employer Name & Address	CONCISE STATEMENT OF ENERGY-RELATED WORK PERFORMED
TITLE OF POSITION		

Please verify that you have completed the items below: ****REQUIRED****

☐ I have completed a minimum of 2 hours of Safety Training within the last three years.

☐ I have participated in five commercial audits within the last three years. Two of the audits are a minimum of 10,000 sq. ft. Also, the audits have been of at least two different building types.

Affidavit

I _____ (Name), having completed the aforementioned to the best of my ability, do hereby apply for AEE Certified Energy Auditor Certification and wish to take the CEA Examination.

I hereby agree (a) to be bound by terms and provisions of the Certificate of Incorporation of the Association of Energy Engineers, its by-laws and such other regulation as may from time to time be in force, so far as they may affect me; (b) to indemnify and hold harmless each and all of your members, Board of Directors, Certification Board, officers, examiners and agents from and against any liability whatsoever in respect to any act or omission by you or them or any of them in connection with this application, the examination, the grades given upon such examination, and/or the granting or issuance of or failure to grant or issue a certificate to me; (c) that any prescribed fee paid by me is not refundable; and (d) that any certificate granted or issued me shall remain the property of the Association. I certify that all the information contained in this application is correct to the best of my knowledge.

I further pledge myself hereby to the highest ethical standards in the practice of energy auditing and hereby agree to abide by the Code of Ethics for Certified Energy Auditors (www.aeecenter.org/CEACodeOfEthics)

Signature in Full _____

Date: _____



**REQUEST FOR EMPLOYMENT AND
JOB DUTIES VERIFICATION**
Certified Energy Auditor

From: _____

To: _____

Date: _____

Dear _____:

I am applying to the Association of Energy Engineers for Certification as an Energy Auditor. In this regard, I hereby authorize your release of the requested information enclosed which verifies my employment and duties from the period _____ to _____.

Please furnish the requested information as completely as possible, and ***return to AEE Certification Board-CEA.***

The receipt of replies will be reported by AEE, but under no circumstances will the information be divulged to me, or used for any purpose except to validate my application for Energy Auditor Certification.

Applicant Signature

NOTE: If self-employed, complete letter of client verification.

APPLICANT COMPLETE / Attach to Cover Letter

Name: _____

Address: _____

City: _____ State: _____ ZIP code: _____

LETTER OF EMPLOYMENT and JOB DUTIES VERIFICATION

The following information verifies the employment and duties of the above applicant for AEE Certification.

Company: _____ Telephone: _____

Address: _____

City: _____ State: _____ ZIP code: _____

The above named applicant was (has been) employed by our company from
_____ to _____ and has held the following positions:

_____	Dates: _____
_____	Dates: _____
_____	Dates: _____
_____	Dates: _____

*****Please fully describe the energy auditing or energy assessment team responsibilities of the applicant (REQUIRED). Attach descriptions if necessary to answer fully. Forms with incomplete details will not be processed*****

To the best of my knowledge, and our employment records, I hereby attest that the above information is true and correct.

Name of person supplying information: _____
(Please type or print)

Official Title of Respondent: _____

Signature: _____ Date: _____

You may be contacted by AEE as a random sample to confirm and verify information provided.

**Return to: AEE CERTIFICATION BOARD – CEA
3168 MERCER UNIVERSITY DRIVE
ATLANTA, GEORGIA 30341**



REQUEST FOR CLIENT VERIFICATION Certified Energy Auditor

From: _____

To: _____

Date: _____

Dear _____:

I am applying to the Association of Energy Engineers for Certification as an Energy Auditor. In this regard, I hereby authorize your release of the requested information enclosed which verifies my employment and duties from the period _____ to _____.

Please furnish the requested information as completely as possible, and ***return to the AEE Certification Board-CEA.***

The receipt of replies will be reported by AEE, but under no circumstances will the information be divulged to me, or used for any purpose except to validate my application for Energy Auditor Certification.

Applicant Signature

NOTE: Complete this form only if self-employed – furnish three (3) client verification letters.

APPLICANT COMPLETE / Attach to Cover Letter

Name: _____

Address: _____

City: _____ State: _____ ZIP code: _____

CLIENT COMPLETE / LETTER OF CLIENT VERIFICATION

The following information verifies the Contractor/Consultant and duties of the above applicant for AEE Certification.

Company: _____ Telephone: _____

Address: _____

City: _____ State: _____ ZIP code: _____

The above contractor/consultant has provided service(s) to our company from:

_____ to _____

*****Please fully describe the energy auditing or energy assessment team responsibilities of the applicant (REQUIRED). Attach descriptions if necessary to answer fully. Forms with incomplete details will not be processed*****

To the best of my knowledge, I hereby attest that the above information is true and correct.

Name of person supplying information: _____
(Please type or print)

Official Title of Respondent: _____

Signature: _____ Date: _____

You may be contacted by AEE as a random sample to confirm and verify information provided.

**Return to: AEE CERTIFICATION BOARD – CEA
3168 MERCER UNIVERSITY DRIVE
ATLANTA, GEORGIA 30341**

Part C: STUDY GUIDE

CERTIFIED ENERGY AUDITOR™ (CEA® EXAM)

The following is a list of the subjects for the CEA exam. Each subject covers a number of topics. Following the list of topics are suggested references with chapter numbers. The primary references are the Handbook of Energy Audits, 9th Edition, by Albert Thumann, Terry Niehus, and William J. Younger, the Commercial Energy Auditing Reference Handbook, 2nd Edition by Steve Doty, and the Energy Management Handbook, 8th Edition by Steve Doty and Wayne C. Turner. However, some other books are also referenced as appropriate.

The study guide will not lead you to answers to all of the questions, but it will certainly lead you to a very large number of correct answers. A person with the necessary experience who reviews the study guide should not have any problem passing the exam.

The exam will: be open book, last four hours, and have 140 multiple choice questions to answer. Each question is valued at 7.2 points for a total of 1,008 points available on the exam. There are 10 sections listed below from which questions mainly are drawn.

BODY OF KNOWLEDGE: STUDY GUIDE TOPICS & REFERENCES

Developing an Energy Audit Strategy and Plan

Energy auditing fundamentals
Energy and power units; Conversion factors
Audit instrumentation
Safety requirements and procedures
Plan Energy Audit
Define Required Audit procedures
Select the Project team
Analyze & Breakdown Energy end use
Determine Appropriate Audit Level
Define Pre- audit tasks
Define Data required for energy analysis
Estimate cooling and heating loads for the system or facility
Plan a Pre-audit interview-
Communicate procedures and data gathering
Identify operations and maintenance team and create pre-audit O&M interview questions.
Define audit report format and requirements
Draft Audit report
Select appropriate instrumentation

REF: Doty and Turner, **Energy Management Handbook**, Chapters 2 and 3

REF: Thumann, Niehus, and Younger, **Handbook of Energy Auditing**, Chapter 1

Utility Analysis

Demand and energy
Power factor
Define Required utility information
Review Rate classifications
Establish utility costs baseline
Establish utility usage baseline
Facility benchmarking

Estimate savings potential
Identify billing errors
Verify Energy bill calculations
Select optimal Rate options

REF: Doty and Turner, **Energy Management Handbook**, Chapter 4
REF: Thumann, Niehus, and Younger, **Handbook of Energy Auditing**, Chapters 2 and 3
REF: Doty, **Commercial Energy Auditing Reference Handbook**, Chapter 1

Data Collection and Economic Analysis

Energy accounting
Define pre-site Data collection
Collect pre-site Data
Define on-site Data collection
Collect on-site Data
Calculate Energy savings and payback
Evaluate Energy management opportunities
Evaluate O&M characteristics and opportunities
Detailed financial analysis
Interactive effects of measures
Computer simulations

REF: Doty and Turner, **Energy Management Handbook**, Chapter 4
REF: Thumann, Niehus, and Younger, **Handbook of Energy Auditing**, Chapter 4
REF: Doty, **Commercial Energy Auditing Reference Handbook**, Chapter 6

Lighting Systems

Measurement of light
Determine Efficiency/efficacy of light source
Determine Appropriate Light color-CCT/CRI
Evaluate Lamp lumen depreciation
Calculate replacement period given Lamp lumen depreciation
Determine Lamp types and characteristics
Evaluate Lamp types & characteristics for replacement
Audit Lighting Control System
Calculate replacement period given Lamp lumen depreciation
Lighting power allowances

REF: Doty and Turner, **Energy Management Handbook**, Chapter 13
REF: Thumann, Niehus, and Younger, **Handbook of Energy Auditing**, Chapters 7
REF: Doty, **Commercial Energy Auditing Reference Handbook**, Chapter 16

HVAC Systems

HVAC basics
Heat Pump classifications
Heat Pump operations
Audit & determine types of HVAC systems
Calculate estimated heating & cooling loads
Identify any special ventilation code requirements that may or may not be met at this time.
Determine existing HVAC efficiencies
Identify existing control strategies including locations of thermostats, scheduling of loads and occupants.
Evaluate ductwork and fan systems for leaks, insulation and or pressure drop
Identify HVAC system components
Audit & determine types of chillers: electric, gas driven, absorbers

Identify piping arrangements for chilled water and or refrigerant systems
Audit & determine types of heat pump, chillers, or split system units
Analyze heat pump or split system efficiencies

REF: Doty and Turner, **Energy Management Handbook**, Chapter 10
REF: Thumann, Niehus, and Younger, **Handbook of Energy Auditing**, Chapter 9
REF: Doty, **Commercial Energy Auditing Reference Handbook**, Chapter 11

Heating Systems

Audit & determine types of boilers: fire tube, water tube, cast iron
Audit & determine types of furnaces: electric, gas, pulse, condensing
Evaluate distribution systems, (ductwork and or piping), for insulation, pressure drop, leaks.
Compare terminal units

REF: Doty and Turner, **Energy Management Handbook**, Chapter 10
REF: Thumann, Niehus, and Younger, **Handbook of Energy Auditing**, Chapters 8
REF: Doty, **Commercial Energy Auditing Reference Handbook**, Chapter 1

Motors and Drives

Audit & determine types and sizes of motors
Evaluate appropriate types of motors
Determine operating characteristics of motors and drives
Calculate efficiencies of motors and drives
Review potential energy savings of variable frequency drives

REF: Doty and Turner, **Energy Management Handbook**, Chapter 11
REF: Thumann, Niehus, and Younger, **Handbook of Energy Auditing**, Chapters 7
REF: Doty, **Commercial Energy Auditing Reference Handbook**, Chapter 12

Compressed Air Systems

Analyze existing conditions for improvement opportunities
Evaluate for upgrade to DDC
Perform savings calculations

REF: Doty and Turner, **Energy Management Handbook**, Chapter 3
REF: Thumann, Niehus, and Younger, **Handbook of Energy Auditing**, Chapter 10
REF: Doty, **Commercial Energy Auditing Reference Handbook**, Chapter 14

Cogen Opportunities

Evaluate option for Cogen opportunity
Perform savings calculations

REF: Doty and Turner, **Energy Management Handbook**, Chapter 7
REF: Thumann, Niehus, and Younger, **Handbook of Energy Auditing**, Chapter 2

Renewable Energy

Evaluate opportunities for use of renewable energy source

REF: Doty and Turner, **Energy Management Handbook**, Chapter 16
REF: Thumann, Niehus, and Younger, **Handbook of Energy Auditing**, Chapter 16

Ventilation Systems

Audit & determine types of ventilation systems
Define characteristics
Ventilation requirements, (code related).
Ventilation control options
Determine heat recovery options

REF: Doty and Turner, **Energy Management Handbook**, Chapter 3
REF: Thumann, Niehus, and Younger, **Handbook of Energy Auditing**, Chapters 10
REF: Doty, **Commercial Energy Auditing Reference Handbook**, Chapter 14

Domestic Hot Water Systems

Audit & determine types of hot water systems
Calculate efficiencies
Identify temperature set points
Evaluate circulating pumps
Evaluate energy savings opportunity for heat pump water heaters

REF: Doty and Turner, **Energy Management Handbook**, Chapter 5
REF: Thumann, Niehus, and Younger, **Handbook of Energy Auditing**, Chapter 13
REF: Doty, **Commercial Energy Auditing Reference Handbook**, Chapter 18

Building Envelope

Heat flow concept
Determine R and U values
Evaluate efficiency of walls, roofs, windows
Evaluate replacement with Low E glass
Audit building envelope infiltration
Balance point temperature
Thermal weight

REF: Doty and Turner, **Energy Management Handbook**, Chapter 9
REF: Thumann, Niehus, and Younger, **Handbook of Energy Auditing**, Chapter 6
REF: Doty, **Commercial Energy Auditing Reference Handbook**, Chapter 17

Water Conservation

Water conservation methods
Determine Rate structures
Apply Water conservation methods
Evaluate Irrigation and landscaping installation and efficiency
Survey Leak detection system
Audit water use

REF: Doty, **Commercial Energy Auditing Reference Handbook**, Chapter 18

EXAM REVIEW QUESTIONS (Sample Only)

Some of these review questions may be more complex or difficult than the exam but will be good practice problems.

1. Which of the following is not always correct?
 - (A) 10 kWh = 34,120 Btus
 - (B) 5 therms = 500,000 Btus
 - (C) 3 tons = 36,000 Btu/hr
 - (D) 1 MCF = 1 MMBtu
2. A factory has a kWh usage in August of 550,000 and a peak demand of 3,000 kW. Calculate the July energy and demand charges if the utility costs for this rate class are \$0.06/kWh and \$15/kW-month for demand.
 - (A) \$33,000
 - (B) \$60,000
 - (C) \$78,000
 - (D) \$45,000
3. The lighting efficacy term is lumens per watt.
 - (A) True
 - (B) False
4. A chiller has a full load rating of 0.7 kW/ton. What is the full load kW if this unit has a 200 ton rating?
 - (A) 286
 - (B) 140
 - (C) 900
 - (D) 75
5. An office building replaced 20 W CFLs with 14W LEDs. The lights are on 3,000 hrs/yr. The average electricity cost is \$0.10/kWh and the LEDs are \$12 each. Calculate the simple payback.
 - (A) 6.67 years
 - (B) 8.67 years
 - (C) 0.15 years
 - (D) 4.25 years
6. A customer wants to install an occupancy sensor in the break room. A data logger has shown that, on average, the lights can be turned off 5 hrs/week. The lights in this room have a combined wattage of 3 kW. Electricity is \$0.09/kWh and an occupancy sensor cost \$150 installed. What is the simple payback?
 - (A) 0.47 years
 - (B) 3.63 years
 - (C) 0.90 years
 - (D) 2.14 years

7. A commercial customer has set a peak demand of 100 kW and has used 45,500 kWh for January. Calculate the load factor.
- (A) 0.61
 - (B) 0.42
 - (C) 0.81
 - (D) 1.63
8. The terms load factor and power factor can be used interchangeably.
- (A) True
 - (B) False
9. A three phase induction motor draws 13 amps at 240 volts. The power factor is 0.9. Determine the kW.
- (A) 5.54
 - (B) 5.16
 - (C) 4.86
 - (D) 6.32
10. A hospital uses 400,000 gallons of water per year just for showers. The showers have the old style showerheads that use 4.5 gpm. What is the annual amount of water saved if they replace the showerheads with new ones that comply with the maximum flow rates allowed per the Energy Policy Act of 1992?
- (A) 200,000 gallons per year
 - (B) 285,765 gallons per year
 - (C) 222,222 gallons per year
 - (D) 177,778 gallons per year
11. An office building has the following:
- Existing: 100 T-12 fixtures @ 164 watt/fixture
 - Proposed: 100 T-8 fixtures @ 106 watts/fixture
 - 4,000 hrs/yr operation
 - Utility costs: \$.10/kWh and \$13/kW-month
 - Installation cost: \$100/fixture
- Determine the simple payback.
- (A) 0.32 years
 - (B) 1.86 years
 - (C) 3.10 years
 - (D) 2.46 years
12. A company has a 1 MMBtu/hr boiler with an efficiency of 70%. They want to replace it with a 90% efficient condensing boiler. The average fuel usage for the last five heating seasons was 20,000 therms. If a therm cost \$0.60, calculate the annual savings per heating season.
- (A) \$4,388
 - (B) \$2,667
 - (C) \$10,000
 - (D) \$3,185

13. The speed of a three phase induction motor is determined by the line voltage.
- (A) True
 - (B) False
14. A 20 HP standard fan motor runs 8,760 hours per year has an efficiency of 86.5%. What will the simple payback be for replacing this motor with a 20 HP premium one with an efficiency of 93.5%? The premium motor cost \$725 installed. The utility charges are \$0.05/kWh and \$14.00/kW-month. Motor loading is 0.7.
- (A) 0.75 years
 - (B) 2.65 years
 - (C) 1.33 years
 - (D) 3.33 years
15. How many Btu/hr of cooling are supplied by a chiller with a 45°F chilled water supply temperature, a 57°F chilled water return temperature and a 2.5 gpm water pump?
- (A) 9,252 Btu/hr
 - (B) 12,000 Btu/hr
 - (C) 120,000 Btu/hr
 - (D) 15,000 Btu/hr
16. A building wall is made up of the following materials:
- Concrete block- $R = 2.2$
 - Brick façade- $R = 3.1$
 - Drywall- $U = 0.5$
- What is the total R value of this wall?
- (A) 5.8
 - (B) 7.3
 - (C) 6.4
 - (D) 1.9
17. Motor slip is defined as:
- (A) Pulley displacement
 - (B) Percentage of winding drift
 - (C) The difference between the synchronous speed and actual speed
 - (D) The difference between nominal efficiency and actual efficiency
18. An absorption chiller has a COP of 0.7. What is the EER?
- (A) 4.87
 - (B) 13.2
 - (C) 3.41
 - (D) 2.39

19. A four ton heat pump with a SEER of 14 and an HSPF of 8.0 operates 3,100 full load hours/yr in the cooling mode and 1,200 hours/yr in the heating mode. What is the annual operating cost if electricity is \$0.15/kWh?
- (A) \$2,675/yr
 - (B) \$3,200/yr
 - (C) \$4,878/yr
 - (D) \$1,320/yr
20. Motor slip is proportional to loading.
- (A) True
 - (B) False

Answer Key:

- 1- D
- 2- C
- 3- A
- 4- B
- 5- A
- 6- D
- 7- A
- 8- B
- 9- C
- 10- D
- 11- C
- 12- B
- 13- B
- 14- C
- 15- D
- 16- B
- 17- C
- 18- D
- 19- A
- 20- A

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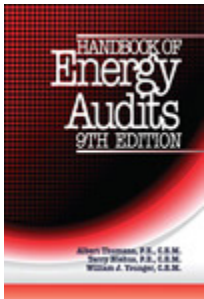
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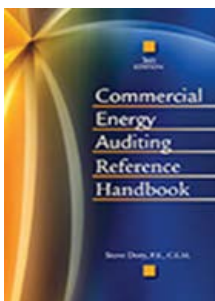
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