Prospectus

19th National Certification Examination (NCE)
For Energy Managers and Energy Auditors – SEPTEMBER 2018
(Under the Energy Conservation Act, 2001)

22nd & 23rd September 2018
Saturday & Sunday

BUREAU OF ENERGY EFFICIENCY (BEE)
(A Statutory body under Ministry of Power, Government of India)

National Certifying Agency
NATIONAL PRODUCTIVITY COUNCIL, INDIA
Department of Industrial Policy & Promotion,
Under Ministry of Commerce and Industry, Government of India.

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With the enactment of the Indian Energy Conservation Act, 2001, an institutional framework has been set up in India for promoting energy efficiency in all sectors of the economy and all the energy efficiency programmes and policies in India are now being guided by the said Act.

The Energy Conservation Act, 2001 primarily ensures energy efficiency in consumption and, consequently, the Demand Side Management (DSM) for reducing the need for installing new capacity, provides the institutional framework and provisions to support the above strategy. The five major provisions of EC Act relate to:

1. Designated Consumers (mainly energy intensive industries) to comply with the specific energy consumption norms for the manufactured products and services and establishment of energy management system.

2. Standard and labeling of energy consuming appliances, gadgets and equipment to ensure promotion of energy efficiency of the new stocks entering the market.

3. Energy Conservation Building Codes ensuring that new commercial buildings constructed in the country have less electricity consumption.

4. Creation of Institutional Set up (Bureau of Energy Efficiency) for effective coordination of the energy conservation efforts in the country.

5. Establishment of Energy Conservation Fund at Centre and States to provide necessary financial support for energy efficiency initiatives in the country.

The EC Act became effective from 1st March 2002 and Bureau of Energy Efficiency (BEE) was operationalized from the same date. The mission of BEE is to develop policy and strategies with a thrust on self-regulation and market principles, within the overall framework of the EC Act with the primary objective of reducing energy intensity of the Indian economy. The EC Act facilitates the State Governments to enforce efficient use of energy and its conservation. It also stipulates penalties and adjudication.

India is now in a position to move ahead at a faster pace in implementing energy efficiency programmes and policies as there is a strong institutional set up in the country equally supported by the strong commitment by the Government both at the Centre and States towards energy efficiency improvement programmes. Within a framework of policies, focusing on optimal utilization of energy resources, energy manager profession is set to become one of the hottest professions in the near future.

In demand are energy managers and energy auditors who will not only track and save energy, but also help minimize its planet-unfriendly by-products like greenhouse gas emissions.

The revolution to engage energy managers and energy auditors has already started in Indian industry, thanks to the Indian National Certification Examination (NCE) for Energy Managers and Energy Auditors.

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01. BACKGROUND

The Government of India has enforced **The Energy Conservation Act, 2001** (No 52 of 2001, 29th September 2001) with effect from 1st March 2002. The Act provides mainly for efficient use of energy and its conservation and for matters connected therewith or incidental thereto. As per the Energy Conservation Act 2001, it is mandatory for all the **designated energy consumers** to get energy audit conducted by an **Accredited Energy Auditor** [under clause 14(h) and 14(i)] and to designate or appoint an **Energy Manager** [under clause 14(e)]. The Government of India has notified the list of designated consumers and the details are available at the following link **www.beeindia.gov.in**.

Bureau of Energy Efficiency (BEE), Ministry of Power, Government of India, is empowered to specify the regulations and mechanism to meet the above objectives. BEE has retained the **National Productivity Council (NPC)** as the National Certifying Agency, which would conduct the National Level Certification Examination for Energy Managers & Energy Auditors under the aegis of Bureau.

02. NEED FOR NATIONAL LEVEL CERTIFICATION EXAMINATION

The essential qualification for a Certified Energy Manager and Certified Energy Auditor would be the passing of a National Level Certification Examination, which will be conducted under the aegis of Bureau of Energy Efficiency. The national level certification examination, conducted by a National Certifying Agency, will establish a uniform criterion for the certification of Energy Managers/Energy Auditors and will also ensure that services of qualified persons, having the requisite knowledge on the subject, are available to the industry.

The certification examination will be conducted based on the syllabus/curriculum approved by the Bureau. The proposed syllabus will go under modifications from time to time based on the feedback received and future developments. The requisite modifications will be incorporated by the national level certification agency in the syllabus in consultation with the Bureau from time to time.

03. CERTIFIED ENERGY AUDITOR (CEA) – ROLE AND IMPORTANCE

Energy Audit involves a systematic study undertaken on major energy consuming sections and equipment including construction of heat and mass balance with a view to identify the flow of energy, efficient use of energy in each of the steps and pin-point wastage of energy. A well- conducted energy audit would reveal the areas of wastage of energy and it would lead to suggestions for possible energy savings in all sectors.

The Energy Conservation Act requires that the every designated consumer, as notified, may get the energy audit done through an Accredited Energy Auditor in a manner and interval of time as specified. The Certified Energy Auditor, as such, is not authorized to conduct such mandatory energy audits under the EC Act. (Certification may be one of the prerequisites along with other conditions, which have to be fulfilled by an energy auditor before applying

for accreditation).The energy audit report is to contain recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption [Clause 14(i)]. The conduct of energy audit and implementation of its recommendations on cost-benefit basis through accredited energy auditors is expected to help the designated energy consumers to achieve significant reduction in their energy consumption levels.

Responsibilities and Duties of Certified Energy Auditor (CEA) are highlighted below:

- Carry out a detailed energy audit.
- Quantify energy consumption and establish base line energy information.
- Construct energy and material balance.
- Perform efficiency evaluation of energy & utility systems.
- Compare energy norms with existing energy consumption levels.
- Identify and prioritization of energy saving measures.
- Analyses technical and financial feasibility of energy saving measures.
- Recommend energy efficient technologies and alternate energy sources.
- Report writing, presentation and follow up for implementation.

04. CERTIFIED ENERGY MANAGER (CEM) – ROLE & IMPORTANCE

Certified Energy Manager occupies an important position and is the focal point of all the activities pertaining to energy management in the organization. The certified energy manager provides leadership in the development of policy on Energy Management Action Plan and plays a key role in the formulation of corporate energy policy. Certified Energy managers also perform the activities related with Plant Energy Management, Project Management, Personnel Management and Financial Management at the plant level. He also prepares the information to be submitted to the Designated Agency with regard to the energy consumed and action taken on the recommendation of the Accredited Energy Auditor [Clause 14(k)].

Responsibilities and Duties of Certified Energy Manager (CEM) are highlighted below:

- Establish an energy conservation cell & prepare an annual activity plan.
- Develop and manage training programme for energy efficiency at operating levels.
- Develop integrated system of energy efficiency and environmental improvement.
- Initiate activities to improve monitoring and process control to reduce energy costs.

- ❖ Co-ordinate implementation of energy audit/efficiency improvement projects through external agencies.
- ❖ Establish / participate in information exchange with other energy managers of the same sector through association.
- ❖ Provide information to BEE and Designated Agency of the respective States demanded in the Act.

05. ELIGIBILITY CRITERIA FOR THE CANDIDATES.

The Candidates appearing for this examination should have the following eligible criteria and requisite work experience to write the certification Examination:

a) **For Certified Energy Managers (CEM) Exam:**

Candidates appearing for energy manager's certification examination should possess any one of the following qualifications:

1. **Graduate Engineer (B.E/B.Tech) or "Equivalent"** with THREE YEARS of work experience involving use of energy in operation, maintenance, planning, etc.
2. **Post Graduate Engineer (M.E/M.Tech) or "Equivalent"** with TWO YEARS of work experience involving use of energy in operation, maintenance, planning, etc.
3. **Graduate Engineer with Post Graduate degree in Management or "Equivalent"** with TWO YEARS of work experience involving use of energy in operation, maintenance, planning, etc.
4. **Diploma Engineer or "Equivalent"** with SIX YEARS of work experience involving use of energy in operation, maintenance, planning, etc.
5. **Post Graduate in Physics or Electronics or Chemistry (with Physics and Mathematics at graduation level)** with THREE YEARS of work experience involving use of energy in operation, maintenance, planning, etc.

b) **For Certified Energy Auditors (CEA)Exam:**

Candidates appearing for Energy Auditors Certification Examination should possess any one of the following qualifications:

1. **Graduate Engineer (B.E/B.Tech) or "Equivalent"** with THREE YEARS of work experience involving use of energy in operation, maintenance, planning, etc.
2. **Post Graduate Engineer (M.E /M.Tech) or "Equivalent"** with TWO YEARS of work experience involving use of energy in operation, maintenance, planning, etc.
3. **Graduate Engineer with Post Graduate degree in Management or "Equivalent"** with TWO YEARS of work experience involving use of energy in operation, maintenance, planning, etc.

c) Candidates should have acquired the requisite number of years of work experience as on the closing date of the application i.e. **13th July 2018**. Candidates will be registered and guidebooks will be sent only on receipt of Experience Certificate. **Candidates without requisite work experience are not eligible to register for the examination.**

d) **Definitions**

1. **"Diploma engineer"** means a person who has obtained a diploma in Engineering from a University or Board or Institution incorporated by an Act of the Central or State Legislature in India or other educational institutions established by an Act of Parliament or any diploma recognized by All India Council for Technical Education as equivalent or has obtained a diploma in Engineering from such foreign University or College or Institution recognized by the Central Government, and under such conditions as may be laid down for the purpose from time to time.

2. **"Equivalent"** in relation to any qualification means educational qualifications acquired by passing an examination conducted by an examining body constituted by law in India or an examination recognized by the Central Government or State Governments or All India Council for Technical Education as equivalent thereto.

3. **"Graduate engineer"** means a person who has obtained a graduation degree in Engineering from an University incorporated by an Act of the Central or State Legislature in India or other educational institutions established by an Act of Parliament or declared to be deemed as Universities under Section 3 of the University Grants Commission Act, 1956 or any degree recognized by All India Central for Technical Education as equivalent or has obtained a graduation degree in Engineering from such foreign University or College or Institution recognized by the Central Government and under such conditions as may be laid down for the purpose, from time to time.

4. **"Post-graduate in engineering"** means a person who has obtained a post graduate degree in Engineering from an University incorporated by an Act of the Central or State Legislature in India or other educational institutions established by an Act of Parliament or declared to be deemed as Universities under Section 3 of the University Grants Commission Act, 1956 or any degree recognized by All India Council for Technical Education as equivalent or has obtained a post-graduate degree in Engineering from such foreign University or College or Institution recognized by the Central Government and under such conditions as may be laid down for the purpose, from time to time.

5. **"Post-graduate"** means a post graduate of an University incorporated by an Act of the Central or State Legislature in India or other educational institutions established by an Act of Parliament or declared to be deemed as Universities

under Section 3 of the University Grants Commission Act, 1956 or any degree recognized by All India Council for Technical Education as equivalent or has obtained a post-graduate degree in Engineering from such foreign University or College or Institution recognized by the Central Government and under such conditions as may be laid down for the purpose, from time to time.

06. EXAMINATION PAPERS AND SCHEME

a) The examination papers for Energy Managers and Energy Auditors are given below:

Paper No	Paper Name	Duration	Max Marks
1	General Aspects of Energy Management & Energy Audit.	3 Hrs	150
2	Energy Efficiency in Thermal Utilities	3 Hrs	150
3	Energy Efficiency in Electrical Utilities	3 Hrs	150
4	Energy Performance Assessment for Equipment and Utility systems (Open Book Examination)*	2 Hrs	100

* **The candidates can refer only to the guide books supplied at the time of their registration, during the Paper 4 (Open Book Examination). No other reference books and written material will be allowed.**

b) A candidate appearing for Energy Manager Examination has to pass **3 PAPERS** viz., Paper-1, Paper-2 and Paper-3 and obtain a minimum of 50% of the maximum marks in each paper.

c) A candidate appearing for Energy Auditor Examination has to pass all the above **4 PAPERS** viz., Paper-1, Paper-2, Paper-3 & Paper-4 and obtain a minimum of 50% of the maximum marks in each paper.

d) Question Papers for Energy Manager and Energy Auditor are common for the first three papers viz. Paper-1, Paper-2 and Paper-3. **Energy Auditor candidates passing the above 3 papers shall be eligible for the award of Energy Manager Certificate.**

e) The degree of difficulty in Paper- 4 will be comparatively much higher than the other papers.

f) Medium of examination is English.

g) Paper-1, Paper-2 and Paper-3 consist of both objective and descriptive type questions.

h) Paper-4 for Energy Auditors is an open book examination and consists of descriptive

and numerical questions.

i) The syllabus for all the papers is given in Annexure – I.

j) **Up-gradation of EM Certification to EA Certification**

Bureau of Energy Efficiency has approved the Up-gradation of Energy Manager Certification to Energy Auditor Certification.

Candidates who qualified for Energy Manager Certification and also fulfill the eligibility criteria for writing the Energy Auditor Certification [**Refer Clause 05 (b)**] are eligible for upgrading from EM Certification to EA Certification.

The choice for issue of exercising this option to an eligible Certified Energy Manager is restricted within a period of **5 YEARS** from the date of issue of his/ her Energy Manager Certification.

Those eligible candidates need to appear only for Paper-4 - Energy Performance Assessment for Equipment and Utility Systems (Open Book Examination). Candidates can register online and send the printout of filled-in application along with the requisite enclosures.

07. MINIMUM MARKS FOR AWARD OF CERTIFICATES.

a) For Certification of Energy Managers:

Fifty Percent (50%) of the maximum marks in each paper ie Paper-1, Paper-2 and Paper-3

b) For Certification of Energy Auditors:

Fifty Percent (50%) of the maximum marks in each paper ie Paper-1, Paper-2, Paper-3 and Paper-4.

Note:

1. A candidate qualifying as Certified Energy Auditor automatically qualifies for Certified Energy Manager as well. Such persons can be considered for appointment or designated as Energy Manager under the **EC Act, 2001** by the Designated Consumers.

2. A newly registered candidate shall be required to pass the national examination for the certification of energy managers / energy auditors by appearing in a **maximum of THREE attempts per paper within SIX consecutive examinations.**

   On the basis of his results of the re-written paper(s), the candidate is declared to have passed the examination, provided he/she secures a minimum of 50% marks in each of the re-written papers as applicable. In case, he does not secure a minimum of 50% marks in each re- written paper(s) as stipulated above, he shall be deemed to have failed

in the said National Certification Examination for which the candidate has registered.

The candidate however, shall have the option to apply and register himself as a fresh candidate in the subsequent National Examinations.

As stated in the clause 6(d) of the National Level Examination, Energy Auditor candidates passing the papers 1, 2 and 3 shall be eligible for award of Energy Manager Certification.

08. SUPPLEMENTARY CANDIDATES

A candidate who has registered **on or before the 13th Exam conducted during September 2012 is not eligible to appear in the 19th Exam as a supplementary candidate**. The candidate however shall have the option to apply and **re-register himself as a fresh candidate in the 19th Exam and subsequent National Certification Examinations**.

A candidate who has registered for the **14th Exam** and thereafter has to pass the examination by appearing in a **Maximum of THREE Attempts per Paper within SIX Consecutive Examinations.**

On the basis of his/her results of the re-written paper(s) candidates are declared to have passed the examination, provided they secure a minimum of 50% marks in each of the re-written papers as applicable. In case they do not secure a minimum of 50% marks in each re-written paper(s) as stipulated they are deemed to have failed in the said National Examination for which the candidates have registered.

The candidate, however, shall have the option to apply and register himself as a fresh candidate in the subsequent National Examinations.

As stated in the clause **6(d) of the National Examination, Energy Auditor candidates passing the papers 1, 2 and 3 are eligible for award of Energy Manager Certification.**

Question Papers:

Eligible supplementary candidates registered for 14th, 15th, 16th, 17th and 18th exams are required to write the examination on 4th Edition Guide Books only.

The Guide Books will be issued at free of cost for 14th and 15th exam supplementary candidates for the respective papers on submitting the application (Excluding who have already obtained the 4th Edition Guide Books by applying in the 18th Exam as Supplementary Candidate).

For Supplementary candidates of 16th, 17th and 18th exam, 4th Edition Guide Books have already been issued at the time of registration.

09. VALIDITY OF THE CERTIFICATE

The certificate is valid for life time until it is cancelled, subject to the condition that the candidate attending an authorized refresher training course of a short term duration

conducted by a designated /approved institute or organization (to be announced by the Bureau of Energy Efficiency) once in a **FIVE YEAR time period**, commencing from the date of award of the certificate within a **SIX MONTH** grace period from the expiry of the **FIVE YEAR** period. Candidates are required to inform the BEE about the attending a refresher course on a specified format so that the fresh certificates are issued for another **FIVE YEAR** duration.

10. REVOCATION OF CERTIFICATE

The Certificates can be revoked on the grounds of proved instances of unprofessional / unethical conduct and practices of a Certified Energy Manager / Certified Energy Auditor. The Bureau of Energy Efficiency will constitute a Committee for this purpose to investigate the matter. The concerned Certified Energy Manager / Energy Auditor will be informed of the charges against him / her and given a reasonable opportunity of being heard to provide his explanation.

11. EXAMINATION CENTRES

a) The proposed center's for conduct of the written examination are: –

Ahmedabad, Bengaluru, Bhopal, Bhubaneswar, Chandigarh, Chennai, Kochi, Dehradun, Delhi/NCR, Goa, Guwahati, Hyderabad, Jabalpur, Jaipur, Kanpur, Kolkata, Mumbai, Nagpur, Patna, Pune, Raipur, Ranchi, Thiruvananthapuram and Vadodara.

b) The applicant will have to give **THREE CHOICES** of examination centre in the order of preference.

c) If the number of applicants for a particular centre is found to be less than the minimum required the can be shifted to next preferred one.

12. EXAMINATION SCHEDULE

Paper No	Examination Paper	Examination Date	Time
1	General Aspects of Energy Management & Energy Audit.	22nd Sept 2018	09:30-12:30 hrs
2	Energy Efficiency in Thermal Utilities	22nd Sept 2018	14:00 -17:00 hrs
3	Energy Efficiency in Electrical Utilities	23rd Sept 2018	09:30-12:30 hrs
4	Energy Performance Assessment for Equipment and Utility systems (Open Book Examination)	23rd Sept 2018	14:00 -16:00 hrs

13. FEE STRUCTURE

a) FOR NEW CANDIDATES

1. Application Fees

For general candidates	Rs.500/-
For Candidates belonging to Scheduled Caste or Scheduled Tribe	Rs.250/-
For Candidates belonging to Other Backward Classes having annual income of less than **Rs.8 lakhs** per annum	Rs.250/-

2. Certification Fee Including Examination Fee:

For general candidates	Rs.10,000/-
For Candidates belonging to Scheduled Caste or Scheduled Tribe	Rs.5,000/-
For Candidates belonging to Other Backward Classes having annual income of less than **Rs.8 lakhs** per annum	Rs.5,000/-
For company sponsored Candidates	Rs.20,000/-

b) FOR SUPPLEMENTARY CANDIDATES

1. Application Fee: Nil

2. Certification Fee Including Examination Fee:

For general candidates	Rs.1500/-Per Paper
For Candidates belonging to Scheduled Caste or Scheduled Tribe	Rs.750/- Per Paper
For Candidates belonging to Other Backward Classes having annual income of less than **Rs.8 lakhs** per annum	Rs.750/- Per Paper

c) **FOR UP-GRADATION FROM ENERGY MANAGER TO ENERGY AUDITOR**

1. **Application Fee: Nil**

2. **Certification Fee Including Examination Fee:**

For general candidates	Rs.1500/-
For Candidates belonging to Scheduled Caste or Scheduled Tribe	Rs.750/-
For Candidates belonging to Other Backward Classes having annual income of less than **Rs.8 lakhs** per annum	Rs.750/-

d) Application Fee and Certification Fee including Examination Fee (as applicable), need to be paid online by completing an Application Form.

e) For supplementary candidates and those applying for up-gradation of EM certificate to EA certificate there is No Application Fee.

f) Candidates sponsored by the State Designated Agencies (SDAs) have to register on-line similar to other candidates and pay the requisite fee online. While sending the hard copy of the application for registration, a copy of the letter from the sponsoring agency, need to be enclosed duly approved by **Bureau of Energy Efficiency (BEE)**. Payment refunds will be initiated on the receipt of the application form along with the requisite enclosures. On verification of the authenticity of the enclosures, fee paid by the candidate will be refunded to the respective accounts from which the payment has originated.

g) **Method of fee calculation through online process:**

The amount of Exam Fee payable by each candidate varies based on the fee structure as mentioned in the **Clause 13, under Sub-Clause a, b and c.**

After filling the Online Application Form and before clicking **"PROCEED TO PAY ONLINE"** button a candidate must click **"CALCULATE FEE"** button to ascertain the fee payable and verify whether the total fee amount appearing in the Exam Fee Text box is correct.

Candidates cannot make any entry in the Exam Fee Text Box directly. Without any value in the Exam Fee Text box, a candidate will not be permitted to proceed further for making the payment. If a candidate finds any discrepancy in the exam fee

calculation, he/she can bring it to the notice of Authorities before making the Payment.

After filling up the application form including fee calculation successfully, the candidate will be navigated to the confirmation screen, wherein he/she can find few basic details like, candidate's name, mobile number, email address, fee amount payable, payment status etc. These are made available for the purpose of checking only. If all the basic details furnished are found to be correct, the candidate can proceed to make the online payment. The candidate should note down the Application Code that appear on the screen for future reference. At this point of time, the Payment Status will be shown as **"PENDING".**

The candidate will be given an option either to make the online payment at this point of time or at a later stage using Application Code and Date of Birth **(as password)**. If the candidate decides to make the payment later, he/she can click the **"Exit"** button and leave the payment screen.

If the candidate decides to make the online payment, he/she has to click the **"Make online Payment"** button. After clicking, the candidate will be immediately navigated to the Payment Gateway (Bill Desk) screen through which the payment can be made using Credit Card or Debit Card or Internet Banking.

After successful payment, the candidate will be redirected to the earlier screen and a confirmation message would appear at the bottom of the screen indicating successful payment and the Payment status will also be changed to **"SUCCESS"** which means that the payment process is over and the candidate can view/take print outs of Application Form with payment details. The Transaction Reference number displayed in the screen shall be noted down by the candidate for future reference.

If the payment is not successful the candidate will come to know it through the message box. The payment status will also be changed to **"FAILURE".** Once the **"FAILURE"** status is appeared, candidates cannot make further payment using the Application Code generated already. The candidate will have to fill a fresh application and make payment subsequently.

After successful payment, the candidate has to submit a hard copy of the application form and send the same to the Controller of Examinations, along with necessary documents. Once the Authorities satisfy that the application and documents are in order, fresh candidates will be allotted EA/EM Registration Number and communicated through e-mail. Supplementary candidates will also get confirmation email with the same EA/EM number allotted earlier. Candidates applying for Up-gradation will be allotted new EA Number and the same will be communicated to him/her through email.

14. GUIDE BOOKS

The following 4th Edition Guide Books will be supplied to the registered candidates of **19th National Certification Examination for Energy Managers and Energy Auditors**.

Paper-1: General Aspects of Energy Management & Energy Audit

Paper-2: Energy Efficiency in Thermal Utilities

Paper-3: Energy Efficiency in Electrical Utilities

Paper-4: Energy Performance Assessment for Equipment and Utility Systems.

Those who have registered for 14th, 15th, 16th, 17th & 18th examination are eligible to appear as supplementary candidates as per the eligibility criteria.

However, the eligible supplementary candidates registered for 14thand 15th exams are required to write the examination using guide books of 4th Edition Guide Books only and the same will be issued at free of cost for respective papers for which the candidates apply (Excluding who have already obtained the 4th Edition Guide Books by applying in the 18th Exam as Supplementary Candidate). For Supplementary candidates of 16th, 17th and 18th exam, 4th Edition Guide Books have been already issued at the time of registration.

15. REGISTRATION AND CERTIFICATION PROCESS

a) After successful completion of the online application, an Application Code will be generated for each application form which may be noted for any future queries.

b) A copy of the application form along with the requisite necessary enclosures shall be sent for scrutiny, addressed to "The Regional Director & Controller of Examination".

c) Once the physical application form is received, scrutiny of the same will be done and a Registration No. will be allotted and intimated through email to the eligible candidates.

d) Guide Books will be dispatched by Speed Post / Regd. Parcel to all the registered candidates.

e) **Printout of the Hall Tickets can be downloaded at www.aipnpc.org, TWO WEEKS prior to the commencement of the examination.**

f) The results of the written examination will be displayed online at **www.aipnpc.org.**

g) The Mark sheet of the written examination can be **downloaded online** at **www.aipnpc.org.**

h) Certificates are issued to the candidates who have cleared the examination successfully and from the 19th Exam onwards, it has been decided by the competent authority (BEE) to issue only e-Certificates online.

Successful candidates can download the e-Certificates from the website **www.aipnpc.org** after the announcement of the results. The date of commencement of e-Certificate download will be intimated through the website.

The e-Certificate can be downloaded from the website using Registration Number and Date of Birth of the candidate and entering the OTP sent to the registered mobile number.

16. ROLE OF NPC AS THE NATIONAL CERTIFYING AGENCY

The Bureau of Energy Efficiency (BEE) has retained the National Productivity Council (NPC) as the National Certifying Agency, which would conduct the National Level Certification Examination for Energy Managers & Energy Auditors.

NPC will carry out the following activities as a National Certifying Agency:

1. Dr. Ambedkar Institute of Productivity (AIP), the training institute of National Productivity Council, Chennai will carry out all the activities for the conduct of certifying examinations. A team of officers and staff located at Chennai will administer and co-ordinate the examination. The Regional Director (AIP) will be the Controller of Examination.

2. NPC will receive and process the applications from the candidates and register them in accordance with the laid down procedures.

3. NPC will send all necessary instructions related to the National Certification Examination such as the venue, timings, code of conduct etc., to the eligible candidates

4. NPC will administer the examination in all the centers.

5. NPC will issue Energy Auditor(EA)/Energy Manager(EM) Certificates and Credentials to the successful candidates under the seal of Bureau of Energy Efficiency(BEE) a statutory body under Ministry of Power, Government of India

17. ENERGY INTENSIVE INDUSTRIES LISTED AS DESIGNATED CONSUMERS

As per the provision of the clause (e) and (f) of section (14) of the Energy Conservation (EC) Act 2001, the Central Government notified the criteria for Designated Consumers vide S.O no. 394 (E) dated 12th March, 2007 under which the following industrial units from 9 energy intensive sectors have been notified as Designated Consumers.

S.No	Designated Consumers
1.	Aluminum
2.	Cement

3.	Chlor-Alkali
4.	Fertilizer
5.	Iron & Steel
6.	Paper & Pulp
7.	Railways
8.	Thermal Power
9.	Textile

The Government has notified the mandatory Energy Audit vide S.O 1378 (E) dated 27th May, 2014 for the Designated Consumers to help in identifying various energy saving opportunities in energy intensive industries & other establishments.

18. CONDITIONS AND INSTRUCTIONS TO THE CANDIDATES

01. Candidates are advised to go through the prospectus carefully before filling the online application form.

02. To fill the online application form, candidates need to visit the website **www.aipnpc.org**.

03. **Last date** for **On-Line Submission of application** is **13th July 2018.**

04. Select the appropriate application form as per your eligibility (Application for New Registration/ Application for Up-gradation/ Application for Supplementary Candidates)

05. After selecting the appropriate forma unique code will be generated for each application form, which shall be noted down for any future reference.

06. All entries shall be filled in correctly by choosing the appropriate dialog boxes as per the eligibility of the individual candidate.

07. As there is no editing facility available at the payment page candidates shall ensure error free information before navigating to that page. If all the details are correct, click **"proceed to pay"** online button. After confirmation no changes are possible and in case of any requirement of editing he/she need to fill an online application afresh and submit again with a new Application Code.

08. For the details of online payment instructions **refer to clause 13 (g)**.

09. After successful payment, candidates must download the application form enclosing it with all the copies of the relevant certificates as a proof of Qualification, Experience, Caste (if applicable), etc., and incomplete applications on account of non- furnishing of the documents will be summarily rejected without getting back to the applicants. Supplementary candidates need not send proof of qualification & experience again.

List of enclosures to be attached along with the printed application form:

a) Affix recent passport size photograph on the application form. (Need not be attested).

b) As a Proof of requisite educational qualification(s), attach a Photostat copy of Degree/Diploma certificate as per the eligibility criteria self- attesting the same.

c) Proof for requisite experience certificate(s), attach proof of work experience certificate as per the eligibility criteria self - attesting the same. Experience Certificate format can be downloaded from the website (excepting the Supplementary Candidates and candidates applying for up gradation of EM certificate to EA certificate, who have already submitted the Experience Certificates).

d) Self-employed candidates shall attach proof of at least two major works carried out for the clients. (Attach either work order or letter from the clients). In addition the candidates shall attach photocopies of the Income tax returns for a minimum period of two years.

e) Proof of SC/ST/OBC certificates as per Govt. of India format in case of claiming fee concession. Certificates issued in local languages will not be accepted. Format can be downloaded from thewebsite:**www.aipnpc.org.**

f) OBC candidates salaried/in-service candidates need to submit an income certificate issued by the employer / IT returns, whereas the self-employed OBC candidates need to submit their latest IT return **as a proof for availing fee concession**.

Note:

- Self-sponsored candidates (individual) in the category of SC/ST/OBC will be required to submit the photo copies (self -attested) of the necessary supporting documents as mentioned in the prospectus and as per the formats applicable for Govt. of India Employees for availing fee concession. (Format can be downloaded from the website: **www.aipnpc.org**. Other formats

issued in local languages will not be accepted.

- The format of OBC Certificate/SC/ST Certificate in Govt. of India format can be downloaded from the website **www.aipnpc.org**.

- The Employment Experience Certificate format can be downloaded from the website **www.aipnpc.org**.

10. The hard copy of the application form along with necessary enclosures shall be sent to the following address so as to reach **on or before 20th July 2018**:

The Regional Director & Controller of Examination,
NCE for EM & EA,
National Productivity Council,
Dr. Ambedkar Institute of Productivity,
6, Aavin Dairy Road, Ambattur Industrial Estate (North),
Ambattur, Chennai – 600 050,
Mobile: +91 9677 245 234, Phone Cum Fax: 044 – 2625 5012,
Email: aipnpc@vsnl.com

Note: All correspondence related with National Examination shall be made to the above address only.

11. The application form received with necessary enclosures will be subjected to scrutiny as per the guidelines issued by the BEE. Registration No. will be allotted only to the eligible candidates and intimated through E-mail and/or SMS.

12. For the Preparation of **19th National Certification Exam, 4th Edition Guide Books alone shall be used.**

13. It is not compulsory to undertake any preparatory training program for appearing in the National Certification Examination. Further, BEE has neither authorized any agency to conduct such preparatory training programs nor provide any guarantee on the quality of their training materials.

14. Once the registration of the candidate is accepted, the application fee and the Certification Fee Including the Examination Fee paid by the candidate for National Certification Examination will not be refunded or adjusted under any circumstances.

15. It is the candidate's responsibility to cross check the information related to allotted examination centre, hall tickets and other instructions issued from time to time on a regular basis from the websites **www.aipnpc.org / www.em-ea.org / www.beeindia.gov.in.**

16. Any candidate, who has not received or lost the admission ticket, shall report to the

allotted examination centre with documentary evidence of having registered for the National Certification Examination. Information related to the allotted examination centers can be seen at the web-site(s) mentioned in the prospectus.

17. **Application for Verification:**

(a) If a candidate on declaration of the results of National Certification Examination is not satisfied with the marks given in any paper(s) and feels that there is a possibility of either omission in marking of any answer(s) or a mistake in totaling of the marks in any paper(s), he/she seek the **verification of all or any paper through online** by visiting the website and filling the online application form within one month of the declaration of results.

(b) Candidates may choose the appropriate dialog box which would automatically indicate the fee to be paid online. The online application fee for verification is **Rs.200 for each paper** and the Bureau or the Agency will not entertain any request for such verification after the expiry of the above said period of one month.

(c) A candidate is eligible to seek verification of paper(s) of the said National Certification Examination one time only.

(d) The process of verification will be completed by the NPC within a period of **TWO WEEKS** from the deadline for online registration and submission of application.

(e) **The marks obtained by a candidate for individual questions of paper(s) will not be provided.**

(f) **Request for revaluation of Answer Books will not be entertained.**

(g) **Photocopies of evaluated Answer Books will not be made available to the candidates.**

18. It is compulsory for the registered candidates to give e-mail ID and a valid mobile number as most of the communication regarding the examination will be sent though either E-mails and/or SMS.

19. Applications received after the last date or in any other format other than the prescribed or incomplete will be summarily rejected.

20. **Candidates for all subsequent correspondence related to the National Examination can make use of the "Online Complaint" feature available on**

the website.

The link for making **"Online Complaint"** is available at the Home Page of the website **www.aipnpc.org**. The candidate can click the link and furnish relevant details including the complaint in **"Complaint Entry Form"**. On submission, the candidate would get a Complaint Registration Code Number for future reference and communication. Later, the candidate can check the status of the complaint and the action taken by the authorities at any time using this Complaint Code.

A Complaint status link is also available in the home page of the website. Once the complaint is closed, the action taken on the complaint would be displayed in the **"Complaint Status".** In addition, the status will also be communicated either through e-mail /SMS.

21. For all updates regarding the Examination visit the following websites **www.aipnpc.org** /**www.em-ea.org** /**www.beeindia.gov.in** on a regular basis.

22. The candidate in case of any changes in the communication address or mobile no shall immediately intimate to mail id changes@em-ea.org for updating in the database.

23. BEE reserves the right to change the examination dates due to unforeseen circumstance and reasons beyond its control.

Annexure- I

SYLLABUS FOR ENERGY MANAGERS AND ENERGY AUDITORS CERTIFICATION EXAMINATION

PAPER-1: GENERAL ASPECTS OF ENERGY MANAGEMENT AND ENERGY AUDIT

1.1 **Energy Scenario:** Commercial and Non-commercial energy, primary energy resources, commercial energy production, final energy consumption, Indian energy scenario, Sectorial energy consumption (domestic, industrial and other sectors), energy needs of growing economy, energy intensity, long term energy scenario, energy pricing, energy security, energy conservation and its importance, energy strategy for the future.

1.2 **Energy Conservation Act 2001 and related policies:** Energy conservation Act 2001 and its features, notifications under the Act, Schemes of Bureau of Energy Efficiency (BEE) including Designated consumers, State Designated Agencies, Electricity Act 2003, Integrated energy policy, National action plan on climate change.

1.3 **Basics of Energy and its various forms:** Electricity basics – Direct Current and Alternative Currents, electricity tariff, Thermal Basics-fuels, thermal energy contents of fuel, temperature and pressure, heat capacity, sensible and latent heat, evaporation, condensation, steam, moist air and humidity and heat transfer, units and conversion, Metric Ton Oil Equivalent conversions.

1.4 **Energy Management & Audit:** Definition, energy audit, need, types of energy audit. Energy management (audit) approach-understanding energy costs, bench marking, 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.

1.5 **Material and Energy balance:** Facility as an energy system, methods for preparing process flow, material and energy balance diagrams.

1.6 **Energy Action Planning:** Key elements, force field analysis, Energy policy purpose, perspective, contents, formulation, ratification, Organizing - location of energy management, top management support, managerial function, roles and responsibilities of energy manager, accountability. Human resource development techniques, Information system-designing barriers, strategies; Marketing and communicating-training and planning.

1.7 **Financial Management:** Investment-need, appraisal and criteria, financial analysis techniques-simple payback period, return on investment, net present value, internal rate of return, cash flows, risk and sensitivity analysis; financing options, energy performance contracts and role of Energy Service Companies(ESCOs).

1.8 **Project Management:** Definition and scope of project, technical design, financing, contracting, implementation and performance monitoring. Implementation plan for top management, Planning Budget, Procurement Procedures, Construction, Measurement &Verification.

1.9 **Energy Monitoring and Targeting:** Defining monitoring & targeting, elements of monitoring &targeting, data and information-analysis, techniques - energy consumption, production, cumulative sum of differences (CUSUM). Energy Management Information Systems(EMIS)

1.10 **Energy, Environment and Climate change:** Energy and environment, air pollution, climate change United Nations Framework Convention on Climate Change(UNFCC), sustainable development, Kyoto Protocol, Conference of Parties (COP), Clean Development Mechanism (CDM), CDM Procedures case of CDM – Bachat Lamp Yojna and industry; Prototype Carbon Fund(PCF).

1.11 **New & Renewable Energy Sources (NRES) :** Concept of renewable energy, Solar energy, wind energy, biomass boilers and gasifiers, biogas, biofuels, hydro, fuel cells, energy from wastes, biomethanation, wave, tidal, geothermal.

PAPER 2: ENERGY EFFICIENCY IN THERMAL UTILITIES

2.1 **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.

2.2 **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.

2.3 **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

24 **Furnaces:** Classification, general fuel economy measures in furnaces, excess air, heat distribution, temperature control, draft control, waste heat recovery. Forging furnace heat balance, Cupola, non-ferrous melting, Induction furnace, performance evaluation of a furnace, hot air generators.

25 **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.

26 **Fluidized Bed Combustion FBC boilers:** Introduction, mechanism of fluidized 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.

27 **Cogeneration:** Definition, need, application, advantages, classification, saving potentials. Heat balance, steam turbine efficiency, tri-generation, micro turbine.

28 **Waste Heat Recovery:** Classification, advantages and applications, commercially viable waste heat recovery devices, saving potential.

29 **Heat Exchangers:** Types, networking, pinch analysis, multiple effect evaporators, condensers, distillation column, etc.

PAPER 3: ENERGY EFFICIENCY IN ELECTRICAL UTILITIES

3.1 **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 labeled 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.

3.2 **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 labeled energy efficient motors, squirrel cage and slip ring and their characteristics, motor history sheet new, 1st rewind, 2ndrewind), Star operation, voltage unbalance, energy efficient motors, soft starters with energy saver, variable speed drives.

3.3 **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.

3.4 **Heating, ventilation, air conditioning (HVAC) and Refrigeration System:** Introduction to Psychometrics, Vapor compression refrigeration cycle, refrigerants, coefficient of performance, capacity, factors affecting Refrigeration and Air conditioning system performance and savings opportunities. Vapor absorption refrigeration system: Working principle, types and comparison with vapor compression system and saving potential, heat pumps and their applications, section on ventilation system, ice bank system, and performance assessment of window and split room air conditioners, Star labeled pumps, cold storage refrigeration, and humidification system.

3.5 **Fans and blowers:** Types, performance evaluation, efficient system operation, flow control strategies and energy conservation opportunities. Pressure drop calculation.

3.6 **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 pumpsets.

3.7 **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.

3.8 **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), labeling scheme, high efficiency street lighting, electronic ballast, occupancy sensors, and energy efficient lighting controls.

3.9 **Diesel/Natural gas Power Generating systems:** Factors affecting selection, energy

performance assessment of diesel conservation avenues. Waste heat recovery.

3.10 **Energy conservation in Buildings and Energy Conservation Building Codes (ECBC):** About Energy Conservation Building Codes (ECBC), building envelope, insulation, lighting, Heating, ventilation, air conditioning (HVAC), fenestrations, water pumping, inverter and energy storage/captive generation, elevators and escalators, star labeling for existing buildings, Energy Service Companies based case studies.

PAPER-4: ENERGY PERFORMANCE ASSESSMENT FOR EQUIPMENT AND UTILITY SYSTEMS

Open Book examination on the following energy performance assessments for equipment and utility systems:

4.1 Boilers.

4.2 Furnaces.

4.3 Cogeneration, Turbines (gas, steam).

4.4 Heat Exchangers.

4.5 Electric Motors, Variable Speed Drives.

4.6 Fans and Blowers.

4.7 Water Pumps.

4.8 Compressors.

4.9 HVAC systems.

4.10 Performing Financial Analysis.

4.11 Energy Performance assessment in power plants.

4.12 Energy Performance assessment in steel industry.

4.13 Energy Performance assessment in process industry (cement and textile).

4.14 Energy Performance assessment in buildings and commercial establishments.

NATIONAL PRODUCTIVITY COUNCIL, INDIA

The National Productivity Council is a national level organization, founded in 1958 by the Government of India. NPC is an autonomous, tri-partite, non-profit organization with equal representation from the government, employers and workers' organizations, apart from technical and professional institutions and other interests on its governing council. Besides its headquarters at New Delhi, NPC operates through 12 offices in India with 250 highly qualified and experienced specialists representing various disciplines.

Training Institute: Dr. Ambedkar Institute of Productivity (AIP) is a long-term training wing of the National Productivity Council of India. The Institute plays a wider role of running 2 years P.G Programmes and Short-term programmes in Managerial & Technical areas.

Mission: Development, Dissemination and Application of knowledge and experience in productivity, for promoting consciousness and improvement in productivity, with the objective of strengthening the performance and competitiveness of the national economy as well as of improving the working conditions and quality of working life.

Objectives: NPC is aiming to promote the cause of productivity in industry, agriculture, service, infrastructure and other sectors of the economy. It aims to help in achieving sustained all round development in India, leading to enhancement of quality of life of people in general. The concept of productivity as perceived by NPC encompasses not only a more efficient use of resources, but also of quality, environmental protection and integrated economic and social development. NPC aims at promoting these as a part of its objectives and activities. NPC possesses a well-equipped Library- cum-Documentation centre.

Services: Besides providing training, consultancy and undertaking research in the area of productivity, NPC also implements the productivity promotion plans and programmes of the Tokyo based Asian Productivity Organization (APO) an inter-governmental body of which the Government of India is a founder member.

Thrust Areas: NPC also conducts institutional training programmes for the development of consultants in Productivity and Management in the areas of Industrial Engineering, Energy Management & Energy Audit, Environment Management, Plant Engineering, HRD, TPM, TQM, Financial Management, Marketing Management and Agricultural Productivity.

NPC aims at propagating productivity as an evolving concept, which includes attention to special issues, and concerns relating to quality, environment, energy, integrated rural and community development, women workers etc. Nap's thrust is on providing modern and high quality productivity- related services to sectors not adequately addressed by others, especially the small-scale industry and informal sector.

NPC has been active in the area of Energy Conservation & Management for over four decades and has undertaken numerous studies at macro, sectoral and unit levels through its team of committed professionals. It promotes rational use of energy through: Optimization of Methods Improvement, Technology Up gradation and Application of alternative energy sources.

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“What we know is only a handful

what we don’t know is an ocean”

- Avvaiyar, Tamil poet, 2 AD.

For any further details, please contact-

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