

BUREAU OF ENERGY EFFICIENCY (CERTIFICATION PROCEDURES FOR ENERGY MANAGERS) REGULATIONS, 2010

R&-33004/99 REGD.NO.D.L-33004D9 Che Gazette of 3ftidia 2791 Nc 2791 EXTRAORDINARY PART III—section 4 PUBLISHED BY AUTHORITY 30, 8, 1932 NEW DELHI, SATURDAY, OCTOBER 30, 2010/KARTIKA 8, 1932 15 2010 æi. 2/11(2 aTqNITüT, 111, 4, 15 2009 2/11 15 2009 fiqr) 2009 2001 (2001 52) 58 (2) 3*rt 37 Zi, 16 2009 Tl-qT i; 3-Tfqfiqq 58 (2) (G) (q) uffiT) 2010 1 2. Q, 3ftfiuq, 2001 13 (1) t; (T) ' ' 3fiFFW1" (33f É) 2006 2 4235 GI/20tO (t) [PART 4] 2 GAZETTE OF NDIA : EXTRAORDINARY (q) 3Äf anQT t 8 ZTQT (e) 'fig' , @ qft&Tr" Gg fiuq, 2006 (q) "øq«r" t ; (71) "qrr" I (2) zrgi t q-rTT 2 q--QHT 3. frg (2) qr<rzz 4. Rig q-raiTr—ö-\$ üqf (ØÄf Rrg 2006 3 5. fig (1) 4 (ii) Fqg ; 3 (i) (ii) (iii) (iv) (3) Rig I Riq-g ; (4) fig qrg7TT I 6. frg (2) qgi (1) IN, a-TVTÄ qrzn ft-g I (2) Xiqq qna frg vqg e, GRT 4 THE OF NDIA : EXTRAORDINARY [PART III—SEC. 4] (2) 9 (1) yqr@lit 4 *TTT I (3) 3Äf 14 (a) IO. 8 frg q-rq7TT 11. Rig fif& fig q-a 12. 8 9 (2) frg fiqie 13. 3fiq fäg (2) Ff fäfäzrq, 2008 3 q•rq : 5(1) fig (gqqpq) (.3Fq 31. qT. 10. 11. 12. 6 .13. 14. xio 2 3 4 GAZETTE OF INDIA : EXTRAORDINARY [PART HI—SEC. 41 15. frg 2 3 4 5 6 16.8.€r.Rio* 17. fh?l fäkl I 1988) q-t RI-afr-q qi-a g 7 [RÄzrq 8 Nio.. t, (öqf fig #41) 2009 Rig fäg 14 (1) 8 1. 2. 3. 4. 5. 6. 7. 8. 1. 2

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2. Definitions.- (1) In these regulations, unless the context othenwise requires,- (a) "Act" means the Energy Conservation' Act, 2001 ; (b) "Advisory Committee" means a committee constituted by the Bureau under sub-regulation (1) of regulation 13: III—SEC 4] 18 THE GAZETTE OF INDIA : EXTRAORDINARY (c) "agency" means the agency appointed by the Bureau for holding National Examination for certification of energy managers under clause (b) Of sub- rule (1) of rule 2 of the Energy Conservation (Minimum Qualification for Energy Managers) Rules, 2006; (d) "Certified energy manager" means a person who has been issued a certificate under regulation 8; (e) "Form" means a form appended to these regulations; (f) "National Examination" means a National Examination defined in clause (g) of sub-rule (I) of rule 2 of the Energy Conservation (Minimum Qualification for Energy Managers) Rules, 2006 and conducted accordingly under regulation 3; (g) "Register" means a Register of Certified Energy Managers maintained by the Bureau under sub-regulation (I) of regulation 9; (h) "Schedule" means the Schedule appended to

these regulations; (i) "Section" means section of the Act. (2) Words and expressions used herein and not defined but defined in the Act or the rules made there under shall have the meanings respectively assigned to them in the said Act or rules

PART 11 NATIONAL EXAMINATION 3. Conduct of National Examination.- (1), For the purpose of certification of energy managers, the Bureau shall, either by itself or through agency, conduct National Examination. (2) The Bureau shall, by publication in the newspaper, notify the date, time and place where such National Examination shall be conducted. (3) The National Examination shall be conducted in English medium 4. Eligibility for appearing in National Examination.- No person shall be eligible to appear for National Examination unless he possesses qualifications specified in sub- rule (2) of rule 3 of the Energy Conservation (Minimum Qualification for Energy Managers) Rules, 2006. [Part III—avg 4] 5. Application for admission to National Examination.- (1) A person who is eligible to appear for the National Examination under regulation 4 shall seek admission for such examination by making an application to the Bureau in Form-I. (2) Each application shall be accompanied by the following amount of fee payable by demand draft drawn in favor of the Bureau of Energy Efficiency New Delhi, namely:- (a) Application fee - 19 (ii) (iii) for general candidates - for candidates belonging to the Scheduled Castes or the Scheduled Tribes- for candidates belonging to other Backward Classes having annual income- of less than rupees four lakh and fifty thousand per annum- (b) Certification fee including Examination fee, - (ii) (iii) (iv) for general candidates - for candidates belonging to the Scheduled Castes or the Scheduled Tribes- for candidates belonging to other Backward Classes having annual income- of less than rupees four lakh and fifty thousand per annum- for company sponsored candidates- rupees five hundred; rupees two hundred and fifty; rupees two hundred and fifty; rupees ten thousand; rupees five thousand; rupees five thousand; rupees twenty thousand; (3) Subjects for National Examination shall be as specified in the Schedule. (4) A prospectus containing scheme and modalities for the National Examination including eligibility, syllabus and reference material for such examination. shall be THE GAZETTE OF INDIA : EXTRAORDINARY [PART III—SEC. 4 made available by the Bureau at least three months before the actual date of examination

6. Admission for the National Examination.- (1) The Bureau, or the agency, as the case may be, shall, after scrutiny of application form and being satisfied that the applicant is eligible to appear for the National Examination, admit him for the National Examination by issuing him an admission card stating the place, date and time of the National Examination at least fifteen days before the date of the National Examination. (2) Where on scrutiny of the application under sub-regulation (1), an applicant is found ineligible to appear for National Examination, his application shall be rejected for reasons to be recorded in writing and he shall be intimated accordingly

7. Passing of National Examination.- (1) A candidate shall be declared to have passed the National Examination if he secures a minimum of fifty per cent. marks in each paper for the National Examination. (2) An unsuccessful candidate shall be allowed to take a maximum of three attempts per paper within six consecutive examinations held by the Bureau or the agency; as the case may be, on payment of supplementary fee of rupees one thousand five hundred per paper in the case of general candidates and rupees seven hundred and fifty per paper for candidates belonging to the Scheduled Castes and the Scheduled Tribes and also for Other Backward Classes candidates having annual income of less than four lakh and fifty thousand per annum, by means of demand draft drawn in favour of Bureau of Energy Efficiency. payable at New Delhi

PART 11 CERTIFICATION OF ENERGY MANAGERS 8. Certification of energy managers.- For the purpose of certification of energy managers, the Bureau shall issue a certificate to the person who has passed the National Examination in Form-II

9. Register of certified energy managers.- (1) The Bureau shall maintain a Register of Certified Energy Managers in Form-III and include the name of persons to whom certificates have been issued under regulation 8 in the said register. (2) On being registered as certified energy manager under sub-regulation (1) of regulation 9, the certified energy manager shall be issued an identity card in Form-IV. (3) Each certified energy manager shall be eligible to be designated or appointed as energy manager by the designated consumer under clause (1) of section 14. 10. Validity of certification .- The certification made under regulation 8 shall be valid for a period of five years and renewable after every five years on an

application made to the Bureau in Form —V: Provided that no such renewal shall be made unless the certified energy manager has attended a short term refresher training course conducted by the Bureau or the agency, as the case may be, and has produced a certificate of participation issued in that behalf. I I. Cancellation of certification.-(1) The Bureau may cancel the certification of an energy manager on a complaint made against him for- (a) any cotnmission or omission amounting to professional misconduct; (b) any misrepresentation of facts, data or reports on energy consutnption: (c) any act amounting to fraud; (d) failuere to attenci the refresher course: 2 THE GAZETTE OF INDIA : EXTRAORDINARY [PART III—SEC, 4] Provided that no such cancellation shall be done by the Bureau without giving an opportunity of being heard to such energy manager. (2) On cancellation of certification of certified energy manager under sub- regulation (1), his name shall be removed from the register referred to in regulation 9 and thereafter, the certified energy manager shall not be eligible for designation or appointment as energy manager by the designated consumer. Issue of duplicate certificate or identity card.- (1) Where the certificate or 12. identity card issued respectively under regulation 8 and sub regulation (2) of regulation 9 has been lost by the certified energy manager, the Bureau may, on an application made by him in this behalf, duly supported by a copy of first information report lodged with the concerned police station, issue a duplicate certificate or identity card, as the case may be, on payment of a fee of rupees one hundred by demand draft drawn in favour of the Bureau of Energy Efficiency, payable at New Delhi. (2) Where any certificate or identity card issued by the Bureau is damaged, the Bureau may on an application made in this behalf and on surrender of damaged certificate or identity card, issue a duplicate certificate or identity card on payment of a fee of rupees one hundred by demand draft drawn in tavour of the Bureau of Energy Efficiency, payable at New Delhi

PART IV ADVISORY COMMITTEE 13. Constitution of Advisory Committees.- (1; The Bureau may. for the purpose or these regulations, national examination for energy managers and for their certification and registration constitute an Examination Advisory Committee, a Technical Advisory Committee and a Certification and Registration Advisory Conunittee. (2) Each Advisory Comtnittee shall consist Ot-a Chairperson and not more than six Other persons to be nominated by the Bureau rom amongst mentbers or the Advisory Committees constituted under regulation 3 Of the Bureau Energy Efficiency (Advisory Conunittees) Regulations. 23 Form — [[See regulation 5(1)] Application for National Examination Examination you are appearing Energy Manager Candidature: Name of the Company Sponsored Applicant* (First Name) (Middle Name) Father's Name • *Present Address I\$incdde (Surname) Self-sponsored Address PihCo State Date of Birth* Community* Employment Status General SC ST OBC Employed Self Employed 10. Present Company = Address Designation Company Name City State I I. Total Work Experience Nationality Indian (Others Specify Sex Unemployed 12. Contact =ax, Email Office Phone Fax Res. Phone Email* Mobile Pin Code Months 24 THE GAZETTE OF INDIA : EXTRAORDINARY [PART III—SEC 13.Examination Centre preferred: Examination Centre 14. Requisite- Educational Qualification S Ino 2. 3

4. Name of Degree/ Diploma Subjects/ Branch 15.Requisite Experience for fulfilling the eligibility criteria Year of Passing (eg: Board / Universit 1988) Nature Of Work (Max 50 characu Only) Name of Employer/ Sino Designation Organisation 2. 3. 4. 5. 6. 16. DD.No.:• Bank Name: • Year To Amount 17.1 agree to fonvard my name to any Training Agency copducting preparatory •rraining Courses Yes No Declaration by the Candidate I hereby declare that a!! the intOrmation given in the application form and enclosures are true to the best of my knowledg agree to the condition that if any information or any statement is lound to bc incorrect, my admission to the examinat would be cancelled. I also understand that it is my responsibility to cross check iniörmation from the websites as mentionec the prospectus ror the allotted examination centre and issue of hall admission card. I shall inform the Bureau. or the agenc:, the case may be. about any change in my mailing address. telephone nutnber and e-mail 11). iC any, at the earliest. I also ah by the examination Scheme and conditions as mentioned lhe prospectus, Place: Date: 41 day [qrrr III—vc 4] 25 Form —11 [See regulation 8] BUREAU OF ENERGY EFFICIENCY Examination Registration No.: . Certificate Registration No.: Serial Number. .. CERTIFICATE FOR CERTIFIED ENERGY MANAGER Photograph This is to certify that Mr. Mrs./Ms Son/Daughter of.... who has passed the National Examination for certification of energy manager held in the month of . (Year) is qualified as certified energy manager subject to the provisions of Bureau of Energy Efficiency (Certification Procedures for Energy Managers) Regulations, 2010. This certificate shall be

valid for five years with effect from the date of award of this certificate and shall be renewable subject to attending the prescribed refresher training course once in every five years. His/Her name has been entered in the Register of certified energy manager at Serial Number.. ..being maintained by the Bureau of Energy Efficiency under the aforesaid regulations. Mr. /Mrs. {Ms is deemed to have qualified for appointment or designation as energy manager under clause (I) of Section 14 of the Act. Given under the seal of the Bureau of Energy Efficiency, this of.... 20 Dates of attending refresher course the Secretary's signature (Signature and Seal) Secretary Bureau of Energy Efficiency Dates of attending the Secretary's refresher course signature 26 2. 3. 4. 5. 6. 7. 8. B. 1. 2

3. THE GAZETTE OF INDIA : EXTRAORDINARY Form -111 [See regulation BUREAU OF ENERGY EFFICIENCY REGISTER OF ENERGY MANAGERS As on .Cenification Information Name of certified energy manager Father's name Examination Registration No. Certificate Registration No. Date of entry in the Register Date of issue of Certificate Date of re-validation of Certificate (PART 111— .(DD/MM/20YY) Photograph Revalidation record Postal address with Pin Code E-mail address Telephone numbers. with STD Code (0) Cell phone 2

3. Communication Links 27 C Work experience from the date on which the eligibility criteria has been fulfilled From to Brief details of work experience Month Year Month Year Employer's name and address Self Job content / employment experience 1. 2. 3

4. Date of birth Nationality Personal Information DD/MM/YY I.2. 3. 2. 3

4. Educational qualification (record only after schooling) Educational course Institution/University Remarks Year of passing THE GAZETTE OF INDIA : EXTRAORDINARY 28 Form —IV [See regulation Format for Identity Card BUREAU OF ENERGY EFFICIENCY, New Delhi. CERTIFIED ENERGY MANAGER Photograph Examination Registration NO.: Certificate Registration No. Name: Son/Daughter of: [PART III—SEC Address: Date of Issue: . Issuing Authority Name: . Designation: Office address: , Signature: Signature of Certified Energy Manager (Backside of Identity Card) Validity up to: OFFICE SEAL Form-V [See regulation IO] Application for renewal of certification Date: From Mr/ Mrs/ Ms... Registration NO.: . Postal address:.. To The Secretary Bureau of Energy Efficiency Address: Dear Sir/Madam, Subject: Renewal of certification as energy manager This is to inform you that I have attended the short term refresher training course and enclose herewith the certificate of participation issued in this behalf. I hereby apply for renewal of my certification as energy manager. The certificate for doing the needful is enclosed. Yours faithfully, (Signature).. (Name). 30 THE GAZETTE OF INDIA : EXTRAORDINARY Schedule [See regulation SUBJECTS FOR NATIONAL EXAMINATION [PART III—Sec. 4] 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1: GENERAL ASPECTS OF ENERGY MANAGEMENT AND ENERGY AUDIT Energy Scenario: Commercial and Non-commercial energy, primary energy resources, commercial energy production, final energy consumption, Indian energy scenario, Sectoral 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. 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 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, and Metric Ton Oil Equivalent (M TOE) conversions. Energy Management and Audit: Definition, energy audit, need, types of energy audit, Energy management (audit) approach-understanding energy costs, benchmarking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel and energy substitution, energy audit instruments and metering, precautions to be taken in the sampling and measurements, thermography, smart metering. Material and Energy balance: Facility as an energy system, methods for preparing process flow, material and energy balance diagrams. 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. Financial Management: Investment-need, appraisal and criteria, financial analysis techniques-simple pay back 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). Project Management: Definition and scope of project. technical design. financing. contracting, implementation and performance monitoring. Implementation plan for Procedures, Construction. top management. Planning Budget, Procurement Measurement and Verification. 31 1.9 1.10 1.11 2.1 2.2 2.3 2.4 2.5 2.6 2.7 Energy Monitoring and Targeting: Defining monitoring & targeting, elements of monitoring and targeting, data and information-analysis, techniques - energy consumption, production, cumulative sum of differences (CUSUM). Energy Management Information Systems (EMIS) Energy, Environment and Climate change:-energy and environment, air pollution, climate change United Nations Framework Convention on Climate Change (UNFCCC), sustainable development, Kyoto Protocol, Conference of Parties (COP), Clean Development Mechanism (CDM), Sample Procedure case of CDM- Bachat Lamp Yojna and industry; Prototype Carbon Fund (PCF). New and Renewable Energy Sources (NRES):Concept of renewable energy, Solar energy, wind energy, biomass boilers and gasifiers, biogas, bio-fuels, hydro, fuel cells, energy from wastes, biomethanation, wave, tidal, and geothermal 2: ENERGY EFFICIENCY IN THERMAL UTILITIES Fuels and Combustion: Introduction to fuels, properties of fuel oil, coal and gas, storage, handling and preparation of fuels, principles of combustion, combustion of oil, coal and gas. Agro-residue/biomass handling, preparation and combustion Boilers: Types, combustion in boilers, performance evaluation, analysis of losses, feed water treatment, blow down, energy conservation opportunities. Boiler efficiency calculations for coal, oil and gas, evaporation ratio, Soot blowing and soot deposit reduction, reasons for boiler tube failures, start up, shut down and preservation, Thermic fluid heaters, and super critical boilers. Steam System: Properties of steam, steam pipe insulation, assessment of steam distribution losses, steam leakages, steam trapping, condensate pumping, and flash steam recovery system, thermo-compressors, Steam utilization, steam dryers, Performance assessment of Steam system, and identifying opportunities for energy savings. Furnaces: Classification, Forging furnace, Cupola, non ferrous melting. Induction furnace, hot air generators, excess air, heat distribution, temperature control, draft control, waste heat recovery, heat balance and performance evaluation of a furnace, general fuel economy measures in furnaces. Insulation and Refractories: Insulation-types and application, Cold insulation economic thickness of insulation. heat savings and application criteria, Refractory- types, selection and application of refractories, and heat loss assessment. Fluidized bed combustion (FBC) boilers: Introduction, mechanism of fluidized bed combustion, advantages, types of FBC boilers- Biomass based fluidized bed combustion boilers, Atmospheric Fluidized bed combustion boilers. Circulating Fluidized bed combustion boilers. Pressurized Fluidized bed combustion boilers. application and operational features, retrofitting FBC system to conventional boilers, saving potential. Cogeneration: Definition. need. application. advantages. classification. heat balance, steam turbine efficiency. tri-generation, micro turbines and saving potentials. 32 2.8 2.9 3.1 3.2 3.3 3.4 3.5 3.6 3.7 THE GAZETTE OF INDIA : EXTRAORDINARY [PART III—SEC Waste Heat Recovery: Classification, advantages and applications, commercially viable waste heat recovery devices, saving potential. Heat Exchangers: Types, networking, pinch analysis, multiple effect evaporators, condensers, and distillation column. 3: ENERGY EFFICIENCY IN ELECTRICAL UTILITIES Electrical system: Electricity billing, electrical load management and maximum demand control, Maximum demand controllers, power factor improvement and its benefit, selection and location of capacitors, performance assessment of PF capacitors, automatic power factor controllers, energy efficient transformers, Star labeled distribution transformers, Assessment of transmission, distribution and transformer losses. Demand side management, and losses due to harmonics and voltage unbalance Electric motors: Types, squirrel cage and slip ring induction motors and their characteristics, motor history sheet (new, 1st rewind, 2nd rewind), rewinding and motor replacement issues, Star operation, voltage unbalance, energy efficient motors, losses in induction motors, motor efficiency, Star labeled energy efficient motors factors affecting motor performance, soft starters with energy saver option, variable speed drives, and energy saving opportunities, Compressed Air System: Types of air compressors, reciprocating vs screw, compressor efficiency, efficient compressor operation, Compressed air system components, Air Driers, capacity assessment, leakage test, factors affecting the performance and savings opportunities. Heating,

ventilation, air conditioning (HVAC) and Refrigeration System: Introduction to psychometrics, Vapor compression refrigeration cycle, refrigerants, coefficient of performance, capacity, ice bank system, performance assessment of window and split room air conditioners, factors affecting Refrigeration and Air conditioning system performance and savings opportunities, ventilation system, cold storage refrigeration, humidification system, Vapor absorption refrigeration system: Working principle, types and comparison with vapor compression system and saving potential, heat pumps and their applications, Fans and blowers: Types. pressure drop assessment, performance evaluation, efficient system operation, flow control strategies and energy conservation opportunities. Pumps and Pumping System: Types; performance evaluation, efficient system operation, flow control strategies and energy conservation opportunities. Energy conservation opportunities in boiler feed water pumps, pumping systems for municipal drinking water. sewerage. and agriculture pump sets, Star labeled pumps Cooling Tower: Types, fan-less cooling tower, natural draft cooling tower. performance evaluation, efficient system operation. cooling water treatment control strategies and energy saving opportunities assessment of cooling towers. [Part III—4] 3.8 3.9 3.10 3.3. Lighting System: Light source, Light Emitting Diodes (LEDs), metal halides, fluorescent tube lights, Compact fluorescent lamps (CFL), choice of lighting, luminance requirements, energy efficient street lighting, electronic ballast, occupancy sensors, energy efficient lighting controls, labeling scheme, and energy conservation avenues. Diesel/Natural gas Power Generating systems: Factors affecting selection, Waste heat recovery, energy performance assessment of diesel/natural gas power generating systems. 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. AJAY MATHIR Director-General [No. ADVT. 111/4/185/10-Ext.] Printed by Manager. Government Of India Ring Road. New Delhi-110064 and Published by the Controller of Publications. Delhi-110054.