

BUREAU OF ENERGY EFFICIENCY (MANNER AND INTERVALS OF TIME FOR CONDUCT OF ENERGY AUDIT)REGULATIONS, 2010

geta-33004/99 REGD. NO. D. L.-33004/99 Che Gazette of India 1161 EXTRAORDINARY PART 4 PUBLISHED BY' AUTHORITY 28, 2010 8, 1932 NEW DELHI, WEDNESDAY, APRIL 28, 2010/VAISAKH 8, 1932 28 2010 02/11(6 2001 (2001 52) \$1 58 \$1 (1) 2009, 02/11 (6)/05, 2? 2009 3, 4, 26 2009 Q1, F1 \$1 291, 26 2009 I aid, 310. Ff Q, \$1 ujV1 13 afi (2) (20 58 \$1 (2) (y) 2. 3121ffl— Ofd 3i?NIFT) fufiu-q, 2010 I aqfäÄuq, 2001 @ 1606 GI/2010 2 3. OF INDIA : EXTRAORDINARY [PART III—SEC.4] (u) fiqié" ffrzrq 3 f@qié (q) " ttfm?tz fäg yfä 312} 1 fäg - (1) 14 (i) 18 (1) (O (IT) t?qhé Quit) f*uq, 2007 gfhT, fög; fäg, fäg (m) ii Rrq \$1 Yfä *7TT I fävqr- *TIT', 3 fig (Ø) q. EFT.3iT.318(a0, 2 HE}, 2007 fög ?JG€fl (73) _ (i) <FFTT (ii) fäg Q, (q) (z) (+1) 3TfäQi \$fTfl a--TH?TT flf*f - fHru afi Trg \$1 zrgi THE OF INDIA : EXTRAORDINARY 4 [PAÄT111—Sæ.41 ftqhé Trg fû#ru -aj-v-å fäg 6. (1) ftqsré fäkT fig-qiTfQ?fi (qi) OT8iJT , (q) fiqh-é gfQTföTUT firiré 4 I -0 -e-q-ö gg 5 gg TTV I (5) f?tThé rr\$ 3tq ftftftz 1 2 4 5 6 20 7.0 7.1 (i) (ii) (iii) (v) (G) (m) (ii) (iii) q. 3frq \$- €6) (u) @/täi) X 100 1 2 (fiTftruq (frifäZFT (*zrq) (qq-ät1-2 frif& 20 20 6 (v) (ii) (i) (ii) (iii) (v) (u) (e) 7.2 (Qi) (iii) (iv) (v) (vi) (u) (i) (i ii) THE GAZETTE OF INDIA : EXTRAORDINARY 1m TIL) (QT Fqg) 20 fhT (rftvr\$). 7.1(u) + u(i) + 7.1 [Eb(i) + ?Y-TT] @\$d/fh.JÄT.) [PART III—SEC. 41 - 20 (eqgä) fäg (qqq (++a/fhq*.): 3Tqrvwr 7 (v) (vi) (i) (ii) (iii) (v) (Vi) 7.3 (i) (ii) (iii) (v) (vi) (i) (ii) (iii) (iv) (v) (vi) (i) (iii) (eqgé) föqr€e C*/fr;. TAT.) (FIÄ) rh fäg a-Fl 31\) (/mur.) -t Aft fig oft fög (FT/O<) (qq erra F./Ä€) 20-20 (v) (vi) (q) (i) (ii) (iii) (u) (i) (ii) (iii) (v) 7.4 (Qi) (iii) (iv) (v) (G) GA7ETIE OF : EXTRAORDINARY 20 (gqwü) AT.) aft (\$ATQT/) fäg (w83ä) qft HTÄT (zBgag-ä) fäg 49 A, (7U Frei) (gafi\$) (PART III—SFC.4 - 20 (ii) (iii) (v) (vi) (i) (ii) (iii) 7.5 (i) (ii) (iii) (iv) 7.6 (i) (ii) (iii) (iv) 7.7 (ii) (iii) 14-4) 20 (ANT @\$O.YT.) *izä (t*fi5.3T1.) fig (eq/uä) fäg 20 10 (iv) (v) q;v.i) I PART 111—SEC.41 (15 30*1.01325 (10) GAZ.EITE OF INDIA : EXTRAORDINARY (PART 41 THE GAZETTE OF INDIA : EXTRAORDINARY 6(2) ftqlé - f&lé - fQqh-é - ava 1.0 1.1 1.2 [PART 111—SEC.4] 1.3 Fl) 1.4 2.0 2.1 2.2 ufi-e 2.3 3.0 3.1 g-q-frJT 3.2 3.2.1 32.2 3.2.3 3.2.4 3.2.5 32.6 3.2.7 15 4.0 Ff 4.2 4.3 å 5.0 5.1 52 6.0 6.1 6.2 6.3 6.4 6.5 6.6 6.7 qvTFéft 6.8 6.9 fäga 6.10 6.11 7.0 7.1 7.2 7.3 • 7.4 t 7.5 7.6 7.7 7.8 Qlf&d 8.0 0;qf 8.1 RqY 3Tffä aft 8.2 2 8.3 ITg • 8.4 fttfr4 8.5 8.6 9.0 16 THE GALEITE OF {NDIA : EXTRAORDINARY IPART III—SEc. 4] (ii) @ 3frq zn aft I (iii) 3;qf (iv) fä4T I (v) (v;qf fäg 3iaua) 2010 t 111/4/185/10-3THT.] BUREAU OF ENERGY EFFICIENCY NOTIFICATION New Delhi, the 28th April, 2010 No. certain draft regulations namely, the Bureau of EhergFEfficiency (the manner and intervals of time for conduct of energy audit) Regulations, 2009,were published vide Bureau of Energy Efficiency notification number dated the 22M December,2009 in the Gazette of India, Extraordinary, Part III; Section 4, dated the 26th December, 2009 as required under sub-section (1) of Section 58 of the Energy Conservation Act, 2001 (52 of 2001) inviting objections and suggestions from all persons likely to be affected thereby within forty five days from the date of publication of the said notification in the Gazette. And whereas the said draft regulations were published in the official Gazette on the 26th December, 2009. And whereas no objection or suggestion has been received in respect of the said draft regulations within the specified period. Now, therefore, in exercise of the powers conferred by clause (g) of sub-section (2) of section 58, read with clause (q) of sub-section (2) of section 13 of the said Act, the Bureau of Energy Efficiency with the previous approval of the Central Government, hereby makes the following regulations, namely:- 1. Short title and commencement.- (1) These regulations may be called the Bureau of Energy Efficiency (Manner and Intervals o! Time for Conduct of Energy Audit) Regulations, 2010 (2) Gazette. They shall come into force on the date of their publication in the Official [•m III—avg4] 2 Definitions. - (1) In these regulations, unless the context otherwise requires,- (a) "Act" means the Energy Conservation Act, 2001 ; "energy audit report" means the report of energy audit submitted (b) under regulation 3 and signed by the accredited energy auditor; "Form" means a form appended to these regulations;. (c) (d) "specific energy consumption" means the average of enecgy consumed per unit of product or product—mix for the completed financial year. (2) Words and expressions used herein and not defined but defined in the Act Shai! have the meanings respectively assigned to them in the Act. intervals of time for conduct of energy audit.-(l) Every designated consumer shall 3 have its first energy audit conducted, by an accredited energy auditor within 18 months of the notification issued by the Central Government under clause (i) of section 14 of the Act. (2) The

interval of time for conduct and completion of subsequent energy audits shall be three years with effect from the date of submission of the previous energy audit report by the accredited energy auditor to the management of the designated consumer



4. Manner of energy audit.- Every energy audit under the Act shall be conducted in the following manner:-

17 (1) Verification of data of energy use.- The accredited energy auditor shall - of it) ;ial (2) (a) (b) (c) verify the information submitted to the designated agency under the Energy Conservation (the form and manner for submission of• report on the status of energy consumption by the designated consumers) Rules, 2007 for the previous two years through examination of energy bills, production data, inspection of energy—using equipment, production-processes, and systems, spot measurements, discussion or interview with the officers and staff regarding operation of plants, energy management procedures, equipment maintenance problems, equipment reliability, projected equipment needs, improvements undertaken or planned, establish validated data on annual energy consumption and prepare a report in



Form 1 for the year preceding to the year for which energy audit report shall be prepared and submitted; establish specific energy consumption for the year referred to in clause (a); disaggregate the energy consumption data and identify major energy using equipment, processes and systems. Scope of energy audit.-The accredited energy auditor jointly with the energy manager of the designated consumer shall- 18

(a) (b) (c) (d) THE GAZETTE OF INDIA : EXTRAORDINARY [PART III—Sc 4) develop a scope of work for the conduct of energy audit required under the Act with a view to ensuring adequate coverage in terms of the share of total energy use that is covered in the energy audit, select energy intensive equipment or processes for energy auditing; agree on best practice procedures on measuring the energy efficiency performance of selected equipment and on algorithm to estimate energy performance and energy savings; collect energy consumption, and production data for the equipment and processes covered within the scope of energy audit, operating data, and schedule of operation, non proprietary process flow charts, production level disaggregated by product, if applicable, and such other historical data as may be considered essential by the accredited energy auditor for achieving the purpose of energy audit. (3) Monitoring and analysis of use of energy data for energy audit.- The accredited energy auditor shall- (a) (b) (c) verify the accuracy of the data collected in consultation with the energy manager, appointed or designated by the designated consumer in terms of the notification number S.O.318(E), dated the 2nd March,2007, as per standard practice to assess the validity of the data collected; analyse and process the data with respect to- (ii) (i) (ii) consistency of designated consumers' data monitoring compared to the collected data; recommendations to reduce energy consumption and improve energy efficiency; summary overview of energy consumption in plant or establishment by fuel type and by section; conduct equipment energy performance measurements with due diligence and caution. Preparation of recommendations on energy saving measures, their cost (4) benefit analysis.-The accredited energy auditor having regard to the overall efficiency of the production process, techno-economic viability of energy saving measures, site conditions and capacity of the designated consumer to invest for their implementation, shall prepare a list of recommendations to save energy and the list shall include- (a) a brief description of each recommended measure; (b) the estimated energy saving as well as energy cost reduction potential over a reasonable technical or economic life of the measure; 19 (c) (d) (f) (g) any known or expected measure; technical risk associated with each a preliminary assessment of financial attractiveness of each measure or assessment of maximum investment feasible based on the estimated energy cost saving potential over the life of the measure; tabulated summary of recommendations listed as per their implementation schedule (short, medium and long term); where different alternatives for implementation of an energy efficiency measure are available, the accredited energy auditor shall examine and discuss such options recommend the techno-financially better option where the installation or implementation of any recommended energy saving measure affects procedures for operation and maintenance, staff deployment and the budget, the recommendation shall include discussion of such impact; including their solutions. Prioritisation and preparation of action plan.- (1) The accredited energy auditor 5. jointly with the energy manager shall select from the energy audit report such recommended measures as are included in sub-regulation (4) of regulation 4 which in the opinion of the designated consumer are technically viable, attractive and within its financial implementation and (a) (b) (c) means, prioritize them and prepare plan of action for their this action plan shall include- preparation of detailed techno-economic analysis of selected measures; a monitoring and verification protocol to quarterly on annual basis the impact of each measure with respect to energy conservation and cost reduction for reporting to Bureau and the concerned State designated agency; a time schedule agreed upon by the designated consumer of selected measures taking into consideration constraints such as availability of finance and availability of proposed equipment. (2) The accredited energy auditor based on the activities undertaken under sub-regulation (4) of regulation 4 and regulation 5 shall submit a report in Form 2 to the management of the designated consumer. (3) The accredited energy auditor shall evaluate the implementation of each recommended energy saving measure in the previous audit report and submit a report in Form 3 to the management of the designated consumer

6. Structure of the energy audit report.-(1) The energy audit report structure shall be jointly decided by the accredited energy auditor and designated consumer. n, on he THE GAZETÉOF INDIA : EXTRAORDINARY [PARTIJ1—SE€.41 (2) The energy audit report shall highlight, details of specific energy consumption, iist of recommendations to reduce energy consumption and costs, monitoring and evaluation of impact of selected measures and conclude with certification by accredited energy auditor stating that - (a) (b) (c) (d) the data collection has been carried out diligently and truthfully; all data monitoring devices are in good working condition and have been calibrated or certified by approved or authorised agencies and no tempering of such devices have occurred; all reasonable professional skill, care and diligence have been taken in preparing the energy audit repon and the contents thereof are a true representation of the facts: adequate training provided to personnel inVolved in daily operations after implementation of recommendations; and the energy audit has been carried out in accordance with these regulations, and the format for the preparation of energy audit report is given in



Form 4 for guidance. (3) The accredited energy auditor shall highlight the strengths and weaknesses of the designated consumer in the management of energy and energy resources in the energy audit report and recommend necessary action to improve upon method of reporting data, energy management system in detail along with their underlying rationale, and improving energy efficiency and reducing energy consumption in the designated consumer. (4) The accredited energy auditor shall sign the energy audit report under the seal of its firm giving all the accreditation details along with details of manpower employed in conducting the energy audit. (5) The energy audit report shall include a work schedule sheet duly signed by accredited energy auditor and energy manager of the designated consumer. i: 2 (b) 4 5 6 Year 20-20 7.0 7.1 (A) (iii) (iv) (v) (B) (a) (i) (iii) (iv) (v) Form 1 Details of validated data on energy consumed and specific energy consumption per Unit of production [See regulation Name of the Unit The *sector in Which unit falls (Refer Annexure-I) Complete address of Unit's location (including Chief Executive's name and designation) With mobile telephone, fax numbers. and e-mail, Year of establishment Registered office address with telephone, fax numbers and e-mail Name, designation, address, mobile, telephone. fax numbers and e-mail of energy manager Production and capacity utilisation details Main products Product 1 Product 2 Other products Units (Please specify) Installed capacity (a) Actual production (b) % Capacity utilisation (bla) Specific energy consumption x 100 Year 20 - 20 Energy consumption and cost Electricity consumption and cost Purchased electricity Units (Millions kWh/year) Total cost (Rs. Millions/year) Plant connected load (kW) Contract demand (kVA) with utility Connected load (kW) Own generation Through diesel generating sets Annual generation (Millions kWh/ year) Total cost (Rs. Million/ year) Fuel used (HSD/LDO/LSHS/LSFO (Refer Annexure-2) Gross calorific value (kCal/kg) Annual fuel consumption (tonne) Total annual fuel cost (Rs. Million) 22 (b) (ii) (c) 0 (ii) (iii) (v) (C) 7.2 (iii) (iv) (v) (vi) (B) 0) 00 (iii) (iv) (v) GAZETTE OF INDIA : EXTRAORDINARY Year 20 - Through steam turbine/ generator Annuai generation (Millions kWh/ year) Fuel used state which type of fuel was used (C=coal. B=biomass, *electricity). If coal was used. state which grade i.e., C/I=imported or C/F=Coal of grade F Through gas turbine Annual generation (Millions kWh/ year) Fuel used (state which type of fuel was used Natural Gas (NG), Piped Natural Gas (PNG), Compressed Natural Gas (CNG), Naphtha) Gross calorific value (kCal/SCM) Annual fuel consumption (SCM) Total annual fuel cost (Rs. Million) Total generation of electricit•y (Millions kWh' year) 7.1 (B) Electricity supplied to the gctdl others (spec!fy (Millions kWh year) Total Electricity consumed kWh/yeac) 7.1 [A(i) +C-DI Fuel consumption and % cost for peocess heating Coal Gross calottfic vajuue (kCattk2) Quantity purchased (tonne! year) Quantity esod Tor power generation Quantity used as raw material, if any (tonne/year) Quantity used for process heating (tonne/year) Total coal cost for process (Rs. Million/year) Lignite Gross calorific value (kCal/kg) Quantity purchased (tonne/year) Quantity used for power generation (tonnes/year) Quantity used as raw material. if any (tonne/year) Quantity used for process heating (tonne/year) Total lignite cost for process (Rs. Million/year) [PART 20 Year 20 - 20 (iii) (iv) (vi) 7.3 (A) O) (iii) (iv) (v) (B) (iii) (iv) (v) (C) 00 (iii) (iv) (v) (vi) Bio mass Other purchased solid fuels (please specify) bagasse, rice husk, etc. Average moisture content as fired (%) Average gross calorific value as fired (kcal/kg) Quantity purchased (tonne/year) Quantity used as raw material, if any (tonne/year) Quantity used for process heating (tonne/ year) Total bagasse cost for process (Rs, Million/year) Liquid Furnace Oil(F.o.) Gross calorific value (kCal/kg) Quantity purchased (kL/ year) Quantity used for power generation (kW year) Quantity used as raw material. if any (kL/ year) Quantity used for process heating (kW year) Total F.O. cost for process heating (Rs. Million/year) LOW Sulphur Heavy Stock (LSHS) Gross calorific value (kCa\jkg) Quantity purchased (tonne,€year) Quantity used for power generation (tonne/year) Quantity used as caw material, if any (tonneoeat•) Quantity used for process heating (tonne/year) Total LSHS Cost for process heating (Rs. Million/year) High Sulphur Heavy Stock (HSHS) Gross calorific value (kCal/kg) Quantity purchased (tonnes/year) Quantity used for power generation (tonne/year) Quantity used as raw material, if any (tonne/year) Quantity used for process heating (tonne/year) Total HSHS cost for process heating (Rs. Million/year) 24 (0) (iii) (v) (b) (iii) (iv) (vi) 7.4 (iji) (iv) W) (B) (iii) (iv) (v) (vi) THE GAZEITE OF INDIA : EXTRAORDINARY Year 20 [PART III— SFC.4) 20 Diesel Oji High Speed Diesel Gross calorific vatuue (YCaaj,'kg) Quantity purchased (KL/year) Quantity used toq power generation (tonne/year) Quantity used as raw material, if any (kU/year) Quantity used for process heating (kW/year) Total HSD cost for process heating (Rs. Million/year) Light Diesei Oil (I-DO) Gross calorific value (kCal/kg) Quantity purchased (klJ/year) Quantity used for power generation

(kÜ/year) Quantity used as raw material, if any (kU/year) Quantity used for process heating (klJ/year) Total LDO cost for process heating (Rs. Million/year) Compressed Natural Gas (CNG) Gross calorific value (kCal/SCM) (Refer Annexure 2) Quantity purchased (million SCM/year) Quantity used for power generation (million SCM/year) Quantity used as raw material, if any (million SCW/year) Quantity used for process heating (million SCM/year) Total cost of natural gas for process heating (Rs. Million/year) Liquefied Petroleum Gas (LPG) Gross calorific value (kCal/SCM) Quantity purchased (million SCM/year) Quantity used for power generation (million scw/year) Quantity used as raw material, if any (million SCM/year) Quantity used for process heating (million SCM/year) Total cost of LPG for process heating (Rs. Million/year) 20 (if) 7.5 (iii) 7.6 (A) (iii) 7.7 (iii) (v) . gna:ure Gas generated as by product! waste in the plant and used as fuel Name Gross calorific value (kCal/SCM) Quantity used for process heating (million SCMi/year) Total cost of byproduct gas for process heating (Rs. Millioryear) Solid waste Solid waste generated in the plant and used as fuel Name Gross calorific value (kCal/kg) Quantity used for process heating (tonne/year) Total cost of solid waste for process heating (Rs Million/year) Liquid waste Liquid effluent/ waste generated in the plant and used as fuel Name Gross calorific value (kCa/kg) Quantity used for process heating (tonne/year) Total cost of liquid effluent for process heating (Rs. Million/year) Others Name Average gross calorific value (kCal/kg) Quantity used for power generation (tonnes/year) Quantity used for process heat (tonnes/year) Annual cost of the others source Year 20 Signature ame of the energy manager, ame of the company ull address eal Name of the accredited energy auditor Accreditation 'details Sea' 26 OF INDIA : EXTRAORDINARY iPK: * Annexurel - Name of sectors Aluminum, cement. chemicals, chlor-alkali, fertilizers, gas crackers, iron and steel, naphtha crackers, pulp and paper. petrochemcajs, petroleum refinenes, sugar, textile. Annexure 2 - Nomenclature HSD LDO LSHS LSFO c cn NG PNG CNG FO LPG SCM Million High Speed Diesel Light Diesel Oil Low Sulphur Heavy Stock Low Sulphur Fumace Oil Coal Biomass Electricity Coal Imported Indian Coal grädé F Natural Gas Piped Natural Gas Compressed Natural Gas Fumace Oil Liquefied Petroleum Gas Standard Cubic Metre (150C and I .01325 bar) Kilo Litre Tea (IO) lakh O THE GAZETTE OF INDIA : EXTRAORDINARY c o O O O > 0) O E E 0 O x o 0 75 0 u a) [PART III—SEC. 41 o 0 o 41 111 nul äe 0 30 Ill Form 4 FORMAT [See regulation 6 Guidelines for preparation of Energy Audit Report Each energy audit report shall include — (I) Title page - Report title Client name - Location of the plant/establishment - Date of report - Name of the accredited energy auditors (2) Table of contents (3) Acknowledgement (4) Executive summary 1.0 - Company's profile - Goals and objectives of the energy management programme - Major challenge and goals for the upcoming year. - Major activities to meet challenges and goal - Summary and classification of energy - Conservation measures — should be in Form 2. Introduction about the plantlestabiishment 1.1 General plant/establishment details and descriptions I .2 Energy audit team I .3 Component of production cost (raw materials, energy, chemicals, manpower, overhead, others) 1.4 Major energy use areas 31 2.0 3.0 4.0 5.0 6.0 Production process description 2.1 Brief description of manufacturing process 2 2 Process flow diagram and majo unit operations 2.3 Major raw material Inputs, quantity and costs Energy and utility system description 3.1 List of utilities 3.2 Brief description of each utility 3.2.1 3.2.2 3.2.3 3.2.4 3.2.5 3.2.6 3.2.7 Electricity Steam Water Compressed air Chilled water Cooling water Others Detailed process flow diagram and energy and material balance 4.1 Flow chart showing flow rate, temperature, pressures of all input- output streams 4.2 Water balance for entire industry 4.3 Energy balance of the designated consumer in the tabular form Performance evaluation of major utilities and process equipments/ systems 5.1 List of equipments and process Where performance testing was done 5.2 Results of performance testing Energy efficiency in utility and process system 6.1 Specific energy consumption 6.2 Boiler efficiency assessment 32 7.0 8.0 TI IE GAZETTE OF INDIA : EXIRAORDINARY 6.3 Thermic fluid heater performance assessment 6.4 Furnace efficiency analysis 6S Cooling water system performance assessment 6.6 Diesel Generator set performance assessment 6.7 Refrigerator system performance 6.8 Compressed air system performance 6.9 Electric motor load analysis 6.10 Lighting system 6.11 Others. Evaluation of energy management system 7.1 Energy management policy 7.2 Energy management monitoring system 7.3 Bench marking Ill Si:c.41 7.4 Development and establisiment of procedures include energy efficiency possibilities 7.5 Training to staff responsible for operational and associated processes 7.6 General audit review 7.7 Conform to Act, rules and regulations framed there under 7.8 Strength and weaknesses of the designated consumer. Energy conservation measures and recommendations 8.1 8.2 8.3 8.4. The report shall provide existing energy profile of the designated

consumer with percentage share of major equipment / processes, utilities etc., so that it becomes a basic documents for future monitoring. Details of energy saving measures recommended in Form 2 Cost benefit analysis of each recommended energy saving measures as per standard practice. The investment proposals shall be backed with technical and economic viability and prioritization of energy conservation measures based on financial analysis of various options taking into account the capacity of the designated consumer to make investment in such measures. Ill—wg4] 33 8.5. 8.6. The energy auditor may also consider the substitution of existing energy use by any other form of techno-commercially viable form of energy. Details of energy saving measures implemented, investment made and saving in energy achieved together with progress made in the implementation of the remaining energy saving measures in Form 3. 9.0 Certification This part shall indicate certification by accredited energy auditor stating that- (iii) (iv) (v) the data collection has been carried out diligently and truthfully; all data monitoring devices are in good working condition and have been calibrated or certified by approved agencies authorised and no tempering of such devices has occurred; all reasonable professional skill, care and diligence had been taken in preparing the energy audit report and the contents thereof are a true representation of the facts; adequate training provided to personnel involved in daily operations after implementation of recommendations; and the energy audit has been carried out in accordance with the Bureau of Energy Efficiency (Manner and Intervals of Time for the Conduct of Energy Audit) Regulations, 2010. Signature Name of the accredited energy auditor Accreditation details Seal Printed by the Manager. Government of India Press. and Published by the Controller Of AJAY MATHUR, Director-General [ADVT 111/4/185/10-Exty.1 Ring Road. Mayapuri. New Delhi-1 10064 Publications. Delhi-1 10054,

