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Ministry of Power
Government of India

Detailed Procedure for
Compliance Mechanism under CCTS

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Detailed Procedure for Compliance Mechanism under CCTS

Bureau OF ENERGY EFFICENCY (BEE)

Detailed Procedure for Compliance Mechanism under CCTS

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1. Definitions

1. **Activity data** means the quantity of fuels, energy, or materials consumed or produced by a process relevant for the Greenhouse Gas (GHG) emission calculations.
2. **Baseline year** means the financial year in which a base level of GHG emissions is used as a reference point for establishment and assessment of greenhouse gas emissions intensity, based on verified data submitted by the obligated entity.
3. **Biogenic source of energy** encompasses energy derived from organic materials, particularly biomass and includes various forms of renewable energy generated from biological sources, such as agricultural and forestry residues, organic waste, and sewage, through processes like combustion or anaerobic digestion.
4. **Biomass** means the biodegradable portion of products, waste, and residues from biological sources such as agriculture (including vegetal and animal waste) forestry and related industries, as well as biodegradable fraction of industrial and municipal waste, it includes biogas, bioliquids and biofuels.
5. **Calculation factors** means factors that are referred for calculation of GHG emissions including but not limited to calorific value, emission factor, total carbon content of the fuel, oxidation factor, stoichiometric conversion, oxidation factor and conversion factor.
6. **Combustion GHG emissions** means emissions of greenhouse gases resulting from the chemical reaction of solid, liquid, or gaseous fuel with oxygen, typically involving the release of carbon dioxide (CO_2) and other greenhouse gases.
7. **Compliance Year** means the specific financial year by which obligated entities shall meet their Greenhouse Gas Emission Intensity (GEI) targets.
8. **Co-processing** means the utilization of waste materials in manufacturing processes with the aim of recovering energy or resources, or both, thereby reducing the reliance on conventional fossil fuels or raw materials, or both, through substitution.
9. **Data Control** activities mean the entire set of acts or measures that are implemented by the obligated entity to mitigate risks related to the data flow. Such measures include policies and procedures mitigating risks and providing safeguards for maintaining data integrity.
10. **Data flow** means all data points and activities related to the acquisition, handling,processing, transferring, and storing of data that are needed to draft a GHG emissions report from primary source data.

11. **Direct GHG emissions** means GHG emissions from the production processes of the obligated entity, including emissions from the production of electricity, heating and cooling that is consumed during the production processes and the emission sources located in the Gate-to-Gate boundary of the entity.
12. **Direct process emissions** from industrial processes means GHG emissions other than combustion emissions occurring because of chemical reactions between substance or their transformation.
13. **Emission factor** means the average emission rate of a greenhouse gas relative to the activity data of a source stream, assuming complete oxidation for combustion and complete conversion for all other chemical reactions and is denoted in terms of kg CO_2 emission per unit of energy or per unit of material.
14. **Emission source** means a separately identifiable process within an obligated entity, which causes relevant emissions of greenhouse gases.
15. **Emission source stream** means a particular fuel type, raw material, or product leading to the emission of relevant greenhouse gases at one or more emission sources due to its consumption or production.
16. **Gate-to-Gate** boundary outlines the monitoring scope of obligated entities and it covers direct and indirect GHG emissions resulting from obligated entities process and operations.
17. **GHG emission intensity** of an obligated entity, means tonnes of carbon dioxide equivalent (t CO_2e) per unit of equivalent product.
18. **Indirect GHG emissions** means GHG emissions resulting from production of purchased electricity and heat, and is consumed in production process of obligated entity.
19. **Monitoring plan** is a comprehensive document outlining the details of an obligated entity's Gate-to-Gate boundary, the monitoring methodology applied by the obligated entity, data control, and any other information that is necessary for the transparent monitoring and calculation of GHG emissions relating to an obligated entity's operations.
20. **Oxidation factor** means the ratio of carbon oxidised to CO_2 resulting from combustion to the total carbon in the fuel, expressed as a fraction.
21. **Trajectory period** means three consecutive compliance years or as specified by the Central Government for the greenhouse gas (GHG) emission intensity targets.
22. **Type I emission factor** is a standard emission factor based the latest IPCC Guidelines or national inventory submissions, or emission factor published by statutory bodies/departments of central government.
23. **Type II emission factor** is determined by the obligated entity using sampling and analysis of the fuel or material in accordance with Section 5 of this procedure.
24. **Verification** activity is an independent assessment of the GHG emission report and GHG emission intensity for the relevant compliance year.

2. Introduction

1. To facilitate the achievement of India's enhanced Nationally Determined Contribution (NDC) targets, the Government has initiated development of framework for **'Indian Carbon Market' (ICM)** which will mobilise new mitigation opportunities by creating demand for emission reduction credits through private and public entities.
2. The Central Government has notified the Carbon Credit Trading Scheme (CCTS) 2023 on 28 June 2023 under the powers conferred by clause (w) of section 14 of the Energy Conservation Act 2001 (52 of 2001). This legislation delineates the Indian carbon market, establishing a national framework with the aim of reducing, removing, or avoiding the greenhouse gases emissions (GHG) from Indian economy. It achieves this by pricing the greenhouse gases emission reduction through trading of the carbon credit certificates.
3. The Energy Conservation Act 2001 authorises the Government of India to specify the Carbon Credit Trading Scheme and to issue the 'Carbon Credit Certificates (CCC)' to the registered entities under different mechanisms. Whereas the Environment (Protection) Act 1986 empowers the Government of India to specify standards for emission or discharge of pollutant for the obligated entities.
4. Under the CCTS, the Government has introduced a 'Compliance Mechanism', where the obligated entities shall comply to the greenhouse gas emission intensity targets as may be notified by the central government. Under the CCTS, the compliance mechanism is detailed as below:
    a. The sectors and the obligated entities to be covered under the compliance mechanism shall be decided by the Ministry of Power (MoP) based on the recommendations of the Bureau of Energy Efficiency and The National Steering Committee for Indian Carbon Market.
    b. The National Steering Committee for Indian Carbon Market (NSCICM) is responsible for the governance, oversight and functioning of the ICM. The above committee is chaired by the Secretary, Ministry of Power and co-chaired by the Secretary, Ministry of Environment Forest, and Climate Change. NSCICM also comprised of representatives from relevant government ministries and agencies, representative of state government and industry experts.
    c. The Bureau would develop the targets in terms of tonnes of carbon dioxide equivalent (tCO_2e) per unit of equivalent product after taking into account relevant aspects including available technologies and likely cost of their implementation.
    d. The Ministry of Power, after considering the recommendations of Bureau and National Steering Committee for Indian carbon market (NSC-ICM), shall recommend the greenhouse gases emission intensity targets against each obligated entity to the Ministry of Environment, Forest and Climate Change (MoEFCC) for notification under the Environment Protection Act, 1986.

e. The obligated entities shall be required to achieve greenhouse gases emission intensity in accordance with the targets notified by the Ministry of Environment, Forest and Climate Change.

f. The obligated entities shall also be required to meet any other targets such as use of non-fossil energy consumption as may be notified by the Ministry of Power under the Energy Conservation Act.

5. Further the clause (12) of CCTS, specifies the provisions to develop and publish the detailed procedure for operationalisation of Indian Carbon Market which shall contain the following, -

   i. Criteria for issuance of carbon credit certificates.

   ii. Validity of carbon credit certificates.

   iii. Floor and forbearance price of carbon credit certificates.

   iv. Requirement, format, and timeline for submissions.

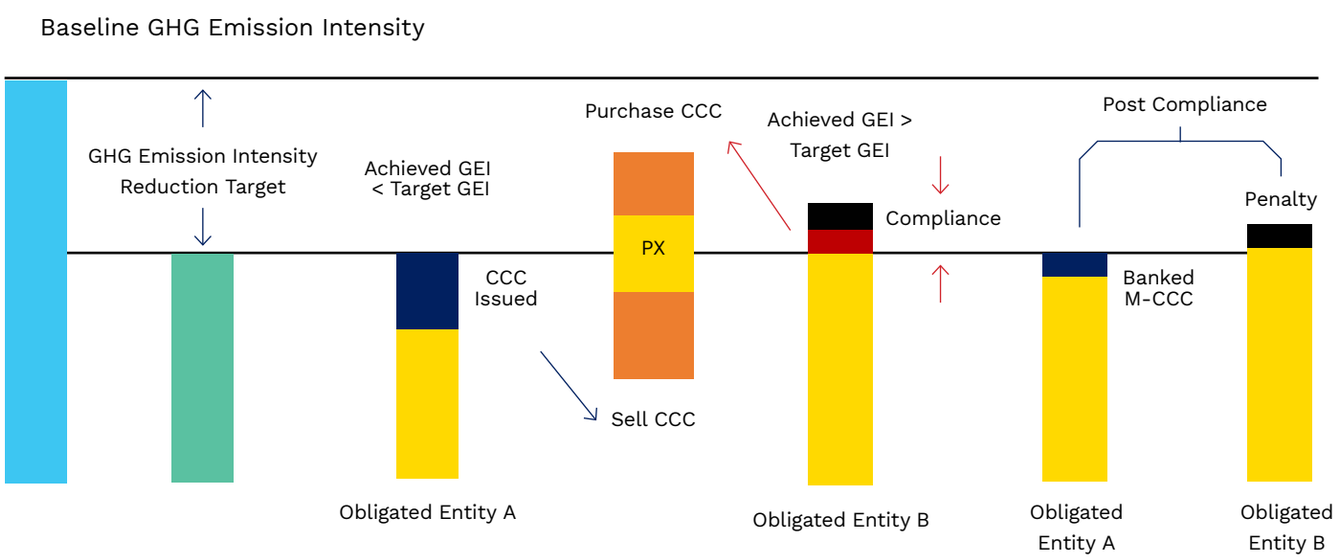
   v. Monitoring, reporting, and verification.

   vi. Any other related and incidental matters.

3. Compliance Mechanism

1. The Carbon Credit Trading Scheme specifies the compliance mechanism, whereby the registered entities which are notified under the compliance mechanism are called as 'obligated entity'.
2. The Ministry of Environment, Forest and Climate Change (MoEFCC) shall notify the GHG emission intensity targets in terms of tonnes of carbon dioxide equivalent (tCO_2e) per unit of equivalent product for each year of the defined trajectory period for the obligated entities, based on the recommendations of the Ministry of Power.
3. The obligated entities will be notified of an annual target for a trajectory period before its commencement. Upon completion of trajectory period, the targets shall be revised for the subsequent trajectory period.
4. An obligated entity, once notified in any trajectory period, must comply with the assigned GHG emission intensity targets for each annual year, known as the compliance year.
5. An obligated entity who reduces their GHG emission intensity beyond the target GHG emission intensity in a compliance year is entitled to the issuance of Carbon Credit Certificates (CCC). These are based on the difference between the achieved GHG emission intensity and target GHG emission intensities, multiplied by the production units in the relevant compliance year.
6. An obligated entity failing to meet the target GHG emission intensity in a compliance year must surrender Carbon Credit Certificates (CCC). The required number of CCCs is calculated by the difference between the actual and the target GHG emission intensities, multiplied by the production for that year. Should the entity lack the necessary certificates for surrender, it must purchase additional CCCs.
7. In case of the CCC to be surrendered, the obligated entities may surrender the banked CCCs or purchase the Carbon Credit Certificates (CCC) to comply with the GHG emission intensity targets in each compliance year.
8. The illustration below shows that obligated entity 'A' receives CCC for achieving a GHG emission intensity below the target. In contrast, obligated entity 'B' must purchase the CCCs from the trading platform to comply with the GHG emission intensity targets.
9. The obligated entity 'A' may sell their Certified Carbon Credits (CCC), while obligated entity 'B' shall surrender the CCC through the trading exchange to comply with the notified annual greenhouse gas (GHG) emission intensity targets.

Figure 1: Working of Compliance Mechanism



4. GHG Emission Intensity Trajectory and Targets

4.1. Inclusion of Obligated Entities under compliance mechanism of CCTS

1. Under the provisions of CCTS, the Central Government shall, upon the National Steering Committee for the Indian Carbon Market's recommendation, determine the obligated entities for notification under the Carbon Credit Trading Scheme's compliance mechanism.
2. The sectors for the obligated entities shall be specified by the central government as per the clause 14 (e) of the Energy Conservation Act. The government may designate any user or class of users within energy-intensive industries and other establishments, as outlined in the Schedule, as a designated consumer.

4.2. Greenhouse Gases (GHG) coverage

1. For the compliance mechanism under CCTS, the greenhouse gases to be covered are carbon dioxide (CO_2) and perfluorocarbon (PFCs) gases from the obligated entities operations.
2. Greenhouse gas emissions shall be converted to carbon dioxide equivalent (CO_2e) based on Global Warming Potential (GWP) for the greenhouse gases (as specified in the latest assessment report by Intergovernmental Panel on Climate Change (IPCC). The GWP values for different gases are provided in Annexure I.
3. The other GHGs may be added in future.

4.3. Establishment of GHG emission intensity trajectory

1. For target setting under the CCTS compliance mechanism, the Bureau will develop a sectoral GHG emission intensity trajectory in consultation with the technical committee for each sector. This trajectory will determine the sectors' potential reductions to meet the NDC targets set by the government.
2. The emission intensity trajectory for the sectors, extending to 2030, will be subject to regular reviews and updates by the Bureau.
3. The GHG emission intensity trajectory for the sector will be developed based on:
    i. GHG reduction required to meet India's nationally determined contribution commitments.
    ii. Available technology and associated cost of their implementation.
    iii. Potential for energy efficiency, fuel switch, use of non-fossil fuel energy/ feedstock and decarbonisation in the sector.

4. Based on sectoral trajectory, the GHG emission intensity targets will be determined for each obligated entity considering:
   i. The GHG emission intensity trajectory developed for the sub-sectors.
   ii. The GHG emission intensity targets for each obligated entity based on the relative GHG emission intensity with respect to lowest GHG emission intensity within its sub-sector.
5. The GHG emission intensity targets shall be notified for the trajectory period (e.g., three years) and the annual targets shall be specified for each compliance year to be complied with by the respective obligated entity.

4.4. Establishment of GHG emission intensity targets

1. To establish the GHG emission intensity targets, the technical committee for the respective sectors, approved by NSC-ICM, shall evaluate the obligated entity's GHG emission intensity in the baseline year and the targets for GHG emissions intensity in the trajectory period. This evaluation will cover direct energy, process, and indirect energy-related emissions within the gate-to-gate boundary established against the product manufactured during the year. The emissions considered are:
   i. Direct GHG emissions.
   ii. Direct process emissions.
   iii. Indirect GHG emissions.
2. The GHG emissions from the obligated entity shall be calculated by considering the following:
   i. Identifying all possible GHG emission sources and source streams resulting in emissions within the boundary of obligated entity.
   ii. GHG emission sources shall cover emissions from energy use and emissions from processes.
   iii. Consider all forms of GHG emission source stream from energy use that is solid fuel, liquid fuel, gaseous fuel, purchased electricity, purchased heat, or any other form of energy imported within the boundary of obligated entity for consumption as energy for production.
   iv. Consider all forms of process-related GHG emissions resulting from chemical reaction between substances or transformation during the production process within the boundary of the obligated entity.
   v. Calculate the total GHG emissions by adding GHG emissions from different source streams and converting into a single GHG emissions unit, namely, tonne of carbon dioxide equivalent using the formulas as specified in the Annexure III.

vi. Where applicable, the entities where intermediate products/raw material are imported within the plant boundary of the obligated entity, notional emissions shall be added to the GHG emission and emission intensity calculation to ensure consistency across different entities within the same sector/subsector and this shall be specified in the monitoring, reporting and verification guidelines for the sectors.

3. For calculating the GHG emissions, the following shall not be included:

   i. GHG emissions from biomass or biogenic sources of energy.

   ii. Energy from renewable energy.

   iii. GHG emissions resulting from co-processing of alternate fuel such as hazardous waste or other waste in manufacturing process as per the latest guidelines or rules by the Central or State Pollution Control Board. However, such fuels shall be recommended by the respective technical committee for the consideration of NSC-ICM. Fuel such as Petroleum coke, Carbon Black, Petro Polymer Fuel, Peat and Dolochar shall not be considered as alternate fuels.

   iv. GHG emissions if captured, transferred, or utilised by the obligated entity through carbon capture, storage, and utilisation technology.

   v. GHG emissions resulting from energy consumed in the colony attached to the obligated entity, temporary or major construction work, and for outside transportation, as these emissions will not be resulting from the production process.

   vi. GHG emissions from refrigerant leakages in office buildings and processes.

   vii. GHG emissions resulting from captive energy production (electricity and heat) which is exported out of the boundary of obligated entity.

   viii. Any other emissions sources or source streams as proposed by the technical committee and recommended by the National Steering Committee for Indian Carbon Market.

4. In calculating the production for the purpose of deriving the GHG emission intensity, where more than one product is produced, the main product or an equivalent product derived from the product mix as per the Energy Conservation (Energy Consumption Norms and Standards for Designated Consumers, Form, Time within which, and Manner of Preparation and Implementation of Scheme, Procedure for Issue of Energy Saving Certificates and Value of Per Metric Ton of Oil Equivalent of Energy Consumed), Rules, 2012 and its subsequent amendment by the central government shall be considered.

   Provided that, should the production of main product is stopped, the obligated entity shall inform the Bureau of the necessary details in this regard. The Annexure II provides details of product to be considered for the sectors.

5. The GHG emissions intensity shall be calculated for the baseline year from the verified data (for calculation of GHG emissions and emissions intensity) submitted by the obligated entity to the Bureau. (The data is to be verified by the accredited carbon verification agency)
6. The technical committee shall prepare a report containing obligated entity's emission intensity targets and submit its recommendation to the Bureau.
7. The Bureau shall examine the report submitted by the technical committee and finalise its report containing the recommendation regarding the GHG emissions intensity targets for each obligated entity and submit it to the working group under NSC-ICM, and NSC-ICM shall further recommend it to the central government for notification.
8. The Ministry of Power, after duly considering the recommendations of the Bureau and National Steering Committee for Indian carbon market, shall recommend the greenhouse gases emission intensity targets to the Ministry of Environment, Forest and Climate Change for notification under the Environment Protection Act 1986.
9. The MoEFCC after considering the said recommendation shall notify the annual GHG emission intensity target for each obligated entity for the trajectory period.

5. Monitoring and Reporting Process

1. The GHG emission intensity is to be calculated considering the direct and indirect GHG emissions based on provisions mentioned in sections (3) and (4) of this document and for this purpose the 'Gate-to-Gate' boundary shall be applied such that the products mentioned in Table in Annexure II shall be fully captured. Once the obligated entity's boundary has been fixed, the same boundary shall be considered for entire trajectory period, and any change in the said boundary such as capacity expansion, merger of two plants, division of operation, etc. shall be duly intimated to the Bureau and will be subject to approval for the Bureau for consideration in the emissions or not.
2. Once the boundary is fixed, the obligated entity shall develop and follow monitoring plan for GHG emissions monitoring, reporting, and compliance with GHG emissions intensity targets, considering the nature and functioning of the entity.
3. The obligated entity shall monitor greenhouse gas emissions based on the monitoring plan and shall submit the monitoring plan to the Bureau within three months from the commencement of the first trajectory period.
4. The subsequent monitoring plans are required to be submitted on an annual basis and within the three months of start of the compliance year.
5. The monitoring plan shall be reviewed and approved by the Bureau and, if required, shall be updated by the obligated entity basing the observations made by the Bureau.
6. The monitoring plan shall contain at least the following:
    i. A description of activities conducted at the entity to be monitored, a list of emission sources, and source streams to be monitored.
    ii. A simple diagram highlighting the emission sources, source streams, metering points, sampling points and metering equipment and also the data flow/ sources concerning the indirect emissions.
    iii. GHG emission monitoring methodology for source streams.
    iv. Monitoring details for activity data and emission factors.
    v. Information on traceable and verifiable reference of activity data such as energy consumption, production, calculation factors, and other parameters where applicable.
    vi. A description of the written procedure for data flow and control activities for data relating to monitoring of emissions.
    vii. A description of the sampling procedure for fuel and other materials as required.
    viii. A description of the internal and external testing procedure for fuel and other materials as required.

ix. A description of procedure to regularly evaluate the monitoring plan and its appropriateness.

x. A description of procedure to assign responsibilities to staff for monitoring and reporting of the emissions.

xi. A description of measurement equipment used, their measurement range, uncertainty, and exact location of the measuring instruments for each source stream to be monitored.

xii. A description of the analysis methods to be used for the determination of all relevant factors for each of the source streams.

xiii. Any change or variation in the submitted monitoring plan based on review by BEE or initiated by obligated entity shall be updated and latest reviewed plan should be made available to the accredited carbon verification agency for the verification purposes.

7. The obligated entity shall calculate direct and indirect GHG emissions by converting into single unit i.e., tonnes of carbon dioxide equivalent (tCO_2e) using the standard emission calculation methodology and/or mass balance methodology.

i. The obligated entity shall monitor and report both direct energy, process, and indirect energy-related GHG emissions within boundary.

ii. For calculation purpose, under the standard methodology, the obligated entity shall calculate combustion-related GHG emissions from emissions source streams. This is done by multiplying the activity data related to the amount of fuel consumed, expressed as tonnes of oil equivalent based on net calorific value (NCV), by the corresponding emission factor. The emission factor is expressed as tonnes of carbon dioxide equivalent per tonne of oil equivalent (tCO_2/TOE) or as grams of carbon dioxide equivalent per kilo calorie (g CO_2e/kCal) consistent with the use of NCV, and the corresponding oxidation factor.

iii. Where applicable, under the mass balance methodology, the obligated entity shall calculate the quantity of carbon dioxide emissions (CO_2) corresponding to the emission sources by the mass balance by multiplying the activity data related to the amount of fuel or material entering or leaving the boundaries of the mass balance, with the carbon content of fuel or material and further multiplied by 3.664 t CO_2/t C (stochiometric conversion to CO_2 based on carbon content).

iv. For the biomass and biogenic fuel source, the GHG emission shall be considered as biogenic GHG emissions and not included in the overall GHG emissions for calculating the baseline or emissions during the compliance year. However, these shall be reported as biogenic emissions separately.

v. The conversion factors for fuel combustion shall be further adjusted with the oxidation factor as monitored and measured by the obligated entity and in case of non-availability of oxidation factor, the default oxidation factor of 1 shall be applied.

vi. For the calculation of indirect GHG emissions from purchased electricity, the emissions shall be calculated by considering the latest average grid emission factors from CO_2 baseline database for Indian Power Sector, published by the Central Electricity Authority (CEA). The emission factor that is applied in baseline year shall be applied across the compliance years, as the obligated entity shall not get benefit due to grid decarbonisation but solely from their actions. There will be no normalisation for power mix.

vii. In case of dedicated power purchase agreement for purchased electricity, the supplier-specific emission factors shall be used, and the obligated entity shall provide the emission factor with supporting documentation verified by an accredited carbon verification agency. In case the emission factor is not available, the default value of 1.19 tCO_2/MWh as published by Central Electricity Authority shall be used.

viii. For the indirect GHG emissions calculation from purchased or export of heat, the emissions shall be calculated by considering the emission intensity or emission factor of heat generation i.e., g CO_2/kCal based on the fuel mix for steam generation.

ix. For the process emissions calculation (if applicable to the obligated entity), the same shall be calculated as per the formula in the sector-specific monitoring, reporting, and verification (MRV) guidelines published by the Bureau.

x. The Bureau shall develop and publish sector specific MRV guidelines based on the recommendations of technical committee and shall be approved by NSC-ICM.

xi. Once the total GHG emissions from the obligated entity is calculated, the GHG emission intensity shall be calculated by dividing the total GHG emissions by the equivalent product from the obligated entity (in tonne).

8. Monitoring of Activity Data

i. The obligated entity shall monitor the activity data of source streams in one of the following direct ways:

   a. Based on continual measurement at the process which causes emissions.

   b. Based on aggregated quantities delivered or consumed, considering relevant stock changes, per batch and at regular intervals – daily, weekly, or monthly.

ii. For the purpose of point (i) (b) The activity data shall be calculated as consumption of fuel or material calculated based on the quantity of fuel or material received during the compliance year minus the quantity of fuel or material moved out of the entity plus the quantity of fuel or material in stock at the beginning of the compliance year minus the quantity of fuel or material in stock at the end of the compliance year.

iii. The quantity of fuel or material shall be represented in mass as tonne (t) or volume as kilolitre (kL) or cubic metre (m^3).

iv. Where it is not feasible to determine quantities in stock by direct measurement due to technical or unreasonable cost associated challenges, the obligated entity may estimate those quantities based on one of the following:

a. Data from previous years correlated with output for the compliance year.

b. Documented procedures and respective data in audited financial statements for the compliance year and in this case, supporting documents need to be kept for the verification.

9. Measurement of energy content

i. The obligated entity shall calculate the net calorific of the fuels for emission calculation purpose.

a. The obligated entity shall undertake the solid fuel analysis to determine the NCV of the solid fuel and shall keep the lab analysis records for calculation of NCV. The NCV calculation for solid fuel shall be undertaken as per Indian Standard (IS) 1350 (Part 2): 2022 or any other equivalent national/ international standard.

b. The obligated entity shall also undertake the gaseous fuel analysis (in case of fuel generated at site through process or reaction) to determine the NCV of gaseous fuel and shall keep the lab analysis records for calculation of NCV. The NCV calculation for gaseous fuel shall be undertaken as per relevant Indian Standard or American Society for Testing and Materials (ASTM) D3488/D1946/1945 or any other equivalent national/international standard.

ii. For liquid fuels and natural gas, the NCV values provided by the supplier can also be used for calculation purposes, provided they are supported with relevant test certificates from fuel testing laboratories accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL).

iii. In case of non-availability of the net calorific value, the standard conversion factor from GCV to NCV as per Intergovernmental Panel on Climate Change (IPCC) of 95% for solid fuels and liquid fuels and 90% for gaseous fuel shall be used for converting the gross calorific value to the net calorific value.

iv. The testing and laboratories requirement are mentioned in the section 5(14) and 5 (15).

10. Emission factors for GHG emission calculation

i. The obligated entity shall determine and apply GHG emission factors either as default values (Type I) or site-specific values based on analysis of fuel, material, or process (Type II).

ii. Type I – Standard emission factor (default) shall be applied based on either of the following and shall only be used when the Type II emission factors are not available.

a. Standard emission factors as provided in Annex IV or provided in latest IPCC guidelines.

b. Standard emission factors as mentioned in the latest national inventory submission (Biennial Update Report or National Communication by Government of India and submitted to UNFCCC).

c. Standard emission factors as published by statutory organization, central government organization, or body or reputed international organization.

d. For Selection of Type I emission factor, the factors should be selected based on the type of fuel used and shall be based on the principle of conservativeness.

iii. Type II – Site specific emission factors shall be used by obligated entities for emission calculation from solid fuel, gaseous fuel, and process emissions and only in the case of unreasonable cost and technical infeasibility, the Type I emission factors shall be referred.

iv. The Type II emission factors values shall be calculated using parameters from laboratory analysis of fuels and raw materials.

iv. For determining Type II emission factors for the solid and gaseous fuel, the emissions factors shall be calculated using the site-specific Net Calorific Value (NCV) (sampled and calculated) of fuel and Total Carbon (TC) (%) in the fuel calculated based on solid fuel analysis or based on composition analysis for gaseous fuels. (As mentioned in sub section (9), (11) and (12) of section (5) of this document).

v. The selection of Type I emission factor and any discrepancy on selection of emission factors shall be finalised by the Bureau based on the recommendations from the technical committees.

vi. For the liquid and gaseous fuel where the contribution of the fuel is less than 10% of overall emissions of all source stream from the Gate-to-Gate boundary of the obligated entity, the emissions can be estimated using the actual Net Calorific Value (NCV) of fuels and type I emission factors.

11. Measurement of Total Carbon (TC) (%) for solid fuels (for emission factor determination)

i. For the determination of the type II emission factors, the obligated entities shall undertake the ultimate analysis of solid fuels to determine the total carbon content of the fuel.

ii. The obligated entity shall follow the Indian Standard IS 1350 (Part 4/Sec 1): 1974 or relevant international standard for the determination of the total carbon for solid fuels.

12. Measurement of Total Carbon (TC) (%) for gaseous fuels (for emission factor determination)

i. For the determination of the type II emission factors, the obligated entities shall undertake the composition analysis of gaseous fuels to determine the total carbon content of the fuel.

ii. The obligated entity shall follow the relevant standard as mentioned in sub-section (9) (i) (b) of section (5) of this document or other relevant international standards for the determination of the total carbon for gaseous fuels.

13. Sampling plan and minimum frequency of analysis

i. For emission calculation based on fuel and material quality, the obligated entity shall have a sampling plan in the form of a written procedure, which contains the information on the procedure on the preparation of samples, including locations for sample collection, frequencies of collection, quantity, storage, and transport of samples.

ii. The sampling plan shall be based on relevant Indian Standard/ISO Standard.

iii. The obligated entity shall ensure that derived samples are representative for the relevant batch or delivery period and are unbiased.

iv. The sampling plan and procedure shall be made available to the accredited carbon verification agency for the verification purposes.

v. The obligated entity shall make necessary arrangements for taking 'as fired' samples for solid fuel from auto-samplers installed at solid fuel feeding points for the purpose of fuel sampling.

vi. The obligated entity shall ensure that solid fuel and material samples are collected at the following minimum frequencies or as per sampling plan, whichever is higher, for analysis of samples to determine calculation factors at internal laboratories:

a. For solid fuels (including coal, lignite, coke, and petroleum coke) – at every 20,000 tonnes and at least once every month.

b. For carbonates (limestone and dolomite) – at every 50,000 tonnes and at least once every month.

c. For material where properties are required for estimation of conversion factors (including raw material, intermediate product, or final product) – at every 50,000 tonnes and at least once every quarter.

vii. The obligated entity shall ensure that gaseous samples are collected at a minimum on a weekly basis or as per the sampling plan (whichever is higher) for analysis to determine calculation factors at internal laboratories.

14. Internal Laboratory Analysis

i. For the purpose of determining the conversion factor, where laboratory analyses are required for determining properties (including net calorific value, total carbon content, and oxidation factors) of materials, fuels, or gases, the obligated entity shall undertake the analysis at their laboratories at defined frequencies and as per relevant Indian or International Standard.

ii. The internal laboratory at the obligated entity premises shall be accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL) as per IS/ISO/IEC 17025: 2017 or other relevant standards.

iii. In case where the accreditation of internal laboratory is not available, the obligated entity needs to demonstrate that their internal lab meets the following.

a. The internal laboratory applies applicable standard for analysis required.

b. The internal laboratory has employed competent personnel.

c. The internal laboratory ensures integrity of sampling and analysis by ensuring and implementing necessary control.

d. The internal laboratory implements necessary quality assurance procedures on calibrations, sampling, and analytical methods.

e. Has all the required tools and apparatus to carry out testing.

iv. If the internal laboratory is not NABL accredited, the obligated entity shall get the NABL certification for their internal laboratory within three years from the inclusion of the respective obligated entity in CCTS.

15. External Laboratory Analysis

i. To demonstrate the proficiency of internal laboratory, the obligated entity shall also facilitate the testing of solid fuel samples at external NABL accredited laboratory and compare the internal lab and external lab results.

ii. For the analysis at the internal and external laboratories, the representative portions should be taken from same sample at the last stage of sample preparation.

iii. The result of duplicate determinations carried out in each of the two laboratories on representative portions shall be close and the deviation between the values should be less than 300 J/gm or 71.7 kcal/kg for coal as per IS 1350: Part 2: 2022 and ±2% for material.

iv. The external lab analysis shall be conducted monthly for samples.

v. Should the difference exceed the aforementioned thresholds, the discrepancy will be added to the analysed parameter of the test result obtained in the obligated entity's internal laboratory for that period.

16. Treatment of exported power to grid or colony (outside boundary of obligated entity)

i. The electricity exported by the obligated entity through means of captive power plant, cogeneration plant, or waste heat shall be adjusted for emissions and subtracted from the overall emissions of the obligated entity.

ii. The emission factor for the exported power shall be calculated based on Weighted Average Net Heat Rate of the power generation and fuel used for power generation at the obligated entity.

iii. In case of non-availability of the above data, the exported power shall be adjusted using the average emission factor for grid electricity as published by the Central Electricity Authority.

17. Treatment of renewable generated electricity

i. The obligated entity using renewable energy at their premises through onsite generation, and/or offsite procurement through open access, dedicated power purchase agreements, or Green Tariff shall be considered as energy input with zero GHG emissions.

ii. The obligated entity claiming such benefits must demonstrate through necessary documentation, such as contracts and agreements, that the procured energy is renewable and that emission reductions are not double counted by both the entity and the renewable energy generator. The obligated entity shall provide an undertaking to prevent double accounting.

iii. The purchase of Renewable Energy Certificates for the purpose of Renewable Purchase Obligation or voluntary purchase is not considered as a claim towards renewable energy under the compliance mechanism.

18. Treatment of purchased and exported heat

i. The obligated entity if purchasing heat in the form of steam, hot water, chilled water, or any other form shall include the indirect emissions from heat generation in GHG emission monitoring.

ii. Emissions shall be calculated using the supplier-specific emission factor based on fuel usage and actual efficiency of the equipment. This number should be verified (in a separate verification activity undertaken by the supplier) by the supplier and made available for verification by an accredited carbon verification agency.

a. If heat is imported from combined heat and power plant or a cogeneration plant, the emissions shall be apportioned to heat (based on heat content) and accordingly the indirect emission shall be calculated.

b. For imported chilled water, the emissions should be calculated based on the type of chilled water generation system (electrical and/or thermal) and accordingly shall be included for emission estimation.

iii. If the obligated entity is exporting heat from its facility to another facility outside its boundary, the emission associated with the exported heat shall be subtracted from the overall GHG emissions.

a. The emissions shall be calculated based on fuel used and actual generation efficiency of the equipment.

b. If heat is exported from combined heat and power plant or a cogeneration plant, the emissions shall be apportioned to heat and accordingly the emissions shall be calculated.

19. Transferred Carbon Dioxide (CO_2)

i. The obligated entity shall subtract the GHG emissions from their overall direct GHG emissions that is transferred outside the obligated entity's boundary and utilised through Carbon Capture Utilisation and/or Storage (CCUS) process.

ii. The transferred or utilised CO_2 shall further be utilised or stored as follows:

a. Captured CO_2 emissions used to produce precipitated calcium carbonate or other chemicals/materials where the captured CO_2 is chemically bonded.

b. The CO_2 emissions is transferred to a long-term geological storage as permitted by relevant regulations of the central government.

iii. In case of GHG emissions transferred to another entity (obligated or non-obligated), the transferred GHG emissions shall be adjusted only if the receiving entity demonstrates that the GHG emissions are permanently stored or utilised.

iv. If an importing entity is a non-obligated entity, captured/stored emission cannot be used to generate carbon credit certificates as they have already been subtracted from the obligated entity's emissions.

v. The obligated entity must monitor and quantify captured or transferred GHG emissions, including any leakages and fugitive emissions during the transfer process, and incorporate monitoring details into the monitoring plan.

20. Data control and reporting of GHG emissions

i. The obligated entity shall prepare and maintain quarterly and yearly data reports and these reports should be supported with established and documented data flow procedures and control procedure.

ii. The obligated entity shall appoint the team to implement and maintain the data control and reporting activity, and also segregate responsibilities among different personnel for the activity.

iii. The data recording and reporting by the obligated shall at least cover the following:

a. GHG emission intensity performance of the entity and production processes.

b. Internal fuel audits of production processes for the purpose of identification of various opportunities and measures to reduce GHG emissions and improve performance.

c. Production achieved, energy consumed, GHG emissions, and GHG emission intensity, measures adopted for GHG reduction/mitigation and quantity of GHG emissions reduced.

d. Data records for fuel analysis.

e. E2 Form– Annual Energy Consumption and GHG Emissions (as per Annexure V).

iv. The obligated entities shall also implement procedure for control activities by

at least covering the following:

a. Regular quality assurance of the measurement equipment and instruments and information technology systems.
b. Internal reviews and validation of data.
c. Carry out correction of data based on internal review (corrective action).
d. Implement quality assurance of outsourced activities (e.g., external lab).
e. Define responsibilities on monitoring and reporting.
f. Ensure competence of personnel involved in monitoring and reporting.
g. Record and document relevant information.

21. GHG Emission Calculation Pro forma

i. The Bureau of Energy Efficiency (BEE) will develop and furnish the GHG Emission Pro forma calculation template, presented as an Excel-based template or an IT-based system.

ii. This will act as a standardised monitoring template through which obligated entities shall systematically monitor and report their greenhouse gas emissions.

22. GHG Emission Report

i. The obligated entity within four months of the completion of the compliance year shall submit the GHG emissions report and GHG Emissions pro forma duly verified by the accredited carbon verification agency to the Bureau of Energy Efficiency and State Designated Agency for compliance purposes.

ii. The annual GHG emissions report submitted by the obligated entity shall include, but not be limited to, the following information:

a. Registration number issued to the obligated entity.
b. Plant Head and Energy Manager Information.
    a. Name, address, and contact details.
c. Details of reporting year, clearly indicating the reporting year for which the emissions data is presented.
d. Monitoring plan details.
e. Reference to the latest submitted monitoring plan, including version number and effective date.
f. Changes in operations.
g. Disclosure of any relevant changes in the operations of the obligated entity during the reporting period.
h. Production process details – including raw material consumption, production process/sub-process wise.

i. Emissions source information: Comprehensive details for all emissions source and source stream, including:

a. Total emissions expressed in tonne of CO_2 equivalent.

b. Emissions of greenhouse gases other than CO_2, expressed in metric tonne.

c. Calculation methodology.

d. Type of emission factors applied for each source.

e. Activity data details.

a. For fuels: Amount of fuel, expressed in tonne or normal cubic meters (Nm3), and net calorific value (kCal/kg or kCal/Nm^3) reported separately.

b. For other source streams: Amount expressed in tonne or Nm^3.

f. Emission factors, oxidation and conversion factors, expressed as dimensionless fractions.

g. Mass Balance Methodology: Details on the mass flow and carbon content for each source stream entering and leaving the obligated entity and compare the values as determined in the GHG emission calculations.

j. Sampling plan and procedure.

k. Data control.

l. Memo items reporting amounts of biomass combusted or employed in processes, expressed in TJ, t, or Nm^3, as applicable.

m. List of GHG reduction measures implemented by the obligated entity in the reporting year.

23. All the activities undertaken by the obligated entity under this procedure shall be scrutinised by the accredited carbon verification agency for the purpose of preparation of verification report and verification of compliance with respect to GHG emissions intensity targets as notified by the MoEFCC.

6. Verification and Assessment of Performance

1. Every obligated entity shall, within four months of the conclusion of the compliance year, submit to Bureau of Energy Efficiency and the State Designated Agency the performance assessment document in Form 'A' (as per Annexure VI) covering the performance for the relevant compliance year, specifying the compliance with GHG emission intensity targets, duly verified together with certificate of verification in Form 'B' (as per Annexure VII) given by an accredited carbon verification agency and accompanied by the following documents, namely:-
   i. Copy of unique number of registrations given to the obligated entity.
   ii. Proof of timely submission of E2 form- annual energy consumption and GHG emissions.
   iii. Details of GHG emission reduction measures implemented to comply with the GHG emission intensity targets in the compliance year enclosing therewith, a brief about the GHG mitigation measures, details of investment made, photographs in support of measures implemented, if feasible, and percentage reduction in GHG emissions achieved.
   iv. Details of GHG emissions and GHG emission intensity in the baseline year and compliance year as assessed by the accredited carbon verification agency. This should include entitlement or requirement of surrendering Carbon Credit Certificates, along with details of calculation and data correctness, duly certified and reasonably assured by the accredited carbon verification agency.
   v. Verified GHG emissions report.
   vi. Name and particulars of the energy manager, his or her date of appointment, and details of duties performed, including initiatives undertaken for reduction of GHG emission intensity.
2. To conduct the verification process, the obligated entity shall appoint the accredited carbon verification agency as accredited by the Bureau of Energy Efficiency.
3. The accredited carbon verification agency shall carry out verification with reasonable level of assurance.
4. On appointment, the accredited carbon verification agency shall undertake pre-contractual review of the proposed verification activity and review shall include the following:
   i. Assess whether the proposed verification falls within the scope of its accreditation.
   ii. Assess whether it has team members/resource with required competence and experience. The team members must be capable of dealing with the complexity of the obligated entity's operations and confident of completing the verification activities within the required timeframe.

iii. Review of the key information provided by the obligated entity to determine the scope of verification.

iv. Appropriate time allocation required to conduct the verification activity.

v. Time allocation in the contract shall be adjusted if additional verification activities have to be carried out.

5. Once the contract is in place, the obligated entity shall provide following to the accredited carbon verification agency.

   i. The latest filled pro forma (Excel-based calculation template) for baseline and compliance year greenhouse gas emission calculation.

   ii. GHG emissions report indicating the activity data, emission factors referred, absolute emissions, and GHG emission intensity.

   iii. The latest monitoring plan as submitted to the Bureau of Energy Efficiency

   iv. Other relevant documents such as sampling procedures, data flow, and control activities.

6. At the beginning of the verification the accredited carbon verification agency shall undertake a strategic analysis by assessing the nature, scale and complexity of verification activity. To undertake the strategic analysis, the accredited carbon verification agency shall undertake following.

   i. Review of the information provided by the obligated entity as per sub-section (4) of Section 6 of this document.

   ii. Required materiality threshold level.

   iii. Risk analysis to design, plan, and implement an effective verification.

7. The accredited carbon verification agency shall appoint a team for conducting the verification process as per the team requirements defined under the 'Accreditation Eligibility Criteria' and 'Procedure for Accredited Carbon Verification Agency', the agency shall further define roles and responsibilities of each team member in verification and shall communicate the team details to the obligated entity before initiating the verification process.

8. The accredited carbon verification agency shall develop a verification plan containing following:

   i. Verification objectives and scope.

   ii. Verification activities and schedule.

   iii. Team structure with roles and responsibilities.

   iv. Data and information to be reviewed and verified.

   v. Data sampling plan.

   vi. Risk management plan.

   vii. Data control sampling and testing plan.

   viii. Plan for interviews/discussion and documentation of verification records.

9. The verifier shall at least conduct one site visit to the obligated entity during the verification process to carry out the activities required for verification as well as to gather sufficient information and evidence. This will enable the agency to conclude whether the obligated entity's emission and performance is free from errors, omissions, or misrepresentations.
10. To assess the correctness of the information provided by the obligated entity regarding compliance with GHG Emission intensity targets and accuracy of GHG emission calculation, the accredited carbon verification agency shall:
    i. Assess the data and information systems, IT systems, data flow activities, control activities, control systems, procedures for control activities, and relevant documents such as sampling plans and monitoring plans.
    ii. Verify the emission sources and source streams coverage and boundaries of the entity (the monitoring boundaries).
    iii. Apply standard auditing and verification techniques.
    iv. Apply sampling techniques in relation to data sampling and checking the control activities.
    v. Check the implementation of monitoring plan.
    vi. Check the sampling plan and representativeness of samples.
    vii. Perform analytical procedures to assess the accuracy of the data.
    viii. Identify data gaps and outliers.
    ix. Review the methods used to close data gaps and assess whether those methods do not lead to material misstatements.
    x. Verify the data against the primary and secondary data sources and conduct additional verification checks that may be needed to determine the reliability of the data sources taking into account the risks in the data flow and the risks that data control activities are not functioning effectively.
    xi. Verify the emission monitoring/calculation methodology for each of the source streams of the obligated entity including calculation and analysis of net calorific value, GHG emissions factor, oxidation factor, energy consumption, and other relevant information.
    xii. Document review, involving review of data and its source for tracing the data to the primary source data and carrying out plausibility checks to verify accuracy of the data.
    xiii. Follow up action, involving site visits, interviews with personnel responsible in the obligated entity and cross-check of information provided by the interviewed personnel to ensure that no relevant information has been omitted or, over or under valued.
    xiv. Verify the fuel and material analysis process to determine the emission factor.
    xv. Verify the GHG emission mitigation measures implemented by the obligated entity to comply with the GHG emission intensity targets.

xvi. Verify the technical competence and procedures of internal laboratories conducting the testing of fuel and material.

xvii. Make independent technical review of the verification activity and decision of the verification team undertaking the verification activity.

xviii. Review of formulae and calculation factors applied for GHG emission calculation and report findings in their verification report.

11. The accredited carbon verification agency shall independently evaluate actions undertaken by the obligated entity for compliance with the procedure and GHG emission intensity targets and entitlement or surrender of Carbon Credit Certificates, to ensure that they meet with the requirements of the compliance mechanism under this scheme.
12. The accredited carbon verification agency shall also apply materiality thresholds to the verification activity and the materiality threshold shall be 2% of the total reported emissions in the reporting period.
13. If the accredited carbon verification agency identifies any variations, discrepancy, inconsistency, missing information, misrepresentation, data gaps, or non-compliance with the rules, the agency shall document such information and obtain explanations from the obligated entities supported by additional relevant evidence or explanation and also assess if such variations/discrepancy have material impact on GHG emissions.
14. After completing the verification activity, the accredited carbon verification agency shall conclude the findings of the verification by undertaking the following.
    i. Review the final data from the obligated entity, including any data or information modified based on the verification activity.
    ii. Review and document the reasons for any differences between the initial data provided and final data agreed during the verification activity.
    iii. Review the monitoring plan and implementation of the monitoring plan, including the compliance with this procedure.
    iv. Ensure that the verification activity is conducted in satisfactory manner to provide a verification opinion with reasonable assurance that verification report and data is free from material misstatements.
    v. Ensure that the verification activity is documented and recorded appropriately.
15. The accredited carbon verification agency shall also undertake independent technical review of the verification activity and outcome.
    i. The lead verifier auditor shall submit the verification documentation and the verification report to an independent reviewer prior to the issuance of the verification report.
    ii. The independent technical review shall be carried out by a lead auditor that is not involved or part of the verification team undertaking the verification at the obligated entity.

iii. The independent technical reviewer shall perform the review to ensure that the verification process is conducted in accordance with this procedure and is correctly carried out.

iv. The independent technical reviewer shall also assess whether the verification activity conducted is satisfactory and sufficient to enable the accredited verification agency to issue a verification report with reasonable assurance.

16. The accredited carbon verification agency shall report the results of its assessment in a verification report and the said report shall contain following findings:

i. The summary of the verification process, results of assessment, and his opinion along with the supporting documents.

ii. The details of verification activities carried out to arrive at the conclusion and opinion, including the details captured during the verification process and conclusion relating to compliance with GHG emission intensity targets, increase or decrease in GHG emission intensity with reference to the GHG emission intensity in the baseline year.

iii. The record of interaction, if any, between the accredited carbon verification agency and the obligated entity as well as any change made in his assessment because of the clarifications, if any, given by the obligated entity.

iv. The verification activity findings indicating wheter the GHG emission report is satisfactory, and a positive verification opinion can be issued, or it contains material misstatements that were not corrected before issuance of verification report or non-conformities which restricted the accredited carbon verification agency in issuance of a positive verification opinion.

v. The accredited carbon verification agency may also conclude that the scope of verification is limited if the obligated entity fails to provide required data or evidence, or there are material errors which do not allow a reasonable verification of the GHG emission report. It is responsibility of the obligated entity to address such limitations within 15 days from the submission of verification report.

vi. The accredited carbon verification agency may issue a positive opinion on the GHG emission report if its free from material misstatements.

17. The obligated entity shall address any material outstanding issue or non-conformity as highlighted by the accredited carbon verification agency before the issue of verification report.

18. Should the accredited carbon verification agency record a positive opinion in its verification report, the Bureau shall deem that all requirements concerning compliance with the GHG emission intensity target and entitlements or obligations to surrender Carbon Credit Certificates have been met.

19. The entitlement and liability to surrender the carbon credits shall be calculated based on the formula specified by the MoEFCC in the GHG emission intensity target notification.

20. Upon successful completion of the verification activity and finalisation of positive verification opinion:
    i. The obligated entity shall submit the performance assessment document in Form 'A' (as per Annexure VI) covering the performance for the relevant compliance year specifying the compliance with GHG emission intensity targets to the Bureau of Energy Efficiency and the State Designated Agency (SDA). Along with Form 'A', the obligated entity shall also submit the filled pro forma and GHG emission report.
    ii. The accredited carbon verification agency shall submit the certificate of verification in Form 'B' with the date and signature by an authorised person on behalf of the accredited carbon verification agency to the Bureau of Energy Efficiency and the State Designated Agency (SDA). Along with Form 'B', the accredited carbon verification agency shall also submit the verification report.

7. Check Verification Process

1. The Bureau may on its own, or on receipt of a complaint regarding any error or inconsistency or misrepresentation, within one year from the date of submission of GHG emission and verification report or within six months from the date of issue of carbon credits certificate, whichever is later, initiate action for check verification of compliance in accordance with the provision.
2. The Bureau shall initiate the action as follows:
    i. A notice shall be issued to the obligated entity as well as to accredited carbon verification agency who has submitted the verification report to provide comments in reply to the said notice within ten working days from the date of receipt of aforesaid notice.
    ii. The comments furnished by the obligated entity and accredited carbon verification agency shall clearly state whether:
        a. They uphold the compliance report and verification report submitted, providing a confirmation report with point-by-point replies and necessary documents in response to the notice.
        b. They accept the errors or inconsistencies, or misrepresentation pointed out in the aforesaid notice and shall give detailed explanation in respect to each point in the notice and work out the impacts of such errors or inconsistencies or misrepresentation. The obligated entity shall accordingly submit the revised reports and forms by addressing the identified non-conformities within ten days from the notice of check verification.
    iii. Within ten working days from the date of the receipt of the comments referred to in clause (ii), Bureau after taking into consideration the said comments shall decide to undertake or not to undertake the independent review and the Bureau shall record the reasons in writing for its decision and shall inform decision in writing to the obligated entity, his accredited carbon verification agency and complainant.
    iv. If the Bureau opts to undertake Check Verification:
        a. It shall appoint an accredited carbon verification agency, who has not performed the verification functions with respect to the concerned obligated entity, to conduct the check verification.
        b. On a complaint, the complainant shall submit an affidavit to the Bureau stating that if the complaint is found to be superfluous, the cost of check verification shall be borne by the complainant.

3. The check verification process shall involve assessment to ensure that.
    i. The activities relating to the compliance with this procedure have been performed and the issue of carbon credit certificate are in accordance with the process defined in this procedure.
    ii. The monitoring and reporting process adhere to the process defined in this procedure.
    iii. The evaluation of data and activities concludes that any errors, omissions, or misrepresentations, or their aggregate, do not affect the GHG emission norms achieved and are within the materiality threshold of 2%.
4. The said accredited carbon verification agency shall assess and verify the activities performed by the obligated entity for compliance with GHG emission intensity targets and are in accordance with the process defined in this procedure and the monitoring plan, and the assessment and independent review shall involve:
    i. A review of documents as well as the onsite assessment to verify that the activities performed to comply with the GHG emission intensity targets adhere to the process defined in this procedure.
    ii. An examination of both quantitative and qualitative information regarding GHG emission standards. The quantitative aspect includes data reported in 'Form A', while the qualitative aspect encompasses details on internal management controls, calculation methodologies, data transfer procedures, reports, and the review of internal field audits of calculations or data transfer.
    iii. A review of previous verification reports.
    iv. A review of any other information and documents relevant to or having a bearing on the activities performed under the process defined in this procedure.
    v. A review of monitoring and reporting process.
5. The obligated entity shall furnish full and complete data, provide necessary documents, and support information required by the accredited carbon verification agency for the purpose of performing the function of check verification under the process defined in this procedure.
6. The accredited carbon verification agency, undertaking the check verification function, shall report the results of its assessment in the verification report and it shall contain:
    i. The summary of check verification process, results of their assessment, and its opinion along with the supporting documents.
    ii. The details of check verification carried out to arrive at the conclusion and opinion including the details captured during the verification process and conclusion relating to compliance with GHG emission norms.
7. If the accredited carbon verification agency records in their check verification report a positive opinion, it shall be concluded that all the requirements with regard to the compliance with GHG emission norms and the issue or purchase of carbon credit certificates have been met.

8. Conversely, if the accredited carbon verification agency records a negative opinion in their verification report, the implications of such an opinion on GHG emission standards, issuance, or acquisition of carbon credit certificates, and the agency's liability in issuing the report will be quantified. Additionally, the unfair advantage gained by the obligated entity as a result of the verification report shall be calculated by the agency conducting the independent review.
9. The accredited carbon verification agency in charge of check verification shall submit their review report with due certification in 'Form C' (as per annexure VIII) to the Bureau. Based on the verification opinion and submission of the verification report, the Bureau of Energy Efficiency will take necessary decision.
10. The cost of check verification shall be borne by the obligated entity if, during the independent review, it is found that the obligated entity has submitted false and incorrect information in Form A. Conversely, if it is found no to have submitted false information, the check verification cost shall not be borne by the entity.

8. Issuance and Surrender of Carbon Credit Certificate

1. Upon satisfying itself regarding the accuracy of the verification report, and the check verification report when requested by BEE, the Bureau shall submit the report to the NSC-ICM. This submission is based on the claim made by the obligated entity in Form 'A' and must occur within two months from the final date of submission of the aforementioned Form 'A'. The purpose of this submission is for the issuance of carbon credit certificates under section 14AA of the Act. The report must specify:
   i. The exact number of carbon credit certificates to be issued to the obligated entity and the entitlement to purchase these certificates. The determinisation follows the formula: Number of carbon credit certificates to be issued in any compliance year (t CO_2e): (GEI Target for that compliance year – GEI Achieved in that compliance year) x quantity of equivalent product produced in that compliance year.
   ii. A certification confirming that the obligated entity has complied with all requirements for the issuance of carbon credit certificates. This compliance and the entity's entitlement must be certified in the verification report by the accredited carbon verification agency.
2. The NSC-ICM shall recommend the Bureau to issue carbon credit certificates within two weeks from the date of receiving the report.
3. The Bureau shall issue the carbon credit certificates to the concerned obligated entity within two weeks from the date of receipt of such recommendation from the NSC-ICM on the ICM registry.
4. For the obligated entities where there is requirement to surrender the carbon credit certificates to comply with the GHG emission intensity targets, the report shall specify:
   i. The exact number of carbon credit certificates to be surrendered by the obligated entity after determining by the following formula:
   Number of carbon credit certificates to be surrendered in any compliance year: (GEI Achieved for that compliance year – GEI Target in that compliance year) x quantity of equivalent product produced in that compliance year.
   ii. A certification confirming that the obligated entity has complied with all requirements for the surrender of carbon credit certificates. This compliance and the entity's entitlement must be certified in the verification report by the accredited carbon verification agency.
   iii. The Bureau will debit the registry account of the obligated entity with the equivalent number of carbon credit certificates and the obligated entity will have to surrender equivalent number of carbon credit certificates for the compliance purposes.

9. Trading of Carbon Credit Certificates

1. The obligated entities shall register themselves on the ICM Registry.
2. Each obligated entity shall register with the ICM Registry by submitting the relevant details and paying the prescribes fees as per the procedure defined by the Central Electricity Regulatory Commission (CERC) under the 'terms and conditions' for trading of CCC under the ICM.
3. The non-obligated entities who want to purchase the CCC on voluntary basis shall also register themselves on the ICM Registry by submitting the relevant details and paying defined fees as per the procedure defined by the Central Electricity Regulatory Commission (CERC) under the 'terms and conditions' for trading of CCC under the ICM.
4. On the successful registration with the ICM Registry, the Certificate of Registration shall be issued by the ICM Registry to the concerned obligated and non-obligated entity.
5. The obligated and non-obligated entity shall register and trade the CCC on the Power Exchanges registered by the commission for the purpose of the CCC trade under the ICM.
6. The CCC shall be traded over the power exchanges as per the procedure defined by the Central Electricity Regulatory Commission (CERC) under the 'terms and conditions' for trading of CCC under the ICM.

10. Banking of Carbon Credit Certificates

1. On completion of the compliance year, the remaining Carbon Credit Certificates (CCC) from that year may be banked for use in subsequent compliance years.
2. The banked CCCs, that were issued to the obligated entity, may either be sold within the Indian Carbon Market or utilised to meet compliance in future compliance years.

11. GHG Emission Intensity Targets

1. The obligated entity, for the purpose of achieving the compliance with the GHG emission intensity targets of the trajectory period, shall prepare the long-term action plan (at least five years) for greenhouse gas emissions reduction.
2. The obligated entity shall submit the action plan within one year from the commencement of first compliance year along with the planned annual activities for the current compliance year.
3. The obligated entity shall submit the annual planned activities for the subsequent compliance year within three months from the commencement of relevant compliance year and revised long-term action plan, in case of any revision.
4. The action plan should include at a minimum:
    i. Action Plan containing inter- alia, a brief description of identified GHG reduction measures to comply GHG emission intensity reduction targets.
    ii. The estimated cost and resultant savings of each identified GHG reduction measures.
    iii. Implementation plan to achieve GHG emission intensity reduction targets.
    iv. Details on GHG reduction measures identified for the next five years.
5. The obligated entity shall furnish the status of compliance in the form of 'Compliance Assessment Document' in FORM D (as per Annexure IX) within one month from the date of last trading session of the relevant compliance year.

12. Obligations of the Obligated Entities

The obligated entity shall

1. Develop and implement the monitoring plan to monitor its GHG emissions and emission intensity.
2. Adhere to the monitoring and reporting requirements of this procedure to accurately monitor and report its GHG emissions and emission intensity.
3. Upon completion of the compliance year, entities must undertake verification activities through accredited carbon verification agencies. This is to assess their performance against the GHG emission intensity targets. Subsequently, they should submit a verified GHG emissions report.
4. In a given compliance year, comply with the GHG emission intensity targets by implementing of GHG reduction measures.
5. If entities fail to achieve the GHG emission intensity targets, surrender the equivalent number of carbon credit certificates for compliance with GHG emission intensity targets.
6. Take all measures including implementation of long-term action plan and good practices prevalent or in use in the concerned sector to achieve the reduction in the GHG emissions from their operations.
7. Furnish the full and complete data, provide necessary documents in the form as required by the Bureau or the accredited carbon verification agencies for the purpose of this scheme.

13. Power to Relax

1. The Ministry of Power may, upon the recommendation of the National Steering Committee for the Indian Carbon Market, relax any provisions of these procedures.

Annexure I

Global Warming Potential for Greenhouse Gases

If other greenhouse gases are applicable for an obligated entity, the GHG equivalence calculation shall be undertaken based on the Global Warming Potential (GWP) of GHGs for 100 years, IPCC AR5.

Gas	GWP (100 Years)
Carbon Dioxide (CO_2)	1
CF_4	6630
C_2F_6	11100
C_4F_{10}	9200
C_6F_{14}	7910

Annexure II

Sector and Equivalent Products

Table 1: Sector wise product to be considered for calculating the GHG emission intensity.

Sector	Product	Unit of Measurement
Cement Sector	Cement	Tonnes
Iron & Steel	Crude Steel	Tonnes
Pulp & Paper	Paper	Tonnes
Petrochemicals	Olefin	Tonnes

*more sectors will be included as per approval of the Central Government

Annexure III

Conversion Formula

Measuring Emission Factor from Total Carbon Content

The emission factor (Type II) for the calculation of emission based on total carbon content for fuel shall be calculated using the following formulae:

GHG emssion factor ($gCO_2/kCal$) =(% Total Carbon Content)/(Net Calorific Value (kCal/kg) x 100) x 44/12 x 100.

(Equation I)

A. Total GHG Emissions

Total GHG Emissions=Direct Emissions (energy)+Direct Emissions (Process)+Indirect Emissions from Purchased Electricity & Heat-adjusted emissions from (exported power,CCUS).

(Equation II)

B. Total GHG Emissions Intensity

GHG Emission Intensity ($t\ CO_2/t$)=
(Total GHG Emisisons ($t\ CO_2$))/(Total Equivalent Output (t or MWh)) (Equation III)

C. Absolute Emissions Estimation (Standard Calculation methodology)

In this methodology the emissions are calculated by using activity data i.e., the amount of fuel and raw material consumed by the entity and using the relevant emission and conversion factors. The conversion factors include oxidation factor for combustion emissions and conversion factor for process emissions.

D. Combustion emissions (Direct for solid, liquid or gaseous fuel)

GHG_{Direct} = Activity Data* Emisison Factor*Oxidation Factor (Equation IV) where,

GHG_{Direct} ..... Direct GHG Emissions [$t\ CO_2$]

AD ..... Activity data [TOE or kCal or kg or tonne of material]

EF ..... Emission factor [$t\ CO_2$/TOE or $g\ CO_2$/kCal]

OF ..... Oxidation factor [dimensionless]

Activity data of fuels (including fuels used as raw material input) shall be expressed as net calorific value.

AD = FQ x NCV (Equation V)

Where:

AD..... Activity data

FQ ..... Fuel quantity [tonne or toe or kCal or Nm3]

NCV .... Net Calorific Value [kCal/kg or kCal/Nm3]

Oxidation Factor shall be calculated as per following formula.

Oxidation Factor = 1-Carbon_(ash&gas) / Carbon_fuel (Equation VI)

Where:

Carbon Fuel.....Total Carbon Content in Fuel on based on weight.

Carbon Ash & Gas.... Carbon contained in ash and flue gas dust.

E. Purchased Electricity (Indirect)

GHG_Indirect = AD x EF (Equation VII)

were,

GHG_Indirect ..... Emissions [t CO_2]

AD ..... Activity data [MWh]

EF ..... Emission factor [t CO_2/MWh]

F. Purchased Heat (Indirect)

GHG_Indirect = AD x EF (Equation VIII)

where,

GHG_Indirect..... Emissions [t CO_2]

AD ..... Activity data [TOE]

EF ..... Emission factor [t CO_2/TOE]

G. Process emissions

The process emissions are estimated as

GHG process = AD x EF x CF (Equation IX)

Where:

GHG Process..... Emissions [t CO_2]

AD ..... Activity data [t or Nm3]

EF ..... Emission factor [t CO_2/t or t CO_2/Nm3]

CF ..... Conversion factor [dimensionless]

Activity data can be an input material in a particular process or the output of the process. The process emissions cover both organic and inorganic carbon emissions from the process. The sector specific methodology to estimate process emissions will be included in sector specific monitoring and reporting guidelines.

The following sources of process emissions shall at least be covered by the obligated entity while reporting emissions:

- Calcination of limestone and other carbonates in the raw material.
- Raw materials used for waste gas scrubbing.
- Emissions from reactions of raw materials (other than combustion).
- Emissions from consumption of electrodes.

J. Mass Balance Approach

GHG Emissions =(Material_in x Carbon Content_in-Material_out x Carbon Content_ Out) x 44/12 ..

(Equation X)

Annexure IV

GHG Emission Factors

The obligated entities are required to calculate the emissions using the Type I or Type II emissions factors and when referring to Type I factors, it should be referred from IPCC Guidelines and as per following table:

Sr. No	Fuel	Carbon Dioxide (CO_2)
		t CO_2/TJ
1	Crude Oil	73.30
2	Orimulsion	77.00
3	Natural Gas Liquids	64.20
4	Motor Gasoline	69.30
5	Aviation Gasoline	70.00
6	Jet Gasoline	70.00
7	Jet Kerosene	71.50
8	Other Kerosene	71.90
9	Shale Oil	73.30
10	Gas/Diesel Oil	74.10
11	Residual Fuel Oil	77.40
12	Liquefied Petroleum Gas	63.10
13	Ethane	61.60
14	Naphtha	73.30
15	Bitumen	80.70

Sr. No	Fuel	Carbon Dioxide (CO2)
16	Lubricants	73.30
17	Petroleum Coke	97.50
18	Refinery Feedstock	73.30
19	Refinery Gas	57.60
20	Paraffin Waxes	73.30
21	White Spirit and SBP	73.30
22	Other Petroleum Products	73.30
23	Anthracite	98.30
24	Coking Coal	94.60
25	Other Bituminous Coal	96.10
26	Sub Bituminous Coal	96.10
27	Lignite	101.00
28	Oil Shale and Tar Sands	107.00
29	Brown Coal Briquettes	97.50
30	Patent Fuel	97.50
31	Coke Oven Coke and Lignite Coke	107.00
32	Gas Coke	107.00
33	Coal Tar	80.70
34	Gas Works Gas	44.40
35	Coke Oven Gas	44.40
36	Blast Furnace Gas	260.00

Sr. No	Fuel	Carbon Dioxide (CO_2)
37	Oxygen Steel Furnace Gas	182.00
38	Natural Gas	56.10
39	Municipal Waste (Non-Biomass Fraction)	91.70
40	Industrial Waste	143.00
41	Waste Oils	73.30
42	Peat	106.00
43	Wood/Wood Waste	112.00
44	Sulphite Lyes (Black Liquor)	95.30
45	Other Primary Solid Biomass	100.00
46	Charcoal	112.00
47	Biogasoline	70.80
48	Biodiesel	70.80
49	Other Liquid Biofuels	79.60
50	Landfill Gas	54.60
51	Sludge Gas	54.60
52	Other Biogas	54.60
53	Municipal Waste (Biomass fraction)	100.00

Sr. No	Material	Value	Unit
1	$CaCO_3$	0.440	t CO_2/t material
2	$MgCO_3$	0.522	t CO_2/t material
3	Na_2CO_3	0.415	t CO_2/t material
4	$BaCO_3$	0.223	t CO_2/t material
5	Li_2CO_3	0.596	t CO_2/t material
6	K_2CO_3	0.318	t CO_2/t material
7	$SrCO_3$	0.298	t CO_2/t material
8	$NaHCO_3$	0.524	t CO_2/t material
9	$FeCO_3$	0.380	t CO_2/t material
10	Urea	0.7328	t CO_2/t material

Annexure V

E2 – Energy and Emissions Form

Energy and Emissions Form					
Section-A: General Details					
S No.	**Details**		**Description**		
A1.	Registration Number				
A2.	Obligated Entity Name				
A3.	Sector	Sub-Sector			
A4.	Year of Establishment				
A5.	Unit Address		Complete address of DCs Unit location **(including Chief Executive's name & designation)** with mobile, telephone, fax nos. & e-mail.		
A6.	Registered Office Address		with telephone, fax nos. & e-mail		
A7.	Energy Manager Registration No.		Name, designation,, Address, Mobile, Telephone, Fax nos. & e-mail		
Section – B: Production and Energy Consumption Details					
B1.	**Production Details**				
	Product Name		**Unit**	**Previous Year**	**Current Year**
			(1)	**(2)**	**(3)**
i.	Product 1 <Add row>		Tonne		
ii.	Total Equivalent Product		Tonne		

Energy and Emissions Form				
B2.	**Energy Consumption and GHG Emissions Details**			
	Total Electricity Purchased from Grid/Other Source	Million kWh		
	Total Electricity Generated	Million kWh		
	Total Electricity Exported	Million kWh		
	Total Electrical Energy Consumption	Million kWh		
	Total Solid Fuel Consumption	Million kcal		
	Total Liquid Fuel Consumption	Million kcal		
	Total Gaseous Fuel Consumption	Million kcal		
	Total Thermal Energy Consumption	Million kcal		
	Total Energy Consumption (Thermal + Electrical)	TOE		
	Total Normalized Energy Consumption (Thermal + Electrical)	TOE		
	Direct GHG Emissions (Energy related)	t CO_2e		
	Indirect GHG Emissions (Energy related)	t CO_2e		
	Direct GHG Emissions (Process related)	t CO_2e		
	Total Direct & Indirect Emissions	t CO_2e		
B3.	**Specific Energy Consumption Details and Greenhouse Gas Emission Intensity**			
	Specific Energy Consumption (Without Normalization)	TOE/Tonne		
	Specific Energy Consumption (Normalized)	TOE/Tonne		
	Greenhouse Gas Emission Intensity	t CO_2e/ Tonne		

Energy and Emissions Form				
Section – C: Pro-forma Details				
C1.	**Name of the Sector**	**Sub-Sector**	**Pro-forma in which the details to be furnished**	
	Aluminium	Refinery/Smelter		
		Cold Rolling Sheet		
	Cement	Cement		
	Chlor-Alkali	Chlor-Alkali		
	Fertilizer	Fertilizer		
	Iron and Steel	Integrated Steel		
		Sponge Iron		
	Pulp and Paper	Pulp and Paper		
	Textile	Composite		
		Fiber		
		Spinning		
		Processing		
	Petro-chemical	Petro-chemical		
	Petro-Refinery	Petro-Refinery		

I/we undertake that the information supplied in the Energy and Emission Form and Sector Specific Pro-forma is accurate to the best of my knowledge and the data furnished in E2 Form has been adhered to the data given in the concerned Sector Specific Pro-forma.

Signature

( )

Name of the Energy Manager

Registration number

Annexure VI

Form A –Performance Assessment Document

Form – A

PERFORMANCE ASSESSMENT DOCUMENT

(To be filled by Obliged Entity)

1.	Name of obligated entity				Auto
2.	Registration number				Auto
3.	Sector				Auto
4.	Sub-sector				Auto
5.	Accredited carbon verification agency				Auto
6.	Annual Carbon Emission Accounting Form – Form I Previous Year				Submitted/Not submitted
7.	Achieved GHG Emission Intensity (SGE) [tCO_2e per unit of equivalent product]				
8.	Production (baseline) [tonne or Million kWh]				
9.	Number of Carbon Credit Certificates				Issued/ Surrendered
10.	Carbon Emission Reduction measures implemented in the current compliance year				
11.	Measure	Year of Implementation	GHG Emission (before)	GHG Emission (after)	Investment
(i)					
(ii)					
(iii)					
(iv)					
(v)					
(vi)					

Undertaking

I/We undertake that the information supplied in this Performance Assessment Document is accurate to the best of my knowledge and if any of the information supplied is found to be incorrect and such information result into loss to the Central Government or any of the authority under them or any other person affected, I/we undertake to indemnify such loss.

I /We agree to extend necessary assistance in case of any enquiry to be made in the matter.

Signature

Name

Designation

For and behalf of

Name of the Firm/Company/Organization

SEAL of the Firm /Company/Organization

Annexure VII

Form B –Certificate of Verification

Form B

CERTIFICATE OF VERIFICATION

We _____the accredited carbon verification agency, have undertaken a thorough independent evaluation of the activities undertaken by M/s. _____, a obligated entity for compliance with the greenhouse gases emission intensity targets specified under the Government of India, Ministry of Environment Forest and Climate Change notification number_____, dated the _____for the compliance year ____ and consequent entitlement or requirement of carbon credit certificates and certify that-

(a) the verification of the data collection in relation to greenhouse gases emitted and specific greenhouse gases emission per unit of equivalent product in the compliance year in Annual Carbon Emission Accounting Form (Form 1), has been carried out diligently and truthfully;

(b) the verification of the identified carbon emission reduction measures and the progress of their implementation given in the Form A has been carried out diligently and truthfully;

(c) the verification of the compliance with greenhouse gases emission norms during the compliance year has been carried out diligently and truthfully;

(d) the verification of GHG emissions report;

(e) the verification of the total amount of greenhouse gases emissions reduced in the compliance year and request made by the obligated entity, the entitlement of _____ (Nos) carbon credit certificate (s) required to be issued or to be surrendered by that obligated entity have been carried out diligently and truthfully;

(f) all reasonable professional skill, care, and diligence have been taken in verifying the various verification activities, findings and conclusions, documents, reports, preparing the documents including the performance assessment document in Form 'A' and verification report and the contents thereof are a true representation of the facts.

Signature:

Authorized Signatory on behalf of accredited carbon verification agency

Designation:

Annexure VIII

Form C –Certificate of Check Verification

Form C

Certificate of Check – Verification

We_____the accredited carbon verification agency, have undertaken a thorough independent evaluation of the activities undertaken by M/s. _____, a obligated entity for compliance with the greenhouse gases emission intensity target specified under the Government of India, Ministry of Environment Forest and Climate Change notification number_____, dated the _____for the compliance year ____ and consequent entitlement or requirement of carbon credit certificates, mentioned in the Performance Assessment Document in Form 'A' and compliance of greenhouse gas emission norms document in Form 'D' and certify that-

(a) the check verification of the data collection in relation to greenhouse gases emitted and specific greenhouse gases emission per unit of equivalent product in the compliance year in E2 Form (Form 1), has been carried out diligently and truthfully;

(b) the check verification of the identified carbon emission reduction measures and the progress of their implementation given in the Form A has been carried out diligently and truthfully;

(c) the check verification of the compliance with greenhouse gases emission norms during the compliance year has been carried out diligently and truthfully;

(d) the check verification of the total amount of greenhouse gases emissions reduced in the compliance year and request made by the obligated entity, the entitlement of _____ (Nos) carbon credit certificate (s) required to be issued or surrendered by that obligated entity have been carried out diligently and truthfully;

(e) all reasonable professional skill, care, and diligence have been taken in check-verifying the various verification activities, findings and conclusions, documents, reports, preparing the documents including the performance assessment document in Form 'A' and verification report submitted by the accredited carbon verification agency appointed by the obligated entity ..... for verification and the contents thereof are a true representation of the facts.

Signature:

Authorized Signatory on behalf of accredited carbon verification agency for check verification

Designation:

Annexure IX

Form D –Compliance of Greenhouse Gas Emission Intensity Targets

Form D

COMPLIANCE OF GREENHOUSE GAS EMISSION INTENSITY TARGETS

(To be filled in by obligated entity)

1.	Name of obligated entity		
2.	Registration number		
3.	Sector		
4.	Sub-sector		
5.	Accredited carbon verification agency		
6.	Performance Assessment Document – Form A	Submitted/Not submitted	
7.	Number of Carbon Credit Certificates	Issued/ Surrendered	
8.	Carbon Credit Certificates submission for compliance	No. of Certificates	
(i)	Compliance Year II		Max. CCC Available
	.....	...	....
(ii)	Compliance Year I		Max. CCC Available

Bureau OF ENERGY EFFICENCY (BEE)

Bureau of Energy Efficiency
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