सत्यमेव जयते

Aluminium Sector migration to Carbon Credit Trading Scheme

28th August 2024

Bureau of Energy Efficiency

Ministry of Power

Presentation Outline

Contents

1. Indian Carbon Market Framework
2. Sector – Overview (PAT)
3. Proposed Baseline audit for Aluminium sector and support required
4. Target setting methodology

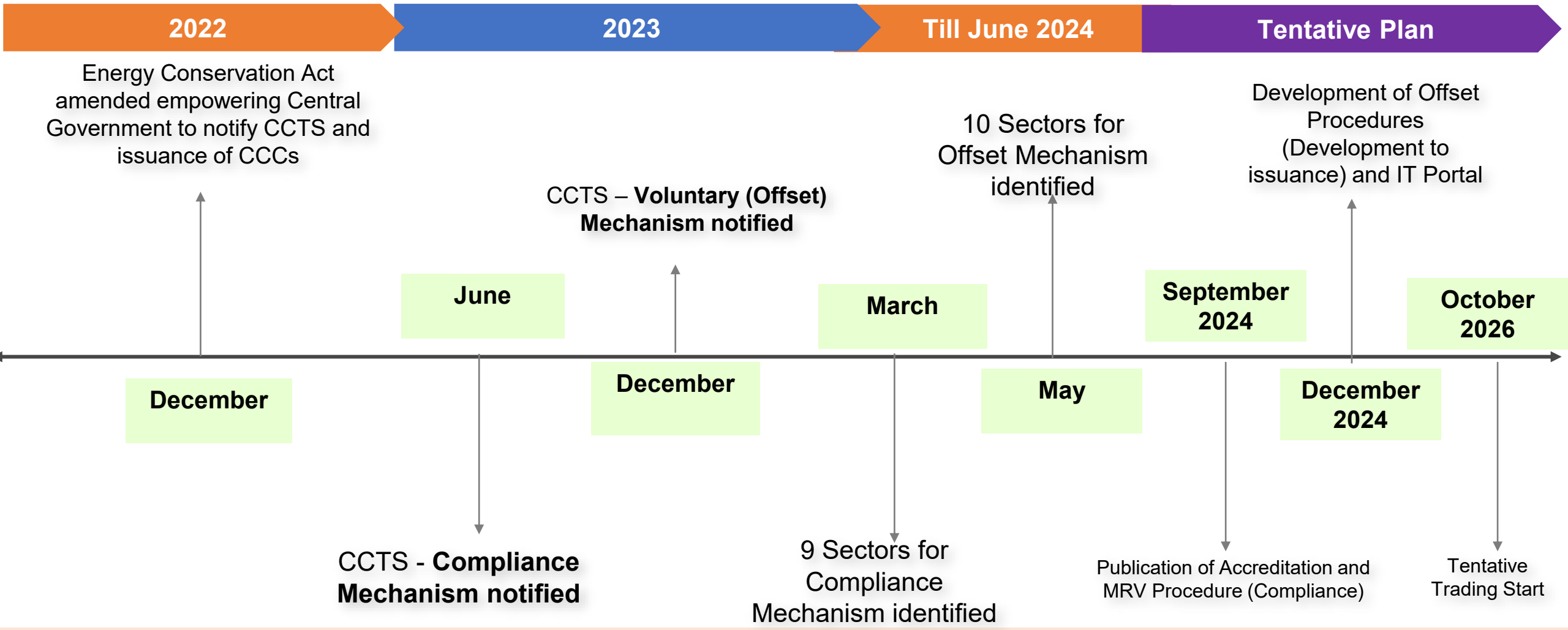
Indian Carbon Market Framework

India's Climate Action Commitments

India submitted its updated Nationally Determined Contributions (NDCs) in August 2022:

- To **reduce the Emissions Intensity** of its Gross Domestic Product (GDP) by 45 percent by 2030, from 2005 level.
- To achieve about **50 percent cumulative electric power** installed capacity from non-fossil fuel-based energy resources by 2030
- To put forward and further propagate a **healthy and sustainable way of living** based on traditions and values of conservation and moderation, including through a mass movement for **'LIFE'– 'Lifestyle for Environment'** as a key to combating climate change.

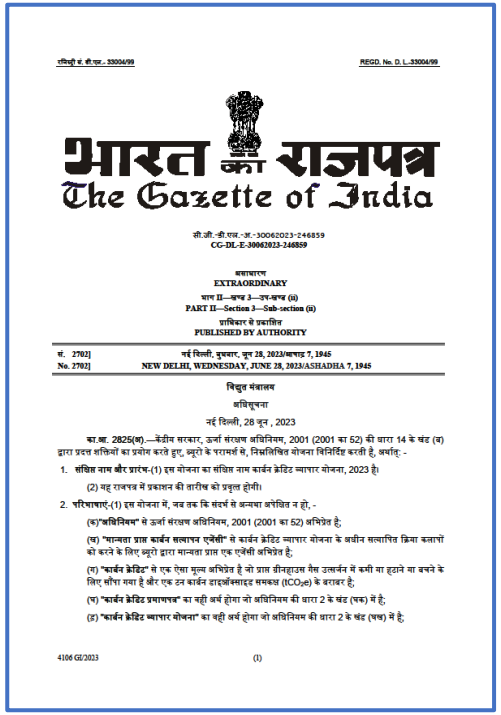
Indian Carbon Market Framework



Offset Mechanism in CCTS

28 June 2023

- Carbon Credit Trading Scheme Notification



रजिस्ट्री सं. डी.एल.- 33004/99 REGD. No. D. L.-33004/99

भारत का राजपत्र
The Gazette of India

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असाधारण
EXTRAORDINARY
भाग II—खण्ड 3—उप-खण्ड (ii)
PART II—Section 3—Sub-section (ii)
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विद्युत मंत्रालय

अधिसूचना

नई दिल्ली, 28 जून , 2023

का.आ. 2825(अ).—केंद्रीय सरकार, ऊर्जा संरक्षण अधिनियम, 2001 (2001 का 52) की धारा 14 के खंड (ब) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, ब्यूरो के परामर्श से, निम्नलिखित योजना विनिर्दिष्ट करती है, अर्थात: -

1. **संक्षिप्त नाम और प्रारंभ.**-(1) इस योजना का संक्षिप्त नाम कार्बन क्रेडिट व्यापार योजना, 2023 है।

(2) यह राजपत्र में प्रकाशन की तारीख को प्रवृत्त होगी।

2. **परिभाषाएं.**-(1) इस योजना में, जब तक कि संदर्भ से अन्यथा अपेक्षित न हो, -

(क)"**अधिनियम**" से ऊर्जा संरक्षण अधिनियम, 2001 (2001 का 52) अभिप्रेत है;

(ख) "**मान्यता प्राप्त कार्बन सत्यापन एजेंसी**" से कार्बन क्रेडिट व्यापार योजना के अधीन सत्यापित क्रिया कलापों को करने के लिए ब्यूरो द्वारा मान्यता प्राप्त एक एजेंसी अभिप्रेत है;

(ग) "**कार्बन क्रेडिट**" से एक ऐसा मूल्य अभिप्रेत है जो प्राप्त ग्रीनहाउस गैस उत्सर्जन में कमी या हटाने या बचने के लिए सौंपा गया है और एक टन कार्बन डाइऑक्साइड समकक्ष (tCO_2e) के बराबर है;

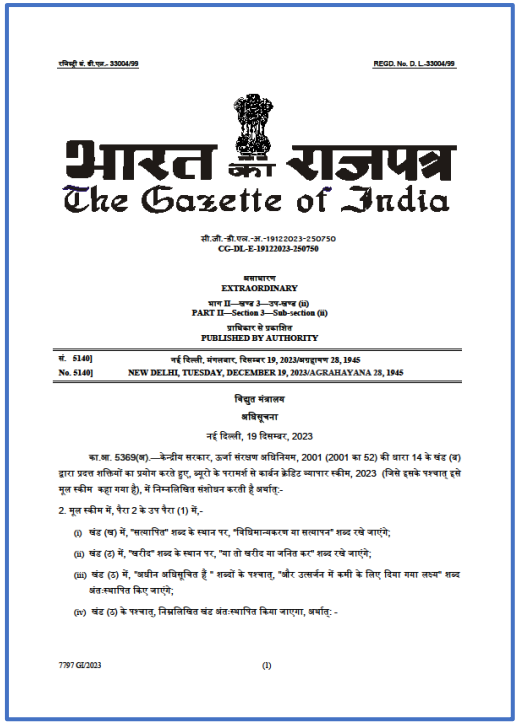
(घ) "**कार्बन क्रेडिट प्रमाणपत्र**" का वही अर्थ होगा जो अधिनियम की धारा 2 के खंड (पक) में है;

(ङ) "**कार्बन क्रेडिट व्यापार योजना**" का वही अर्थ होगा जो अधिनियम की धारा 2 के खंड (पच) में है;

4106 GI/2023 (1)

19 December 2023

- Amendment in the CCTS notification with inclusion of “Offset Mechanism”



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सं. 5140] नई दिल्ली, मंगलवार, दिसम्बर 19, 2023/अग्रहायण 28, 1945
No. 5140] NEW DELHI, TUESDAY, DECEMBER 19, 2023/AGRAHAYANA 28, 1945

विद्युत मंत्रालय

अधिसूचना

नई दिल्ली, 19 दिसम्बर, 2023

का.आ. 5369(अ).—केन्द्रीय सरकार, ऊर्जा संरक्षण अधिनियम, 2001 (2001 का 52) की धारा 14 के खंड (ब) द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, ब्यूरो के परामर्श से कार्बन क्रेडिट व्यापार स्कीम, 2023 (जिसे इसके पश्चात् इसे मूल स्कीम कहा गया है), में निम्नलिखित संशोधन करती है अर्थात्:-

2. मूल स्कीम में, पैरा 2 के उप पैरा (1) में,-

(i) खंड (ख) में, "सत्यापित" शब्द के स्थान पर, "विधिमान्यकरण या सत्यापन" शब्द रखे जाएंगे;

(ii) खंड (ठ) में, "खरीद" शब्द के स्थान पर, "या तो खरीद या जनित कर" शब्द रखे जाएंगे;

(iii) खंड (ठ) में, "अधीन अधिसूचित हैं " शब्दों के पश्चात्, "और उत्सर्जन में कमी के लिए दिया गया तथ्य" शब्द अंत:स्थापित किए जाएंगे;

(iv) खंड (ठ) के पश्चात्, निम्नलिखित खंड अंत:स्थापित किया जाएगा, अर्थात्: -

7797 GI/2023 (1)

Regulatory Framework: CCTS

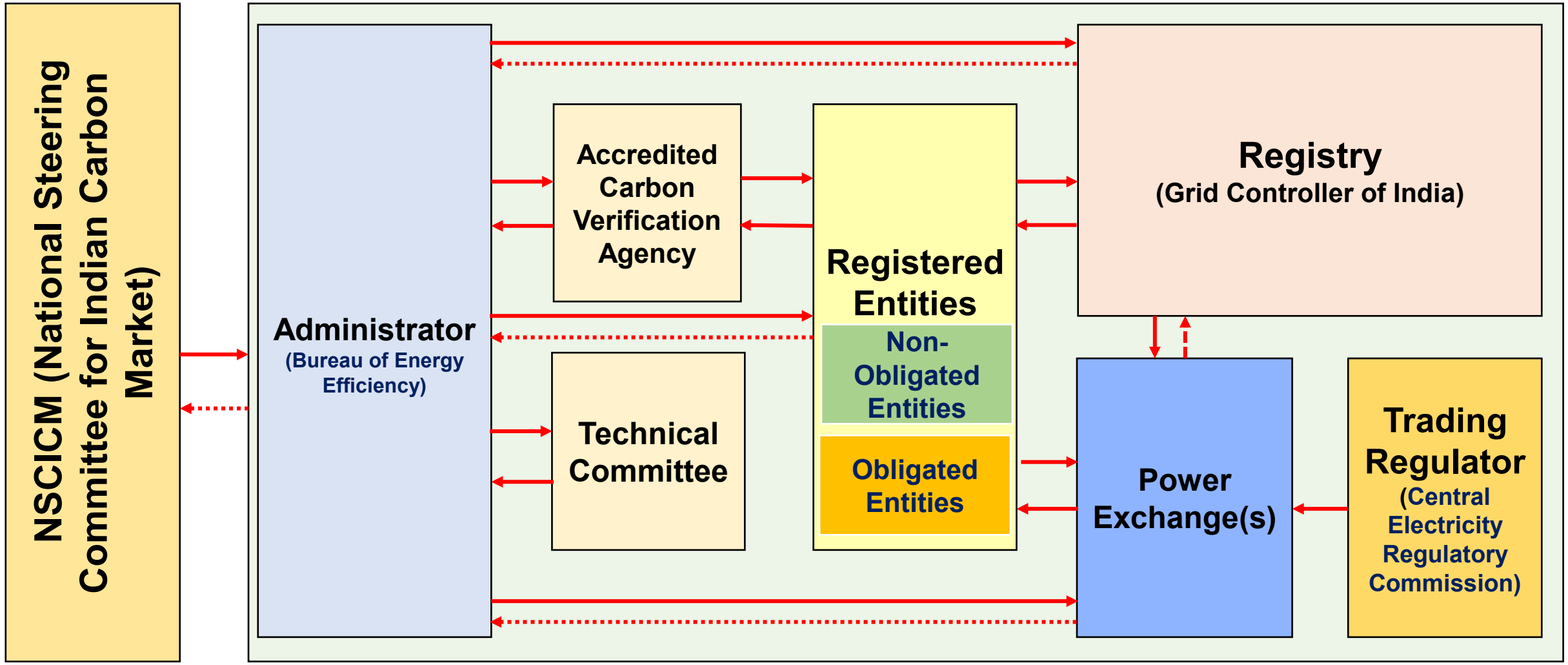
India's **Carbon Credit Trading Scheme, 2023** was notified by the Government of India on **28 June 2023** under the Energy Conservation Act, 2001.

The notification underlines the necessary **framework and the roles of diverse stakeholders** for the development and functioning of the **Indian Carbon Market (ICM).**

Key elements of the CCTS

- **Definitions and Details Procedure**
- **National Steering Committee and Technical Committee (Formation and Functions)**
- **Administrator (BEE) and Registry (GCI) and its functions**
- **Regulations for Trading**
- **Accredited Carbon Verification Agency**
- **Trading of Certificates**
- **Compliance and Offset Mechanism**

Institutional Framework: CCTS



NSC-ICM Governance

Chairpersons

Ministry of Environment, Forest and Climate Change (MoEFCC)

विद्युत मंत्रालय MINISTRY OF POWER

Members

नवीन एवं नवीकरणीय ऊर्जा मंत्रालय MINISTRY OF NEW AND RENEWABLE ENERGY

पेट्रोलियम एवं प्राकृतिक गैस मंत्रालय MINISTRY OF PETROLEUM AND NATURAL GAS

कोयला मंत्रालय MINISTRY OF COAL

इस्पात मंत्रालय MINISTRY OF STEEL

रसायन एवं उर्वरक मंत्रालय MINISTRY OF CHEMICALS AND FERTILIZERS

कृषि एवं किसान कल्याण मंत्रालय MINISTRY OF AGRICULTURE AND FARMERS WELFARE

वित्त मंत्रालय MINISTRY OF FINANCE

NITI Aayog

केविप्रा CEA

ग्रिड-इंडिया GRID-INDIA

Government of Maharashtra

Government of Tamilnadu – Truth Alone Triumphs

Co-opted Members

Confederation of Indian Industry

FICCI

Co-opted experts
Shri Upendra Tripathy
Shri R R Rashmi as experts

*CII & FICCI – also has been included as coo-opted members

Mechanism under ICM

Compliance Mechanism

- Mandatory mechanism
- **Obligated entities** to be given GHG emission intensity targets (t CO2/t)

Offset Mechanism

- Voluntary mechanism
- N**on obligated entities** can register its projects for issuance of carbon credits certificates

PAT Vs CCTS

Scheme	Perform Achieve Trade	Carbon Credit Trading scheme
Based on	Specific Energy Consumption(SEC)	GHG Emission Intensity(GEI)
Power conferred from	Energy Conservation Act	Energy Conservation Act Environment Protection Act
Benefits obtained by improving	Energy Efficiency	Energy Efficiency Renewable Energy Biogenic Emissions
Notification Done by	Ministry of Power	MOEFCC
Cycle Period	3 years	Trajectory period 3 Year
Compliance Frequency	Once in 3 Years	Every Year
M&V Done By	EmAEA	ACV Agency
Excess saving	Energy Saving Certificates (ESCerts)	Carbon Credit Certificates (CCC)
Value of Each Certificate	1 Tonne of Oil Equivalent	1 Tonne of CO2 reduction
Penalty provisions	EC ACT (SDA)	Environment Protection Act (MoEFCC)

Transition from Specific Energy Consumption (SEC) to GHG Emission Intensity (GEI)

SEC ~toe/t to GEI ~ tCO_2e/t

Current Approach under PAT

$$SEC = \frac{\text{Total Energy input to the plant boundary (TOE)}}{\text{Equivalent Product or Output (t)}}$$

Transition

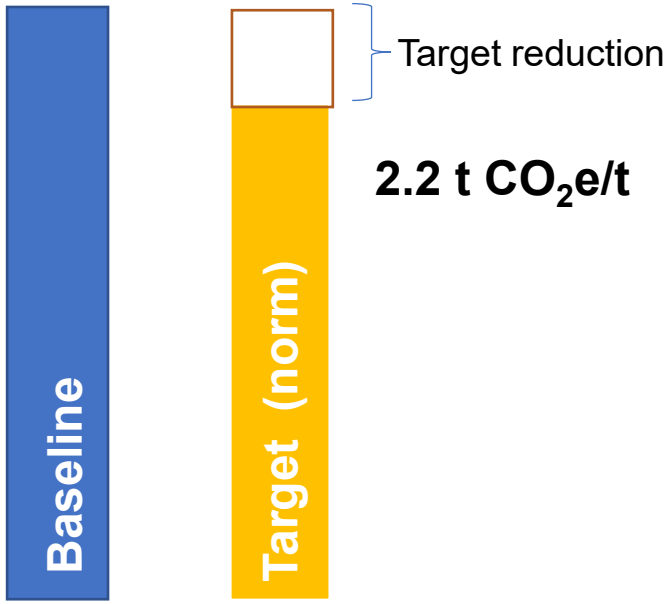
Proposed for Compliance Mechanism Approach under CCTS

$$GEI = \frac{\text{Total GHG Emissions from DCs } (tCO_2eq)}{\text{Equivalent Product or Output (t)}}$$

Compliance Mechanism under CCTS

Baseline

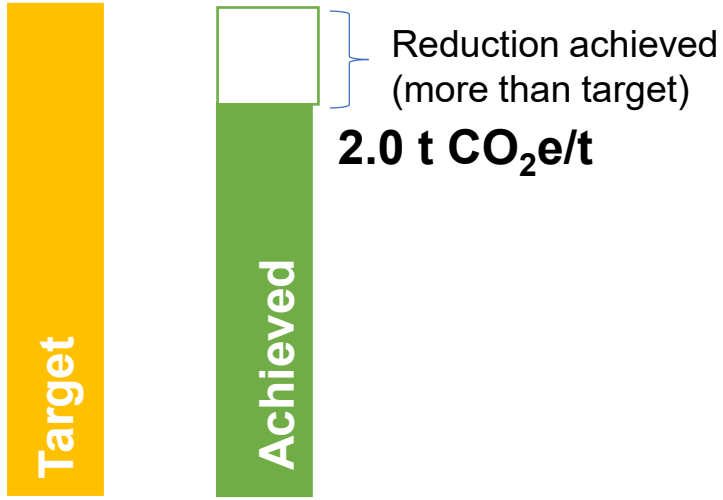
2.5 t CO_2e/t



Case I
Exceeding the Target

Credits to be issued (t CO_2e)
=2000 CCC
(0.2 t CO_2e/t * 10,000 t)

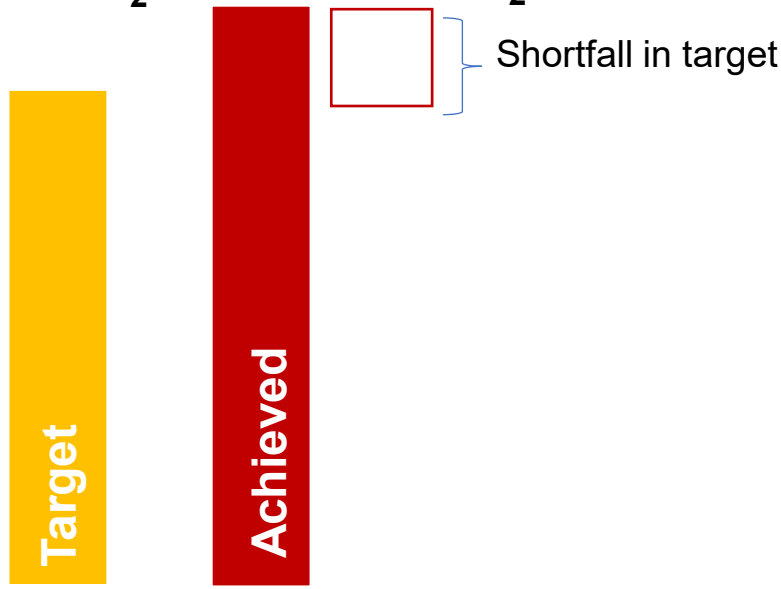
2.2 t CO_2e/t



Case II -
Shortfall in target

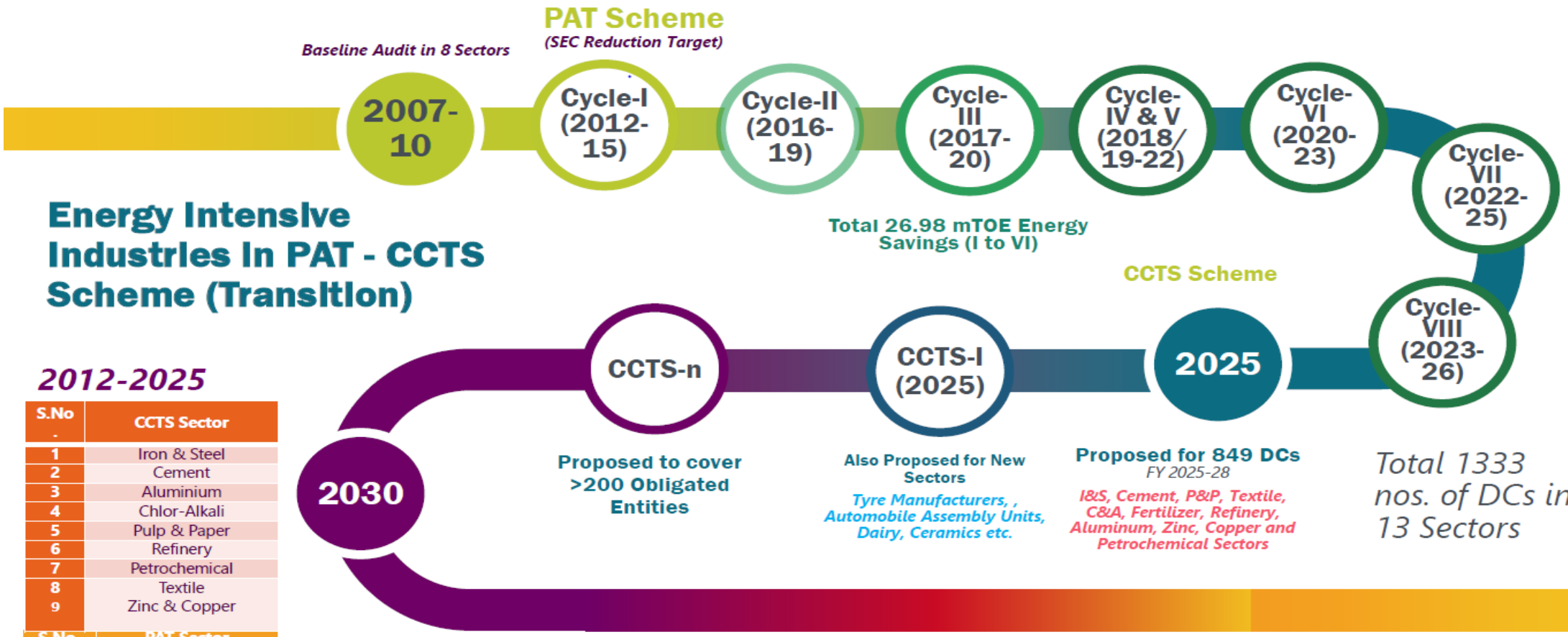
Credits to be purchased (t CO_2e)=
2000 CCC
(0.2 t CO_2e/t * 10,000)

2.2 t CO_2e/t **2.4 t CO_2e/t**



Issuance/purchase of CCCs will be post verification

Transition from Perform Achieve and Trade (PAT)



Energy Intensive Industries In PAT - CCTS Scheme (Transition)

2012-2025

S.No.	CCTS Sector
1	Iron & Steel
2	Cement
3	Aluminium
4	Chlor-Alkali
5	Pulp & Paper
6	Refinery
7	Petrochemical
8	Textile
9	Zinc & Copper

S.No.	PAT Sector
1	DISCOM
2	Railway
3	Thermal Power Plant
4	Sugar

Transition from Perform Achieve and Trade (PAT)

- As per the NSCICM directive, there are plans to establish trajectories and finalize draft targets based on the reported data from the financial year 2023-24 for Designated Consumers (DCs) across PAT Cycles IV, V, VI, and VII.
- This initiative applies to nine sectors, including Aluminium, Cement, Chlor-Alkali, Fertilizer, Iron & Steel, Pulp & Paper, Textile, Petrochemical, and Refinery.

Process Flow for Baseline Audit

❑**Step1:** Finalization of Baseline Audit Agencies with parallel communication with Aluminium DCs and SDAs.

❑**Step2:** Conducting the Baseline Audit (tentatively between **Sep-Nov'2024**) for FY2021-2024.

❑**Step3:** Fixation of Baseline Figures and Target Figures (tCO2eq/t) and subsequent approval of same from Sectoral committee and NSCICM.

❑**Step4:** Publication of Draft Target Notification by MoEFCC in public domain for comments.

❑**Step5:** Final Notification by MoEFCC under Environmental Protection and Conservation Act(EPC),1986

❑**Step6: CCTS Cycle Starts w.e.f. 1st April 2025.**

About the Audit

The objective of conducting the study is to inventarization of baseline GHG emission (tonne of CO2e) and establishment of **GHG Emission Intensity (GEI) (tonne of CO2eq/tonne of product)** of Obligated Entity(OEs) in Aluminium Sector.

General

•Collection and Review of the energy consumption, GHG Emission and production data of last 3 years in the Sector Specific Pro-forma (SSPF) for the years FY2021-22, 2022-23 & 2023-24 by visiting the plant physically.

Technical

Study the process of the entire plant considering a gate-to-gate concept which would mention type & quantity of energy and emission sources consumed, self-generated energy and emission, process technology, raw material, process by-products, product output and various variable factors which affect the energy consumption and emission significantly.

Others

•Investigate possible emission reduction options and identify the emission reduction opportunities.

•Recommend various technically sound and economically viable measures to reduce GHG Emission Intensity.

Last 10 years form-2 and 3 for the calculation of cost of per tonne of Oil equivalent.

Obligations of Audit Agency Bureau

- Presentation regarding Indian Carbon Market, CCTS Scheme, Sector Specific Pro-forma (SSPF), GHG Inventorization etc. to be carried out by the agency for the plant personnel. The Bureau officials may join through online/ offline mode in the meeting.
- Collection and Review of the energy consumption, GHG Emission and production data of last 3 years in the Sector Specific Pro-forma (SSPF) for the years FY 2021-22, 2022-23 & 2023-24 by visiting the plant physically.
- Each industrial unit has to be visited minimum of three members team consisting of **1 AEA, 1 Sector Expert, 1 Lead Verifier, 1 Team member**.
- Estimate the plant existing per ton of CO_2eq Emission cost in INR in FY 2021-24 and estimate the future per ton of CO_2eq Emission cost (INR) as well as future per ton of CO_2eq Emission reduction cost (INR); to be projected till FY 2030.

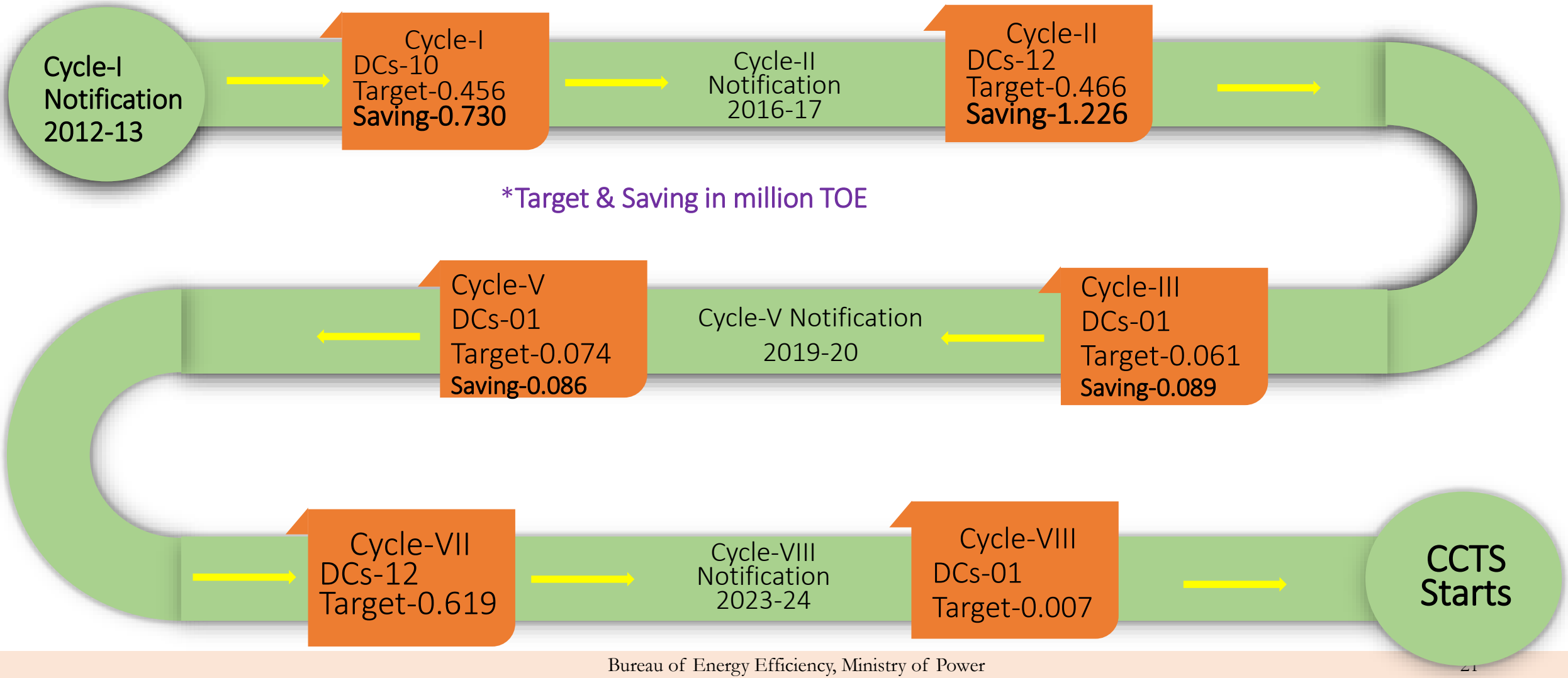
Support Required

- Availability of all Source of Documents as per CCTS Proforma for FY 21-24
- All External & Internal Lab Report for Solid Fuels
- Indexing of Energy & Process Emissions on G-t-G Concept
- Ensure the correctness of Baseline data

- Report the Presence of all Team Members at Site; to Bureau
- Opening & Closing Minutes of Meeting at site including signature of the visiting team
- CCTS Pro-forma (SSPF) authenticated by the energy managers and Unit Head
- Engagement of Process Team

Aluminium Sector Overview – PAT

PAT Cycle – Aluminium Target & Savings in MTOE



PAT Cycle – Aluminium

Threshold Limit:
7,500 (TOE) per annum

Number of Designated Consumer
14

Total Energy Consumption
15.45 million TOE
Total GHG emission
76.5 million tonne CO_2

- Aluminium Smelter **07**
- Integrated Plant **01**
- Alumina Refinery **05**
- Cold sheet plant **01**

Compliance Mechanism – GHG Coverage

Total GHG Emissions

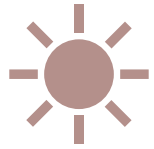
Direct GHG emissions + **Indirect GHG emissions** + **Process Emissions**

Inclusion of emission sources

Solid Fuels

Liquid fuels

Gaseous fuel



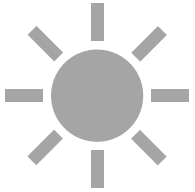
Purchased energy

Process Emissions

Direct and Indirect Definition – ISO 14064-1: 2018

Compliance Mechanism – GHG Coverage

Benefits to industries (exclusions or adjustments)

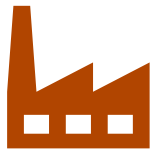


Renewable Energy

Biomass or biogenic sources of energy

Emissions captured CCUS

Energy use in colony attached to plant



Energy Exported out of plant boundary

Refrigerant leakages from buildings

GHG Emission Trajectory

The GHG emission intensity reduction trajectory will be developed for the considered sectors based on the:

a) India's Nationally Determined Contribution (NDC).
b) Potential for energy efficiency, fuel switch, use of non-fossil fuel energy/feedstock and decarbonisation in the sector.
c) Available technology and associated cost of their implementation.

Technical Potential

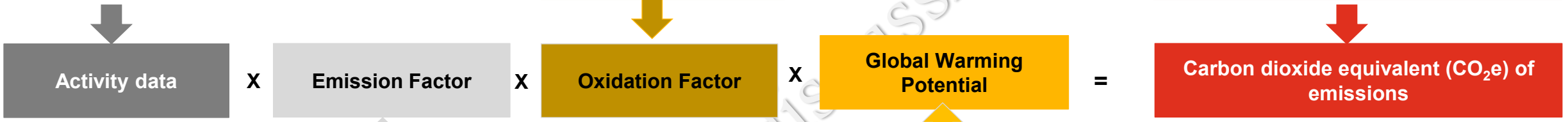
Economic Potential

Standard - GHG Calculation

Activity data refers to the data associated with an activity that generates GHG emissions, such as TOE of coal consumed

Amount of carbon in fuel that is burnt during combustion process (fraction)

GHG **Emissions (t CO2e)**



A factor allowing GHG emissions to be estimated from a unit of available activity data (e.g t CO2/toe)

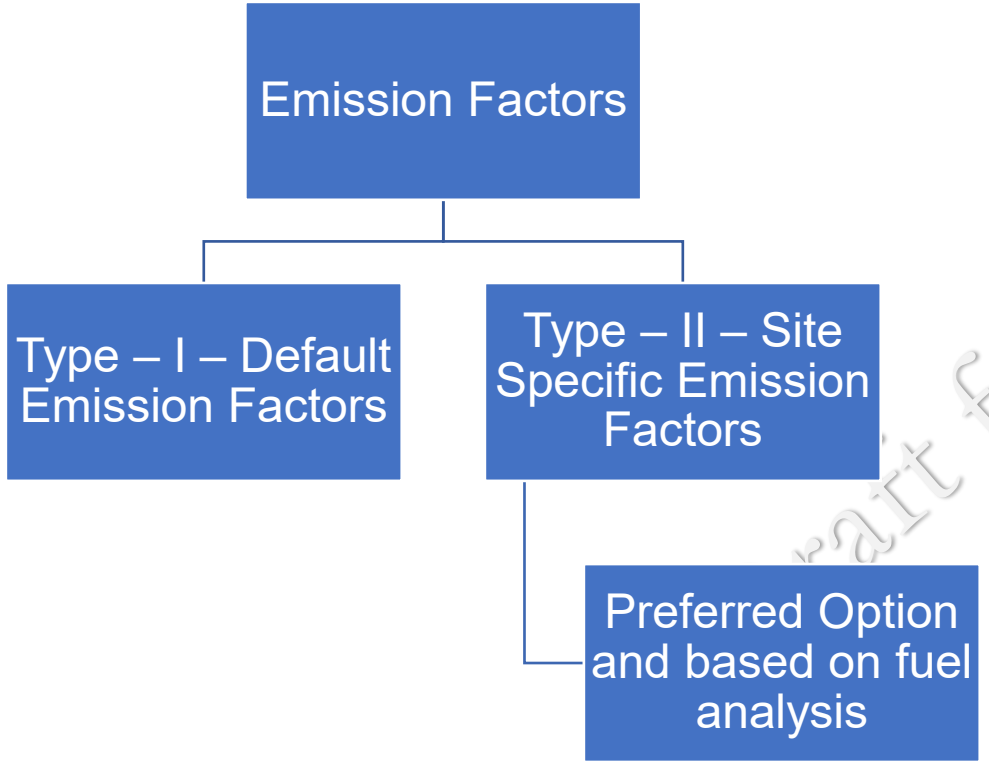
Radiative forcing impact of one unit of GHG (CO2e) relative to CO2

Data Required

Fuel consumption (kg)
% Total Carbon in fuel
Fuel NCV (kCal/kg)
Oxidation Factor

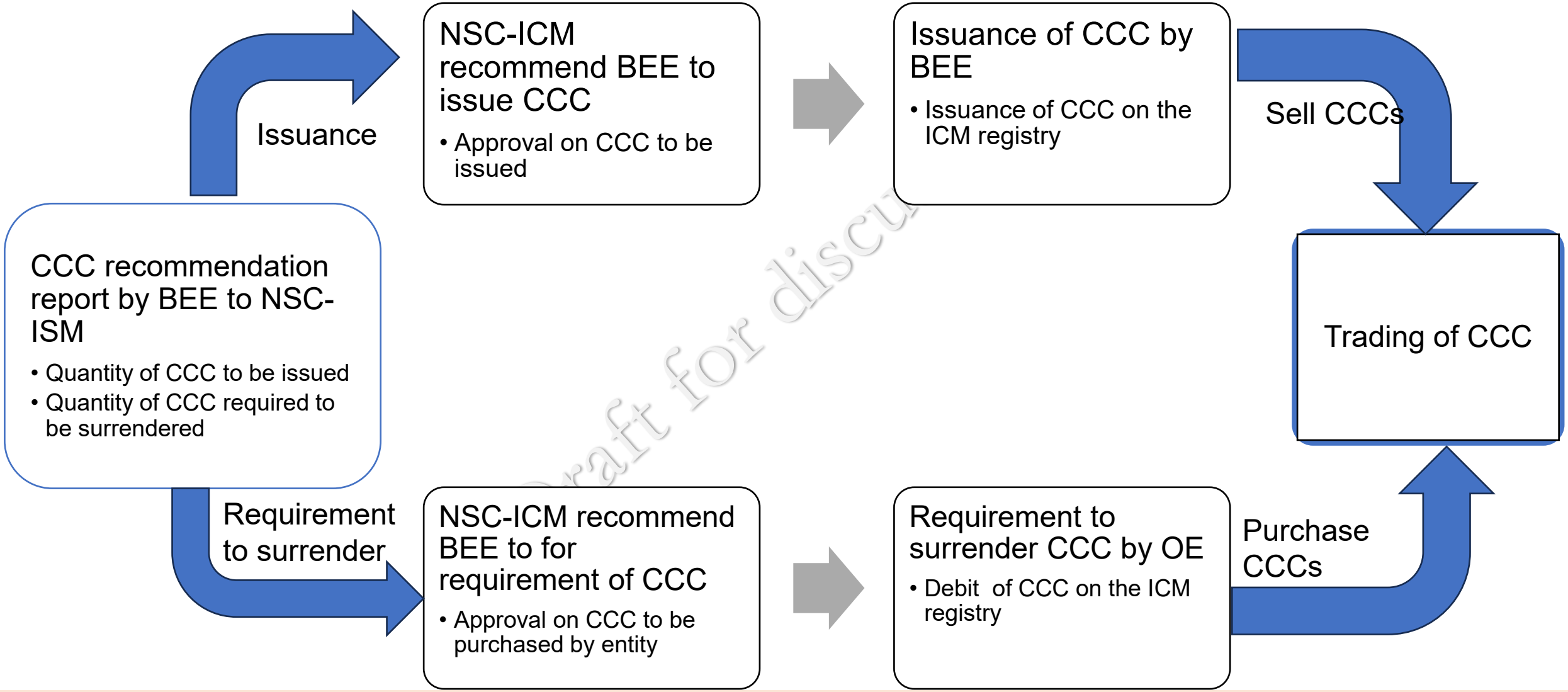
Emission Factors

As per compliance procedure – two type of emission factors can be used



For the liquid and gaseous fuel where the contribution of the fuel is less than 10% of overall emissions the emissions can be estimated using the actual Net Calorific Value (NCV) of fuels and type I emission factors.

Issuance & Surrender of Carbon Credit Certificate



GHG Emission Intensity Targets

The GHG emission intensity reduction target shall be specific for every obligated entity for any sector and shall be determined based on:

A. The GHG emission intensity reduction trajectory developed for that sector.

B. Average rate of reduction in GHG emission intensity across all the obligated entities for that sector determined based on the historical data.

C. The trajectory period will be of three years and the targets will be given on annual basis that has to be complied by the Obligated Entity which is defined as Compliance cycle

OE – specific targets

Fairness
due to relative distribution of targets

Procedure for Target

Step 1

- Discussion and finalization with Technical Committee established for the sector
- Recommend to BEE

Step 2

- BEE to recommend targets to Sub – Working Group to finalize the targets
- Sub Working group to recommend to NSCICM

Step 3

- NSCICM to consider the suggestion by Sub Working Group
- NSCICM to further recommend the targets to the Central Government for Notification

Target Setting Approach

Baseline emissions

- Energy related emissions
- Process related emission

- Estimated using the actual energy consumption and default energy based factors (IPCC)
- Fuel wise information available in PAT

Emission Intensity Calculation (GEI)*

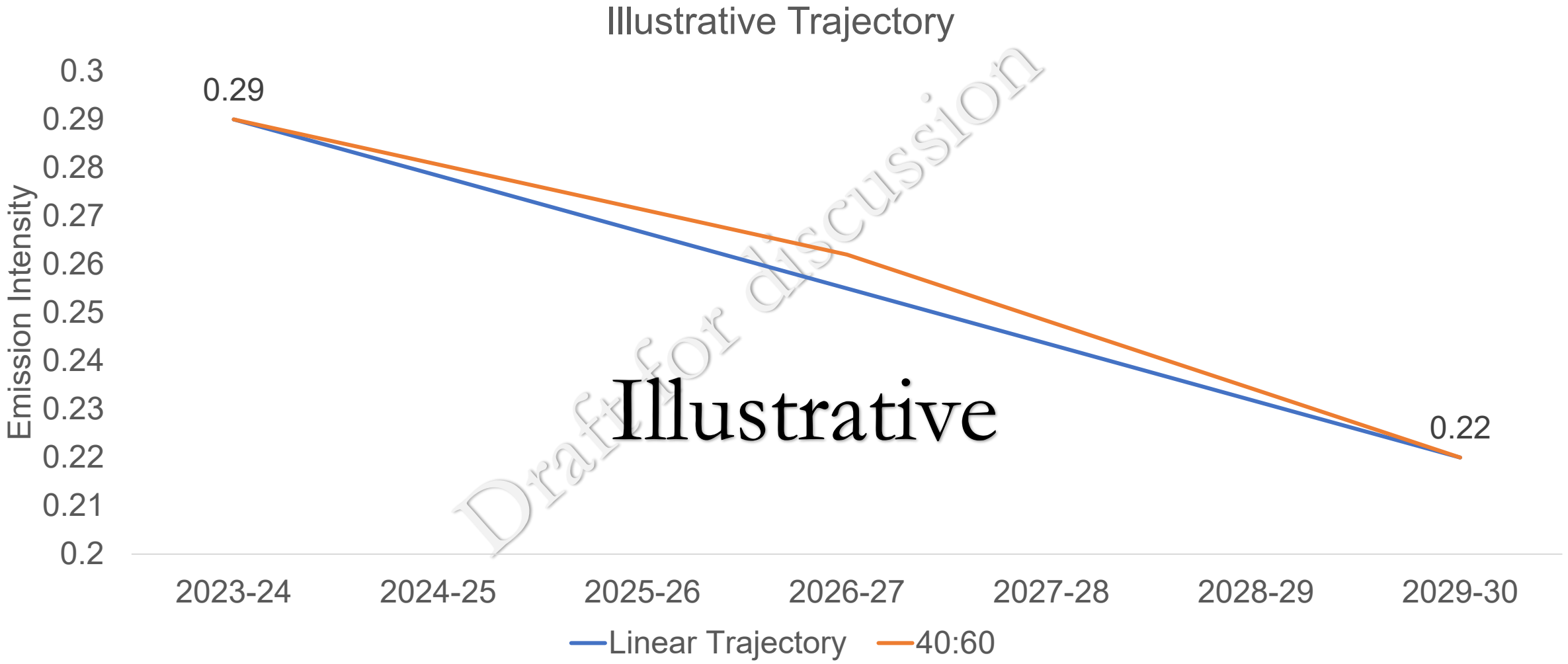
$$\frac{\text{Total Emissions}}{\text{Production}}$$

Target

- Derive Relative GEI
- Estimate yearly target

*GEI – Greenhouse Gas Emission Intensity

Emission Intensity – Trajectory



Illustrative

Step 1 – Calculating Baseline Emissions & Emission Intensity

Unit	Production (t)	Total GHG Emissions (t CO2)	GHG Emission Intensity
Unit 1	621,629	245,688	0.395
Unit 2	2,803,293	803,310	0.287
Unit 3	3,027,000	870,904	0.288
Unit 4	1,086,642	345,629	0.318
Unit 5	782,419	309,933	0.396
Unit 6	966,642	363,991	0.377
Unit 7	3,122,673	899,950	0.288
Unit 8	2,810,708	940,885	0.335
Unit 9	1,065,680	347,798	0.326
Unit 10	5,121,175	1,132,859	0.221
Unit 11	2,024,572	435,181	0.215
Unit 12	630,578	187,243	0.297
Unit 13	577,173	215,975	0.374

Step 2 – Calculate Relative SGE & % Target

Obligated Entity	Baseline GEI (tCO_2/t)	Relative GEI	Target Calculation	% Reduction
Unit 1	0.395	1.84	1.8X	12.21%
Unit 2	0.287	1.33	1.3X	8.85%
Unit 3	0.287	1.34	1.3X	8.89%
Unit 4	0.318	1.48	1.5X	9.83%
Unit 5	0.396	1.84	1.8X	12.24%
Unit 6	0.377	1.75	1.8X	11.63%
Unit 7	0.288	1.34	1.3X	8.90%
Unit 8	0.335	1.56	1.6X	10.34%
Unit 9	0.326	1.52	1.5X	10.08%
Unit 10	0.221	1.03	1.03X	6.83%
Unit 11	**0.215**	**1.00**	**1.0X**	6.64%
Unit 12	0.297	1.38	1.4X	9.17%
Unit 13	0.374	1.74	1.7X	11.56%

Illustrative

SGE – Specific GHG emission

Sectoral Average Reduction 9.6% is to be achieved say in three years

Step 3 – Yearly Targets for GHG Reduction

Obligated Entity	Baseline GHG intensity	Target Year 1 (40%)	Target Year 2 (60%)
Unit 1	0.395	0.376	0.347
Unit 2	0.287	0.276	0.261
Unit 3	0.287	0.277	0.262
Unit 4	0.318	0.306	0.287
Unit 5	0.396	0.377	0.348
Unit 6	0.377	0.359	0.333
Unit 7	0.288	0.278	0.263
Unit 8	0.335	0.321	0.300
Unit 9	0.326	0.313	0.293
Unit 10	0.221	0.215	0.206
Unit 11	0.215	0.209	0.201
Unit 12	0.297	0.286	0.270
Unit 13	0.374	0.357	0.331

All units in t CO_2e/t -

Thank You