



PAT → CCTS Scheme & Way Forward



INDIAN
Carb·n
MARKET

भारतीय कार्बन बाजार : India Carbon Market

हैदराबाद/Hyderabad
11/09/2024

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ऊर्जा दक्षता ब्यूरो/Bureau of Energy Efficiency



Presentation Outline



1. Background for ICM & CCTS
2. ICM Framework
3. Compliance Mechanism & Offset Mechanism
4. Status of Pulp & Paper Sector
5. CCTS Target Methodology
6. Way Forward for Pulp & Paper



Background for ICM & CCTS



Bureau of Energy Efficiency
Ministry of Power



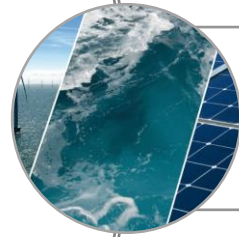
India's Nationally Determined Contributions



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.



Need for Carbon Market



To facilitate the achievement of India's enhanced NDC targets and future NDC goals.



To mobilize new mitigation opportunities through demand for emission reduction credits by private and public entities



To mobilize a significant portion of investments in clean technologies required by growing economy to transit toward low-carbon pathways.



To leverage the potential international collaboration and financing opportunities



Regulatory Framework



Regulatory Framework- Amendments

**The Energy
Conservation
(Amendment) Act,
2022, No. 19 Of
2022**

**Dated: 19th Dec
2022**

EC Act Empowers Central Government:-

- “**Carbon Credit Trading Scheme**” means the scheme for reduction of carbon emissions notified by the Central Government under clause (w) of section 14.
- ‘(h) **“energy”** means any form of energy derived from fossil fuels or non-fossil sources or renewable sources.
- specify **minimum share of consumption of non-fossil sources** by DCs as energy or feedstock, provided different share of consumption may be specified for different types of non-fossil sources for different designated consumers.



Sectoral Coverage (Schedule II of EC Act 2001)



As per EC Act 2001 Schedule II

1. Aluminum;
2. Fertilizers;
3. Iron and Steels;
4. Cement;
5. Pulp and Paper;
6. Chlor Alkali;
7. Sugar;
8. Textile;
9. Chemicals;
10. Railways;
11. Port Trust;
12. Transport Sector (Industries and Services);
13. Petrochemical, Gas Crackers, Naphtha Crackers and Petroleum Refinery;
14. Thermal Power Stations, Hydel Power Stations, Electricity transmission companies and distribution companies;
15. Commercial Buildings or Establishment.

As per Amendment in Schedule II of EC Act 2001 (vide S.No. 09 (E) dt. 3rd Jan 2022

1. Aluminum;
2. Fertilizers;
3. Iron and Steels;
4. Cement;
5. Pulp and Paper;
6. Chlor Alkali;
7. Sugar;
8. Textile;
9. Chemicals;
10. Railways;
11. Port Trust
12. Transport Sector (Industries and Services)
13. Petrochemical, Gas Crackers, Naphtha Crackers and Petroleum Refinery
14. Thermal Power Stations, Hydel Power Stations, Electricity transmission companies and distribution companies;
15. Commercial Buildings or Establishment.
16. Ceramic;
17. Glass;
18. Zinc;
19. Copper;
20. Mines Including exploration.

As per Amendment in Schedule II of EC Act 2001 (vide S.No. 2523 (E) dt. 6th Jan 2023

22. Dairy;
23. Automobile Assembly Units;
24. Tyre Manufacturers;
25. Forging;
26. Foundry;
27. Refractory;



Sectoral Threshold Level



Sr. No	Sector	Annual Energy Consumption (MTOE), Sectoral Threshold Level
1	Aluminum	7,500
2	Chlor-Alkali	12,000
3	Textile	3,000
4	Pulp & Paper	7,500
5	Iron & Steel	20,000
6	Fertilizer	30,000
7	Cement	30,000 & 10,000 for CGU
8	Thermal Power Plants	30,000
9	Refinery	90,000
10	DISCOMS	All Licensed
11	Railway	70,000
12	Buildings	500

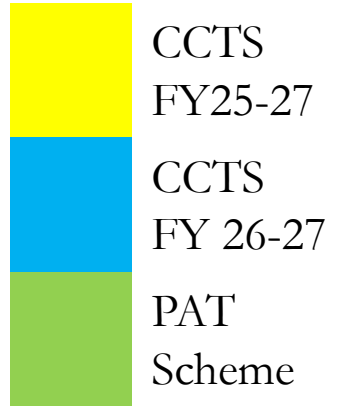
Sr. No	Sector	Annual Energy Consumption (MTOE), Sectoral Threshold Level
13	Petrochemicals	1,00,000
14	Sugar	10,000
15	Chemical	3,000
16	Ceramic	5,000
17	Glass	10,000
18	Zinc	20,000
19	Copper	10,000
20	Port Trust	500
21	Dairy	2,500
22	Automobile Assembly Units	3,000
23	Tyre Manufacturer	7,000
24	Forging	1,500
25	Foundry	5,000
26	Refractories	3,000



PAT to CCTS Transfer.....



Sector / No. of DCs	PAT Cycle I	PAT Cycle II	PAT Cycle-III	PAT Cycle-IV	PAT Cycle- V	PAT Cycle- VI	PAT Cycle-VII	PAT Cycle-VIII	Total Notified DCs Notified till Apr'2023
	(FY'12-15)	(FY'16-19)	(FY'17-20)	(FY'18-22)	(FY'19-22)	(FY'20-23)	(FY'22-25)	(FY'23-26)	
Aluminum	10	12	1	-	1	-	12	1	14
Cement	85	111	14	1	12	37	120	25	200
Chlor- Alkali	22	24	-	2	2	-	24	1	29
Fertilizer	29	37	-	-	-	-	0	0	37
Iron & Steel	67	71	29	35	23	5	134	66	270
Paper & Pulp	31	29	1	2	8	2	24	7	55
Textile	90	99	34	7	16	7	120	38	206
Thermal Power Plant	144	154	37	17	17	-	152	0	239
Refinery	-	18	-	-	-	20	0	0	20
Railways	-	22	-	-	-	-	26	0	26
DISCOMs	-	44	-	-	-	-	95	0	96
Petrochemical	-	-	-	8	-	-	0	0	8
Buildings	-	-	-	37	31	64	0	0	133
Total	478	621	116	109	110	135	707	138	1333

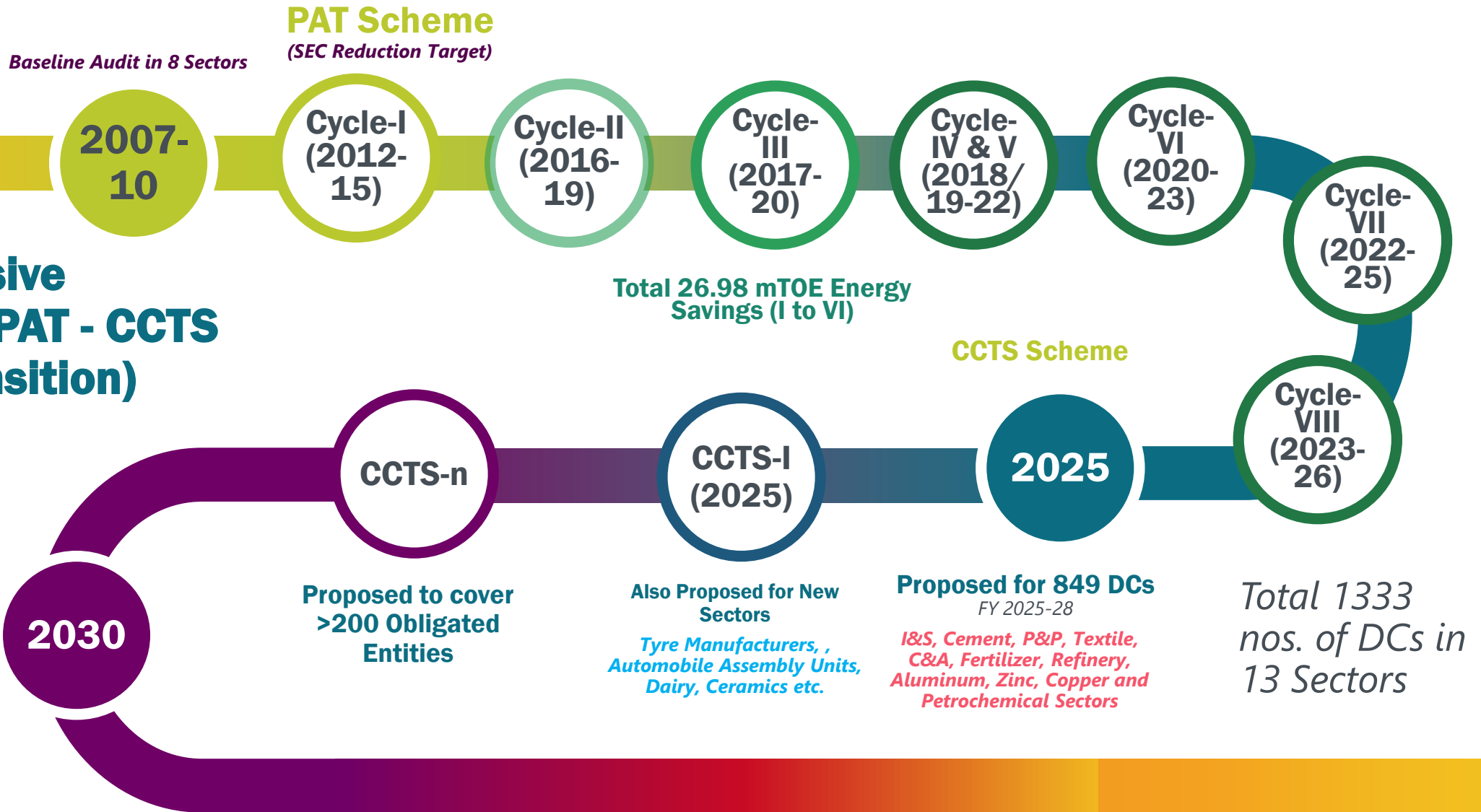


Energy Intensive Industries in PAT - CCTS Scheme (Transition)

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





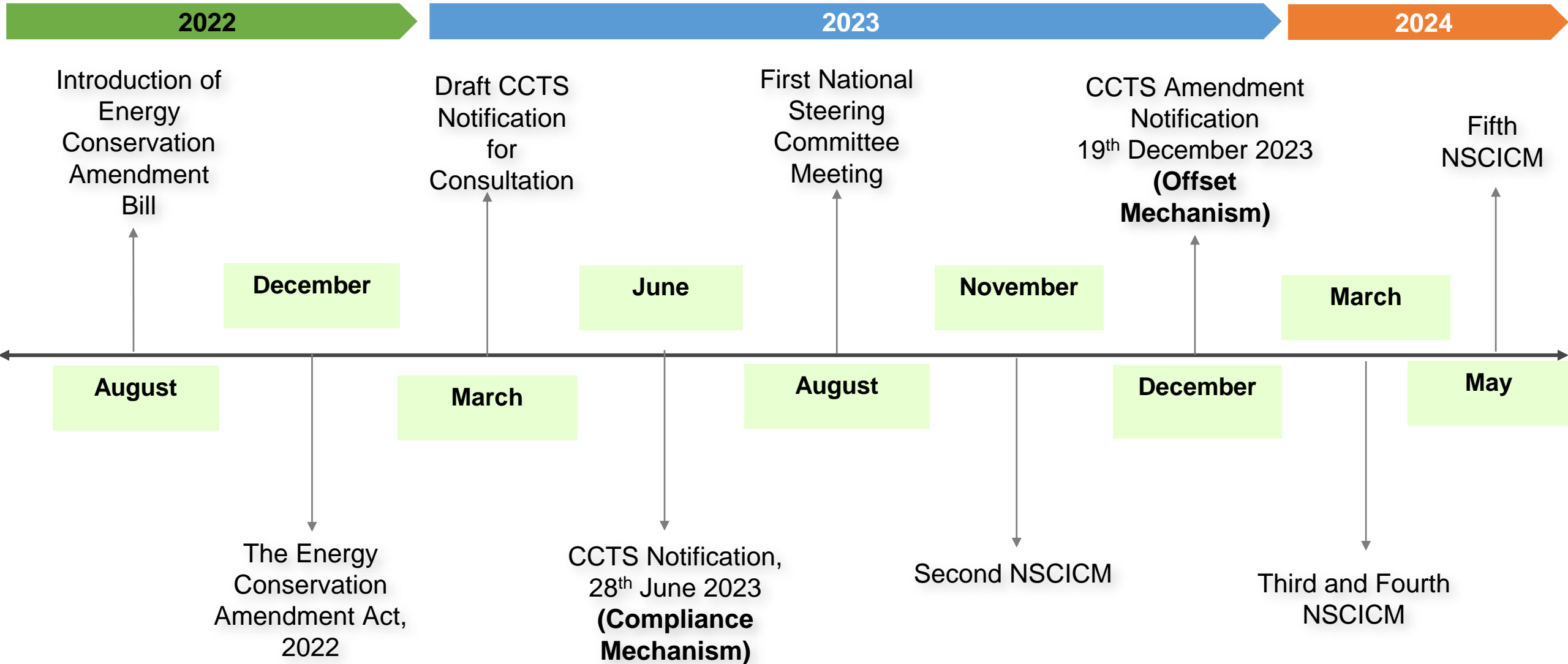
Indian Carbon Market - Framework



Bureau of Energy Efficiency
Ministry of Power



Key Milestone – Indian Carbon Market

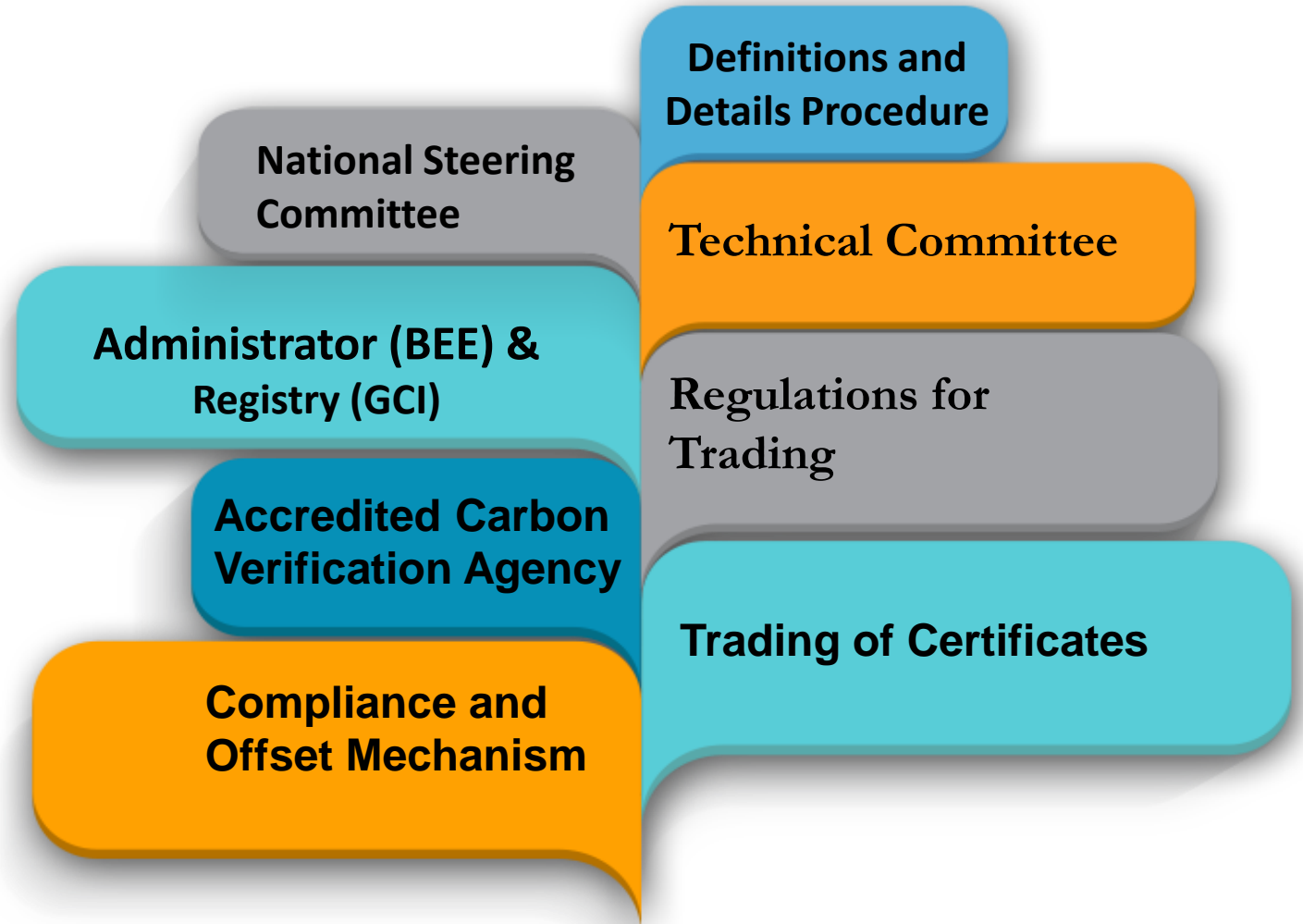




Carbon Credit Trading Scheme

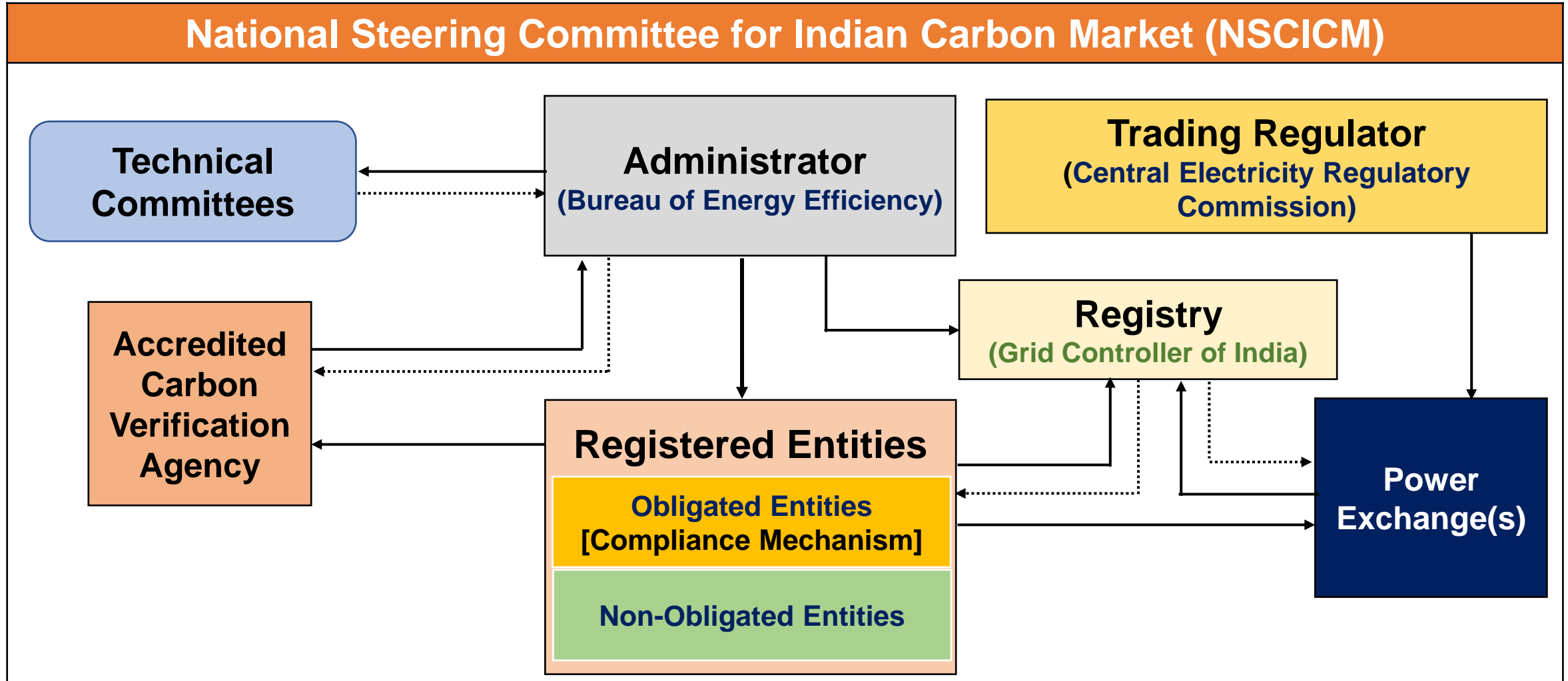


India's **Carbon Credit Trading Scheme, 2023** was notified by the Government of India on **28 June 2023** under the Energy Conservation Act, 2001





Institutional Framework





National Steering Committee for Indian Carbon Market (NSCICM)



National Steering Committee for Indian Carbon Market (NSCICM)			
Chairperson		Co-Chairperson	
Secretary, Ministry of Power		Secretary, Ministry of Environment, Forest and Climate Change	
Members			
Ministry of Finance	NITI Aayog	Ministry of Power	Ministry of Environment, Forest and Climate Change
Ministry of New and Renewable Energy	Ministry of Steel	Ministry of Coal	Ministry of Petroleum and Natural Gas
Ministry of Agriculture and Farmers Welfare	Ministry of Chemical and Fertilizers	Central Electricity Authority	Grid Controller of India Limited
Department of Environment of State Government representing State – (2)	Expert Members - (2)** Other Members - (3)*	Member Secretary: Director General, Bureau of Energy Efficiency	
*CII & FICCI – also has been included as coo-opted members		**Shri Upendra Tripathy & Shri R R Rashmi as experts	



Sectoral Technical Committee



Sectoral Technical Committee under the Indian Carbon Market

Chairperson	Director, Central Pulp & Paper Research Institute (CPPRI)
Ministerial Representation	Department for Promotion of Industry and Internal Trade (DPIIT) Ministry of Environment, Forest and Climate Change (MoEFCC) Central Pollution Control Board (CPCB)
R&D Representation	Central Pulp & Paper Research Institute (CPPRI)
Association Representation	Indian Paper Manufacturers Association (IPMA) Indian Agro & Recycled Paper Mills Association (IARPMA) Indian Newsprint Manufacturers Association (INMA)
Academia Representation	Indian Institute of Technology, Roorkee
Industrial Representation	Obligated Entities (ITC, JK Paper and BILT) {Proposed: Emami Paper & Star Paper Mill}
Member Convener	Bureau of Energy Efficiency (BEE)



Mechanisms under CCTS



Compliance Mechanism

A mandatory mechanism under which **obligated entities** will be given GHG emission intensity targets (t CO₂/t)

Offset Mechanism

A voluntary mechanism under which **non obligated entities** can register their projects for issuance of carbon credits certificates



Key Differences (Compliance & Offset)



Key Aspect	Compliance Mechanism	Offset Mechanism
Nature	Mandatory	Voluntary
Entities Involved	Large Scale emission emitters	Corporations/Companies/nonprofits/Society (no restriction on size or scale)
Level of implementation	Facility Level	Project Level
Usage of Credits	To meet legally binding emission reduction targets	To voluntary offset emission for sustainability goals
Additionality	Less or no emphasis, primary focus is to meet the targets	Crucial Criterion, reduction must be beyond baseline scenario
Scope	Sector Specific, targeting obligated entities (Designated Consumers)	Broad and diverse (sector scope based on emission source/reduction)
Boundary Consideration	Gate to Gate Boundary	Project boundary (but outside boundary of obligated entity under compliance)
Credit Issuance	Against the targets (only on overachievement of targets)	Against the baseline and baseline are based on methodology



Compliance & Offset Mechanism



Bureau of Energy Efficiency
Ministry of Power



Highlights of Compliance Mechanism



Type of Entity

- Obligated Entities

Type of targets

- GHG Emission Intensity (t CO₂/t)

Coverage

- Direct and Indirect Emissions (Scope 1 and 2)

Notification of Targets

- Environment Protection Act, 1986

Compliance

- Annual

GHGs to be covered

GHGs	Combustion	Process
CO ₂	Yes	Yes
CH ₄	No	-
N ₂ O	No	-
PFC	-	Yes

Sectors to be covered

Phase 1	Phase 2
1. Iron & Steel	1. Textile
2. Cement	2. Aluminium
3. Pulp & Paper	3. Refinery
4. Petrochemical	4. Fertilizer
	5. Chlor Alkali



Transition from Specific Energy Consumption (SEC) to Specific GHG Emissions (SGE)



SEC ~toe/t to SGE ~ tCO₂e/t

**Current Approach
under PAT**

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

Transition



**Proposed for Compliance
Mechanism Approach under
CCTS**

$$\text{SGE} = \frac{\text{Total GHG Emissions from DCs (tCO}_2\text{eq)}}{\text{Equivalent Product or Output (t)}}$$



Mechanism



Baseline

2.5 t CO₂e/t



Target reduction
2.2 t CO₂e/t

Case I Exceeding the Target

Credits to be issued (t CO₂e)
(0.2 t CO₂e/t * Production)

2.2 t CO₂e/t



Reduction achieved
(more than target)
2.0 t CO₂e/t

Case II - Shortfall in target

Credits to be purchased (t CO₂e)
(0.2 t CO₂e/t * Production)

2.2 t CO₂e/t



2.4 t CO₂e/t

Shortfall in target

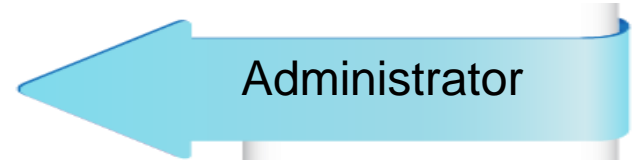
Issuance/purchase of CCCs will be post verification



Procedure



Establishing GHG - Emission Intensity Trajectory and Targets



Administrator

Obligated Entities

Monitoring and Reporting

Verification and Assessment of Performance

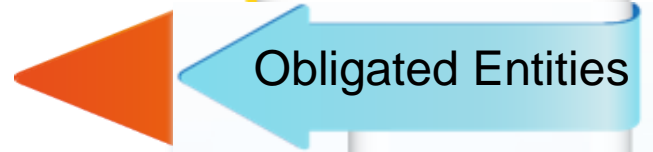


ACV

Administrator/Entity

Issuance & Trading

Compliance Assessment



Obligated Entities

ACV

Check verification



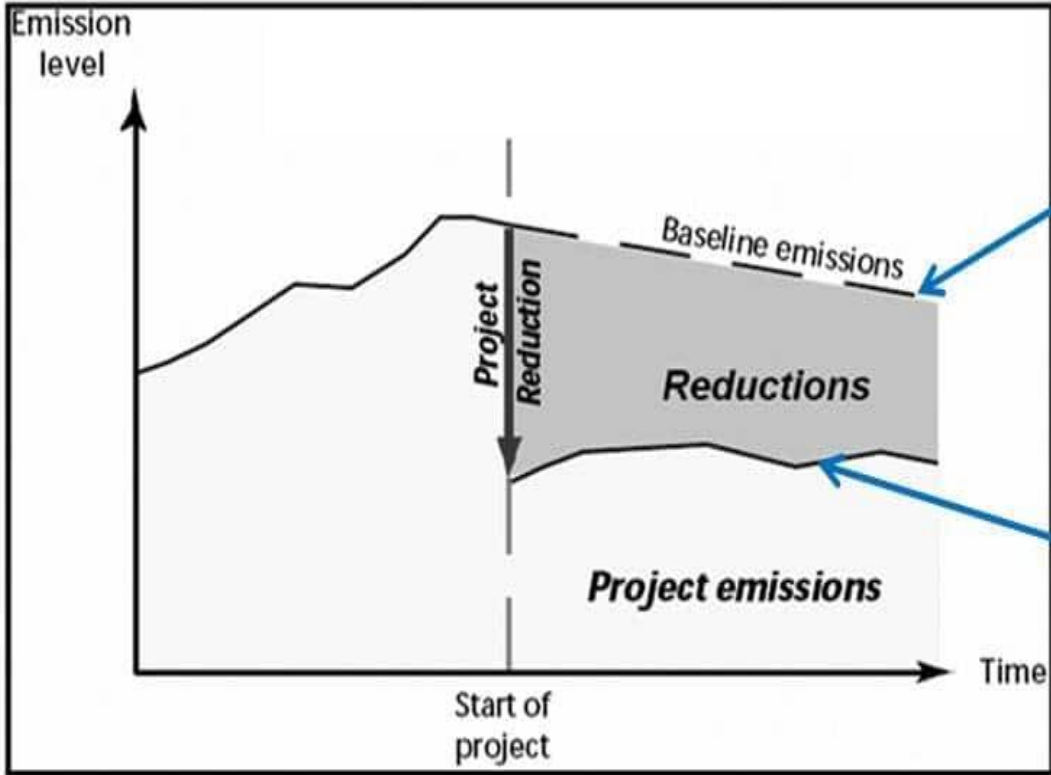
Offset Mechanisms



Emission Reduction
= Baseline Emissions – Project Emission



Carbon Credits (representing 1 t CO₂ reduction)





Architecture



Decision Making Hierarchy

Central Government

NSC-ICM

ICM Administrator

Technical Committee

Key Components

1. Sectors

2. Methodology

3. Project Cycle

Operationalization

Role and Responsibilities

ICM Web Portal and Registry

Procedure Documents



Project Cycle

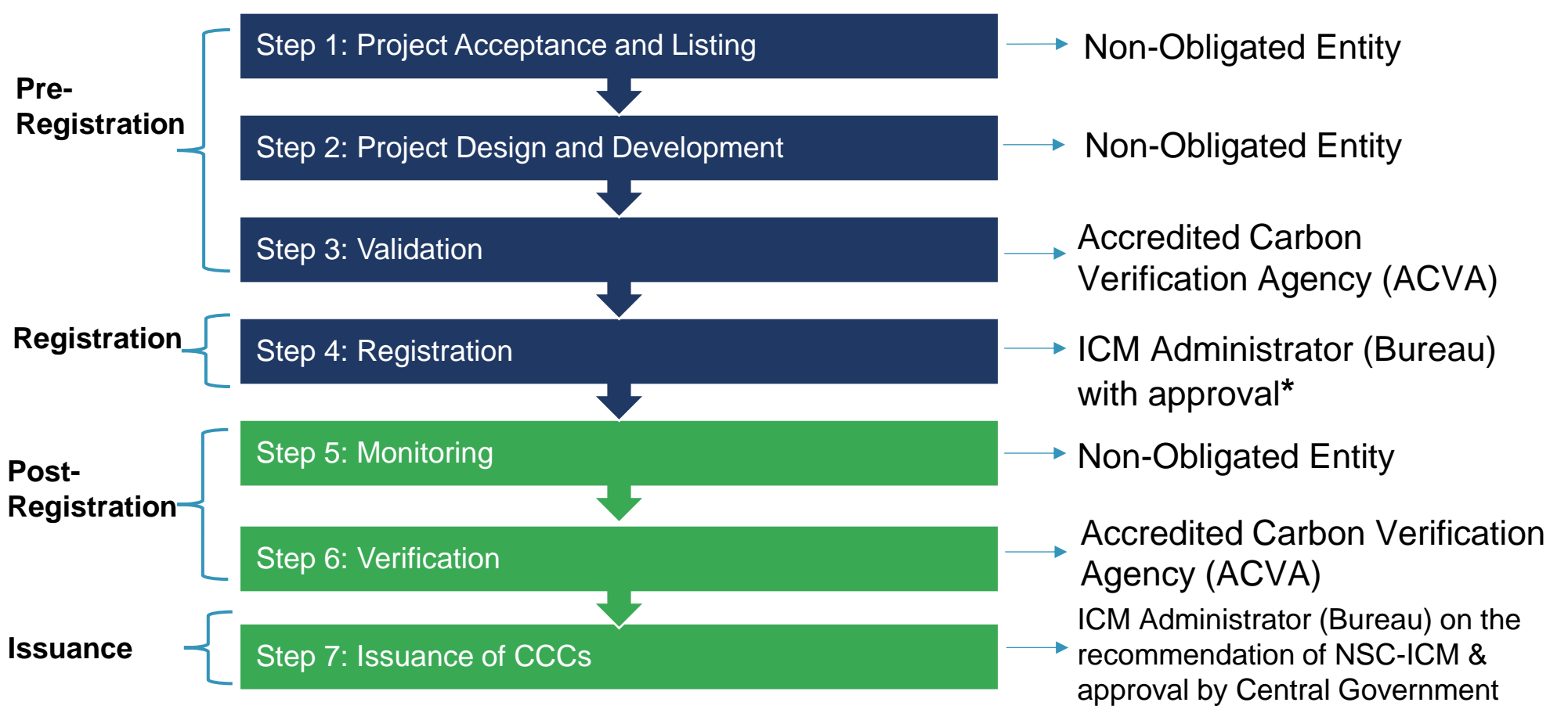


Project Stages

Responsibility

Step 1-4: Project is designed, baseline is established, validated and project is registered. On completion of Step 4, the project is considered as ICM registered project.

Step 5-7: The project is monitored, emission reductions are verified and on approval of verification report, CCCs will be issued.





Sectoral Scope



	Sector	Sub-Sector	Illustrative Technologies
Phase 1	Energy	<ul style="list-style-type: none"> Energy Industries (renewable / non-renewable), Energy distribution & Energy demand 	<ul style="list-style-type: none"> Green Hydrogen production through electrolysis RE with Storage, Offshore Wind Green Hydrogen production through Biomass, Compressed Biogas Energy efficiency improvements of a lime production facility through installation of new kilns
	Industries	<ul style="list-style-type: none"> Manufacturing Industries, Chemical Industries Mining/Mineral production & Metal production 	<ul style="list-style-type: none"> Green Ammonia usage Feed switch in integrated Ammonia-urea manufacturing industry
	Waste handling and disposal	<ul style="list-style-type: none"> Waste handling and disposal 	<ul style="list-style-type: none"> Biochar, Landfill Gas Capture
	Agriculture	<ul style="list-style-type: none"> Agriculture 	<ul style="list-style-type: none"> Systematic Rice Intensification , Biochar
	Forestry	<ul style="list-style-type: none"> Afforestation and reforestation 	<ul style="list-style-type: none"> Afforestation activity
	Transport	<ul style="list-style-type: none"> Transport 	<ul style="list-style-type: none"> Modal Shift, Electric Vehicles/Bus
Phase 2	Construction	<ul style="list-style-type: none"> Construction 	<ul style="list-style-type: none"> Limestone Calcined Clay Cement (LC3)
	Fugitive Emissions	<ul style="list-style-type: none"> From fuels (solid, oil, and gas) From Industrial gases (halocarbons and Sulphur hexafluoride) 	<ul style="list-style-type: none"> CF4 emission reduction in semiconductor manufacturing facility Recovery and utilization of gas from oil fields
	Solvent use	<ul style="list-style-type: none"> Solvent use 	
	CCU	<ul style="list-style-type: none"> Carbon capture and storage of CO₂ and other removals 	<ul style="list-style-type: none"> Post combustion – CCUS



Stakeholder Consultations



Sr. No	Workshop	Outcome
1	<p>Stakeholder Consultation on Compliance Procedure and ACVA, organized under CCTS</p> <ul style="list-style-type: none"> • 20 October 2023 (New Delhi) • 27 October 2023 (Bengaluru) • 03 November 2023 (Mumbai) • 21 December 2023 (Kolkata) 	<ul style="list-style-type: none"> • More than 450 stakeholders participated in the workshops and provided inputs and comments. • The compliance procedure and eligibility requirements and procedure for ACVA was strengthened after incorporating the comments
2	<p>Stakeholder Consultation on PAT Transition Plan under CCTS, held at New Delhi</p>	<ul style="list-style-type: none"> • Stakeholder Consultation held on 1st February 2024. • More than 90 stakeholders participated in the workshops and provided inputs and comments on three proposed transition scenarios. • The approval on the PAT transition plan in progress
3	<p>Stakeholder Consultation on Offset Mechanism under CCTS</p> <ol style="list-style-type: none"> 1. 12 May 2024 –(Bengaluru) 2. 22 May 2024 (Vizag) 3. 29 May 2024 (Mumbai) 4. 05 June 2024 (New Delhi) 	<ul style="list-style-type: none"> • Discussion on sectoral scope • Discussion on Project Cycle and Standard



सत्यमेव जयते

Way Forward: Compliance Mechanism



Specifying Detailed Compliance Procedures



Development of GHG Reduction Targets and Notification



Capacity Building and Awareness



Development of Monitoring and Reporting Guidelines



Baseline Audit for Obligated Entities



सत्यमेव जयते

Way Forward: Offset Mechanism



Development of Procedures



Development of Templates



Capacity Building and Awareness



सत्यमेव जयते

Way Forward – Compliance & Offset Mechanism



Development of Accreditation Procedures: Developing accreditation procedures for verification agencies and initiating the accreditation of such agencies.



Development of Robust IT Infrastructure: Establishing a comprehensive IT infrastructure, including a website and portal.



Development of a Registry System: Creating a registry system for tracking and managing carbon credits.



Capacity Development and Awareness: Continuing to build capacity and raise awareness among stakeholders



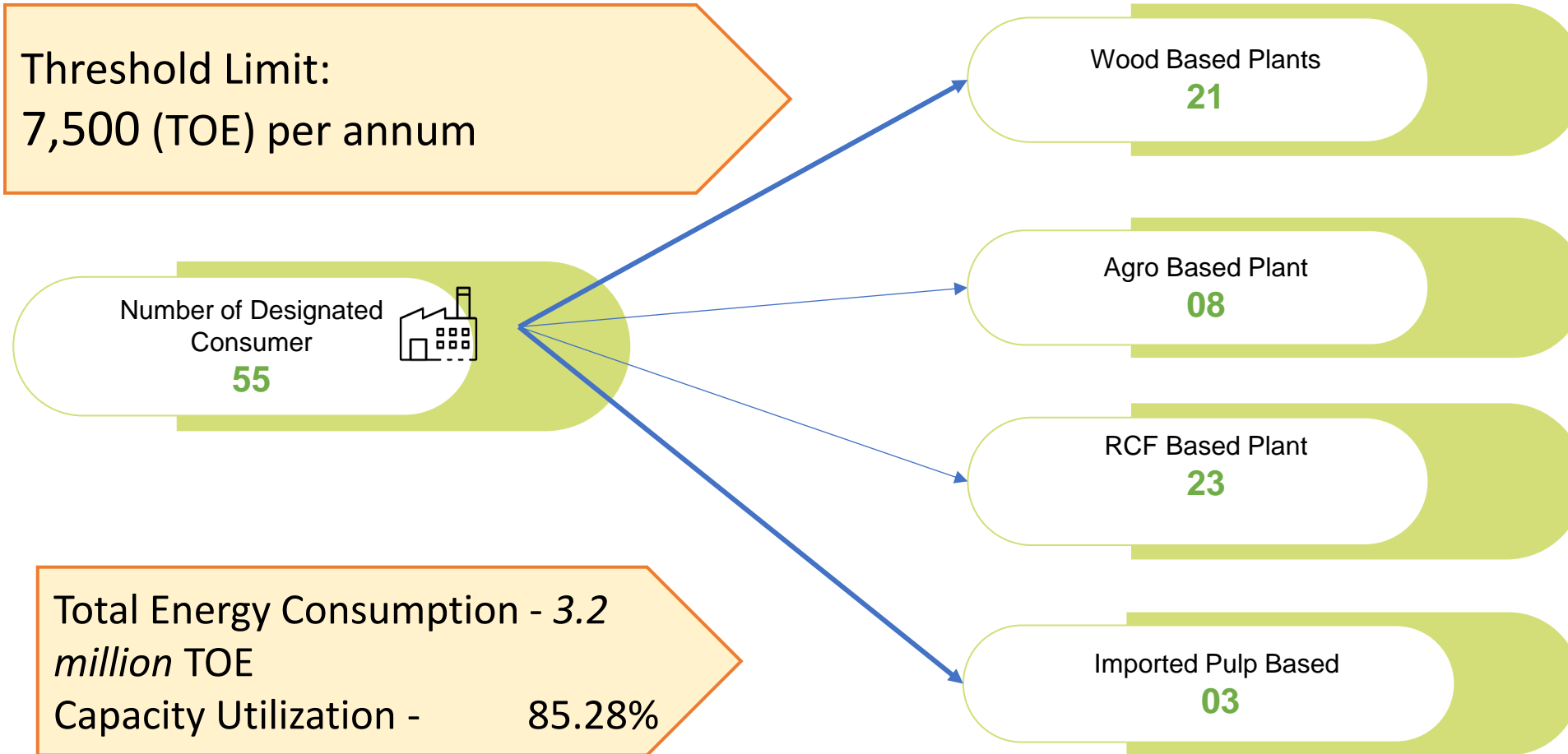
Pulp & Paper Sector (DCs)



Bureau of Energy Efficiency
Ministry of Power



Designated Consumers

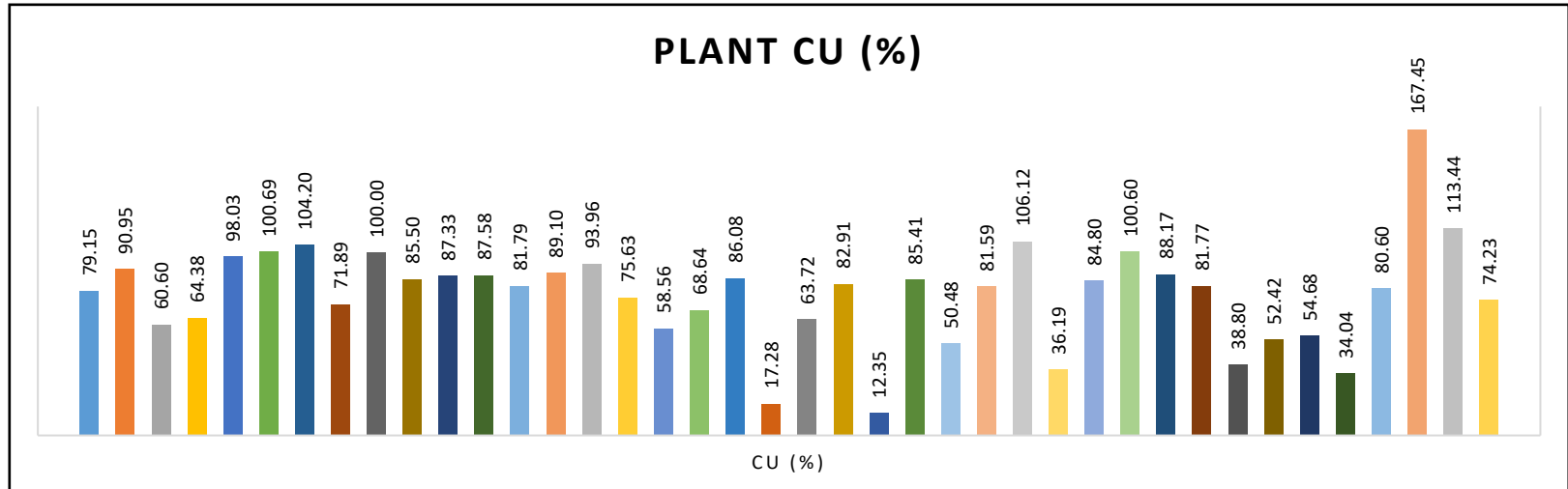
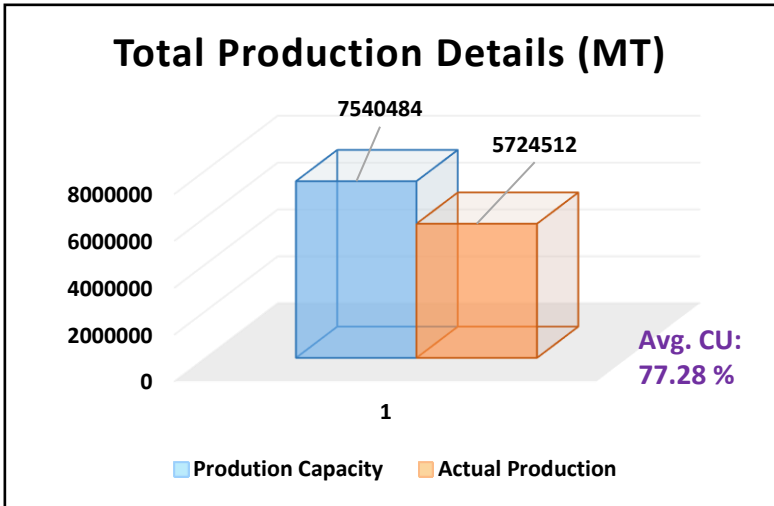
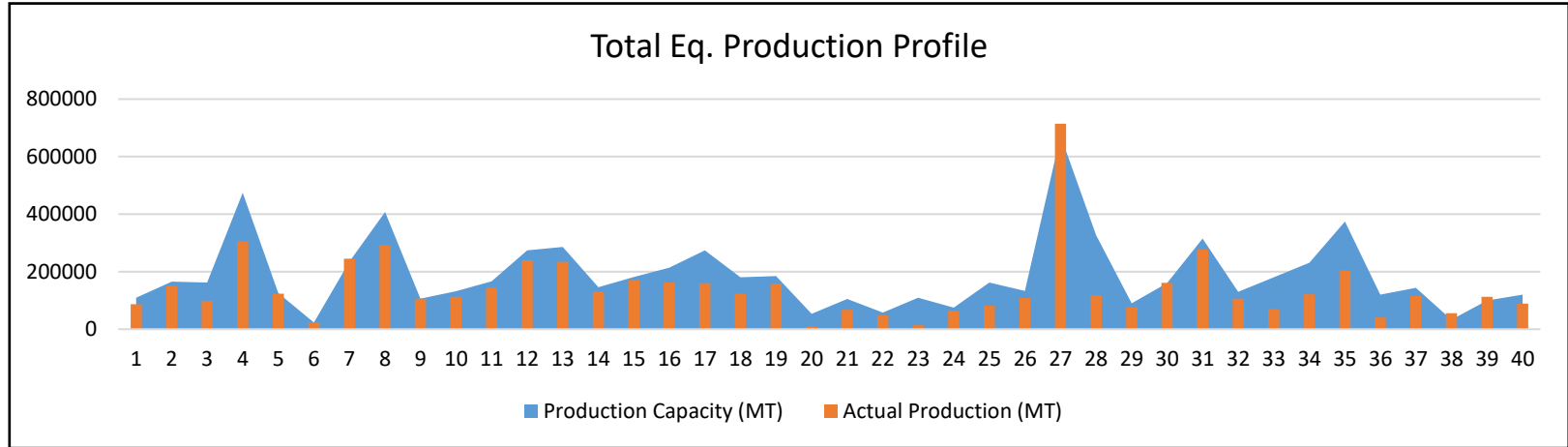




Production Profile (FY 2023-24)

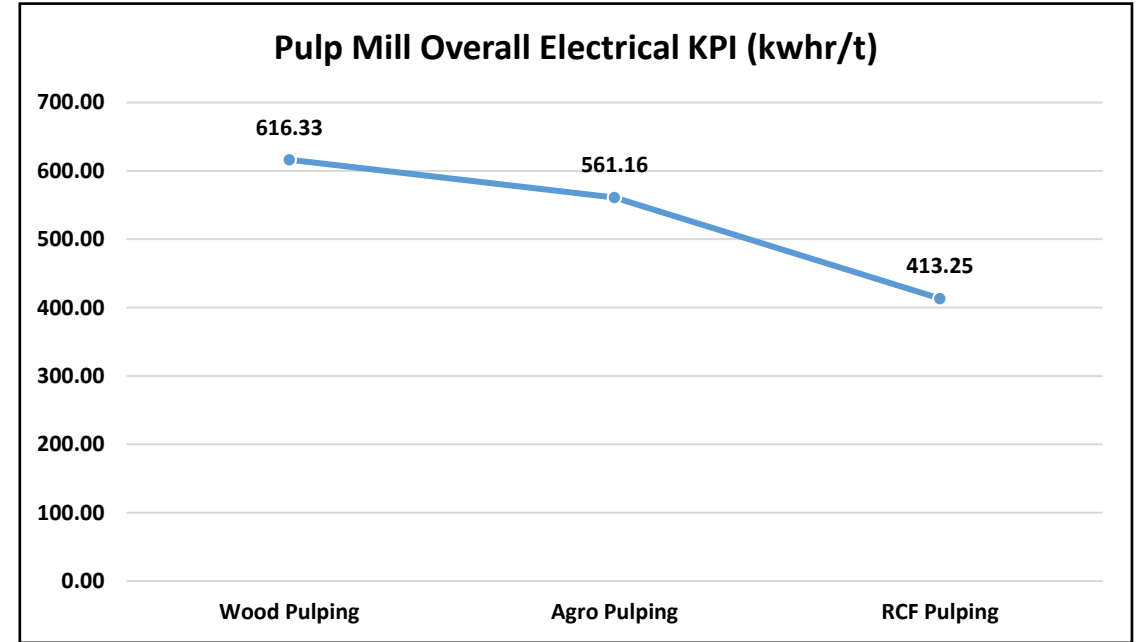
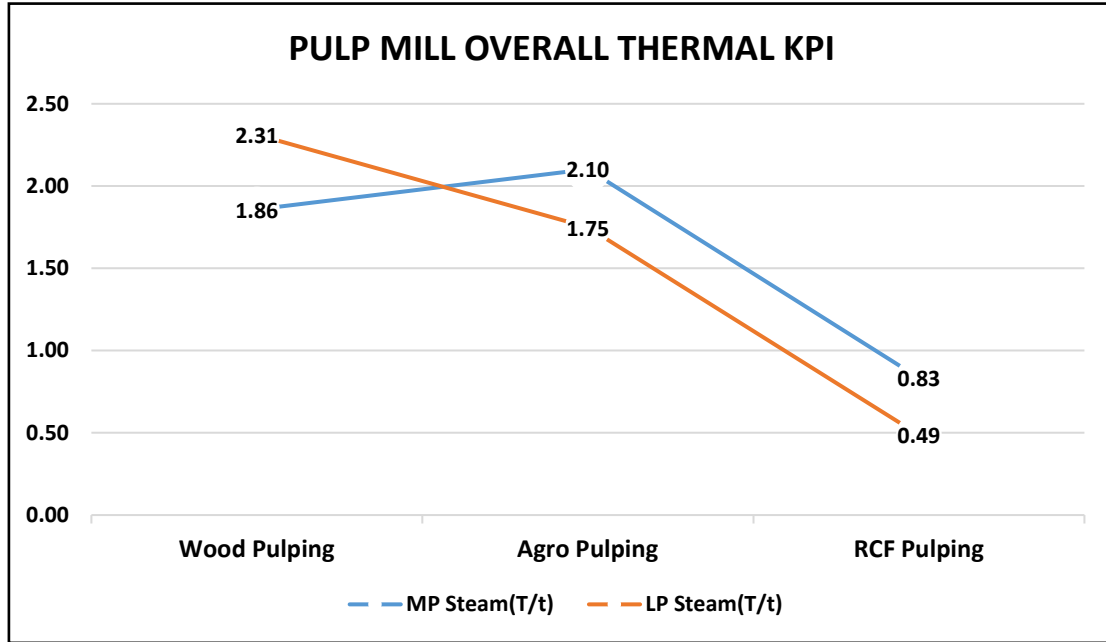


General		
Item	UOM	Qty.
Plants	No.	40
Total Production Capacity	MT	7540484
Total Actual Production	MT	5724512
Avg. CU	%	77.28





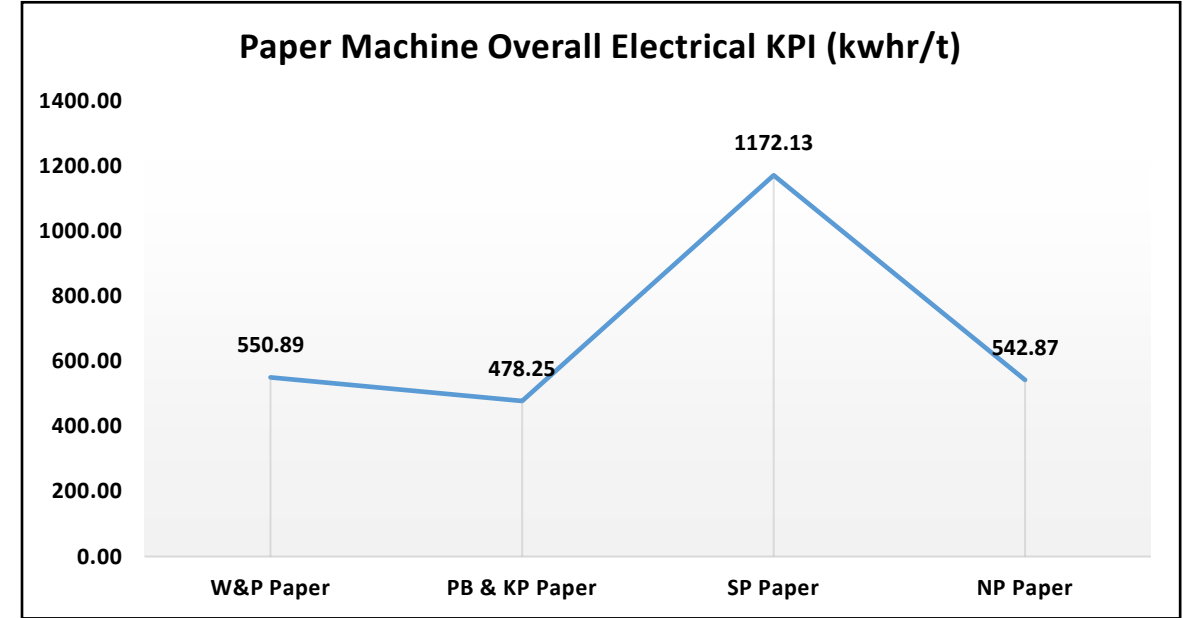
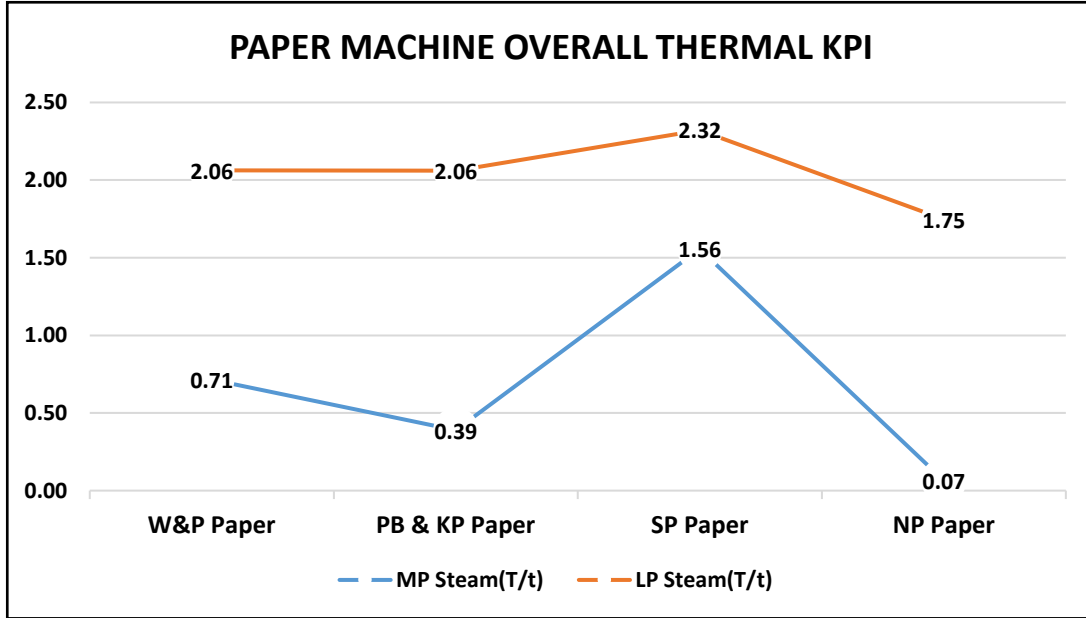
Pulp Mill Performance (FY 2023-24)



Overall Pulp Mill Performance (Wt. Avg. Basis)			
Type	MP Steam(T/t)	LP Steam(T/t)	Power (kwh/t)
Wood Pulping	1.86	2.31	616.33
Agro Pulping	2.10	1.75	561.16
RCF Pulping	0.83	0.49	413.25



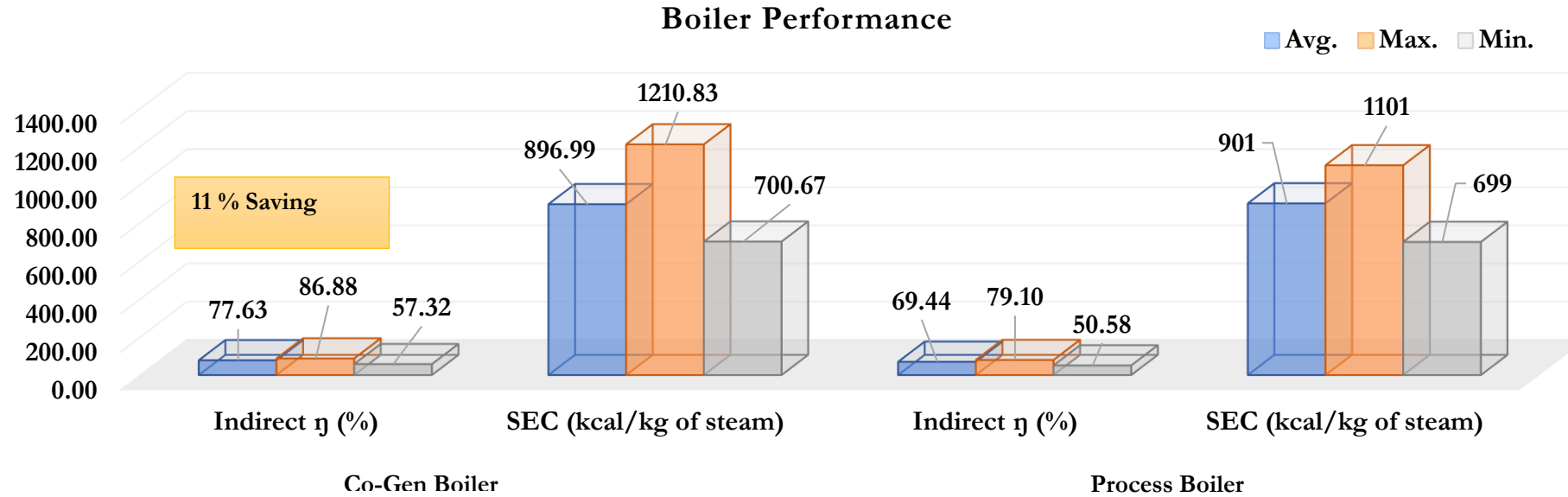
Paper Machine Performance (FY 2023-24)



Overall Paper Machine Performance (Wt. Avg. Basis)			
Type	MP Steam(T/t)	LP Steam(T/t)	Power (kwh/t)
W&P Paper	0.71	2.06	550.89
PB & KP Paper	0.39	2.06	478.25
SP Paper	1.56	2.32	1172.13
NP Paper	0.07	1.75	542.87



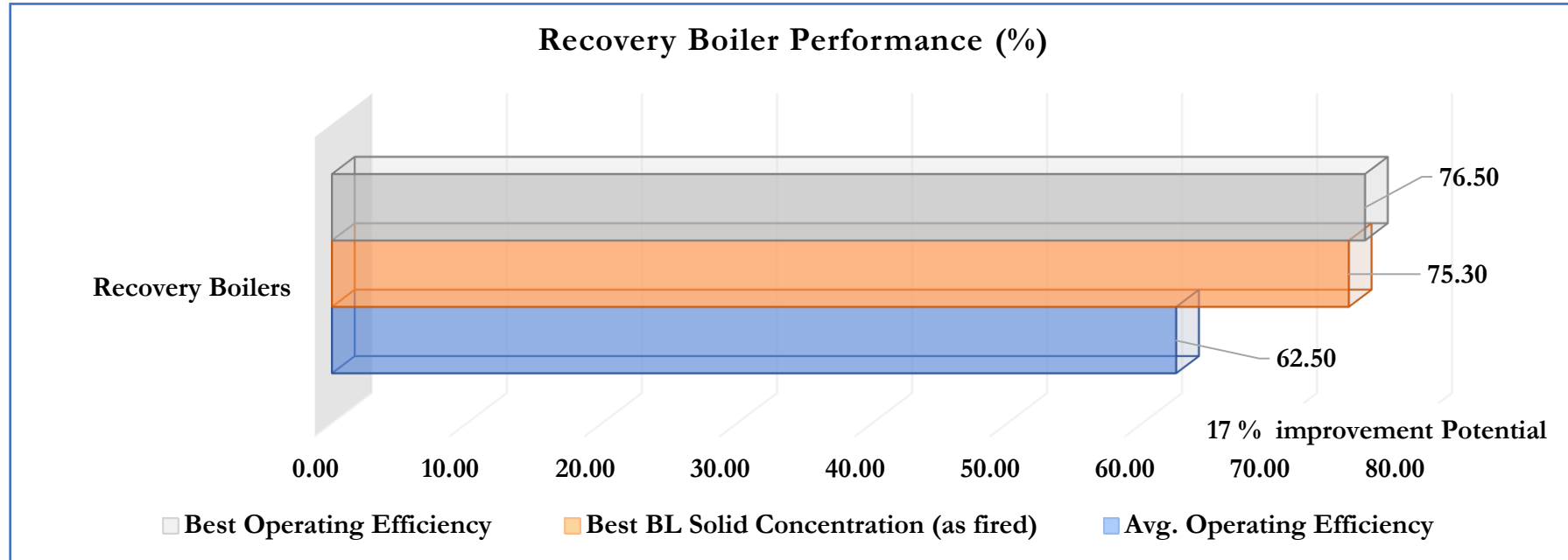
Utility Performance (FY 2023-24)



	Co-Gen Boilers		Process Boiler	
	Indirect η (%)	SEC (kcal/kg of steam)	Indirect η (%)	SEC (kcal/kg of steam)
Avg.	77.63	896.99	69.44	901
Max.	86.88	1210.83	79.10	1101
Min.	57.32	700.67	50.58	699



Utility Performance (FY 2023-24)



Item	Recovery Boilers	Saving Potential
	%	%
Avg. Operating Efficiency	62.50	17.00%
Best BL Solid Concentration (as fired)	75.30	
Best Operating Efficiency	76.50	

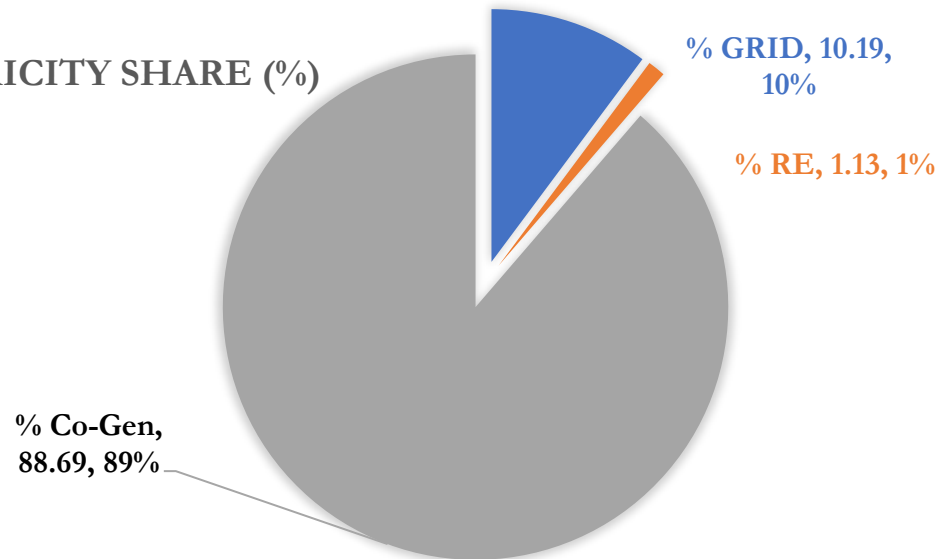


Electricity (FY 2023-24)



Item	Electricity							
	GRID			Co-Gen				
	DISCOM (Lakh kwh)	RE (Wheeling) (Lakh kwh)	Eq. DISCOM Energy (mkcal)	Installed Capacity (MW)	Annual Generation (Lakh kwh)	Annual Running (Hrs.)	Heat Rate (kcal/kwh)	Thermal Energy % in Process
Total	6893.45	761.75	607470.73	1172.75	60004.47	284751.95		
Avg.	186.31	126.96	17356.31	30.86	1579.06	7696.00	2873.86	0.63
Max	883.98	277.24	68247.02	135.00	6322.60	8739.17	4927.00	0.90
Min	1.93	2.20	166.06	2.50	38.10	825.00	951.24	0.48

ELECTRICITY SHARE (%)



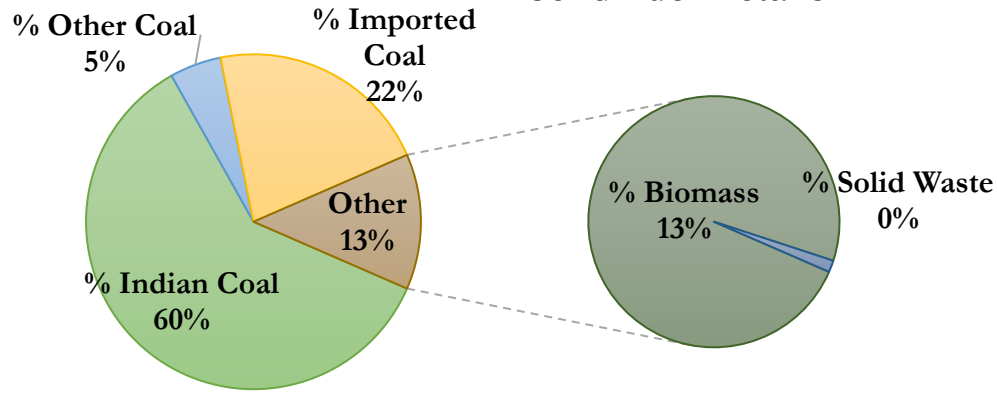
☐ ~ 15.65 % Improvement Potential in Co-Gen Heat Rate.



Sectoral Fuel Mix (FY 2023-24)

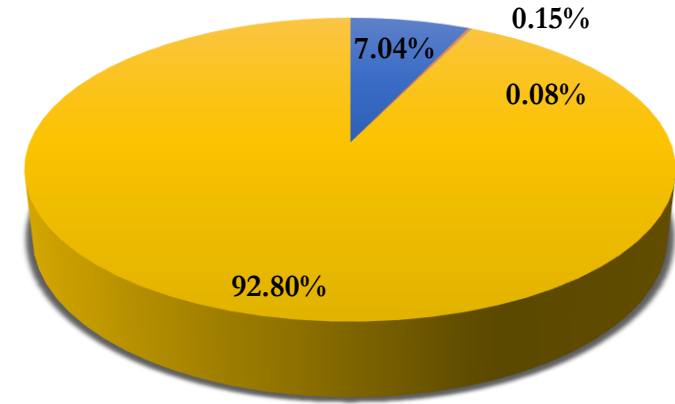


Solid Fuel Details

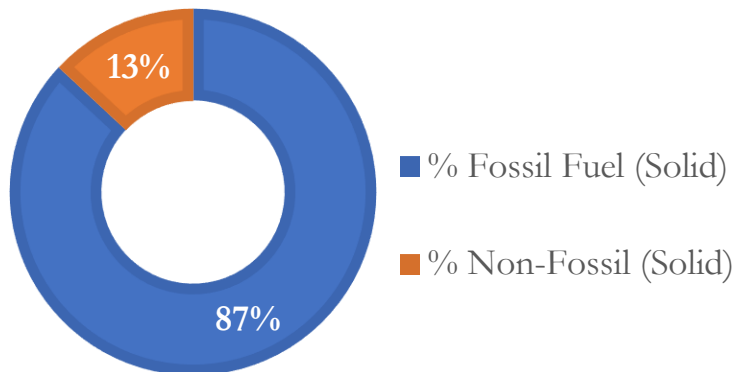


■ % Indian Coal ■ % Other Coal ■ % Imported Coal
 ■ % Biomass ■ % Solid Waste

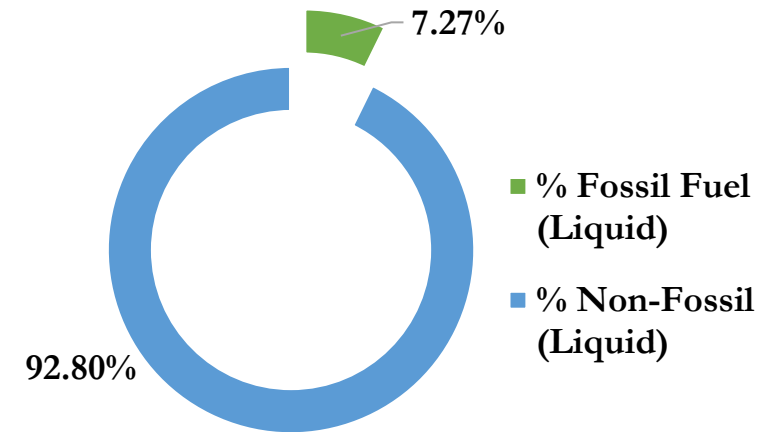
Liquid Fuel Details



■ % FO ■ % HSD ■ % LDO ■ % Black Liquor



■ % Fossil Fuel (Solid)
 ■ % Non-Fossil (Solid)



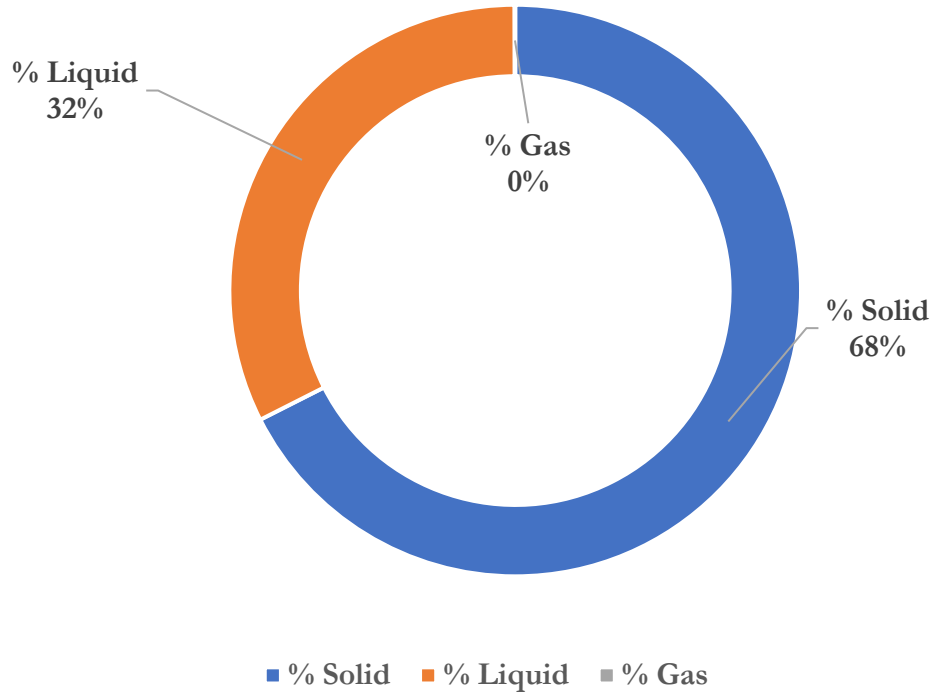
■ % Fossil Fuel (Liquid)
 ■ % Non-Fossil (Liquid)



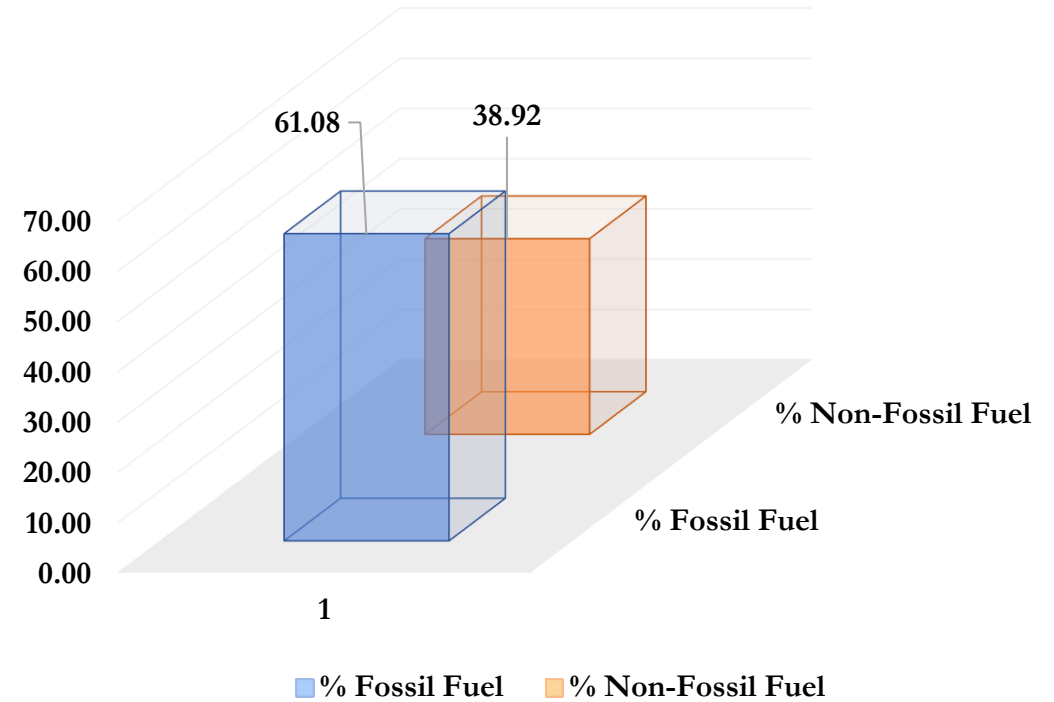
Overall Fuel Mix (FY 2023-24)



Sectoral Fuel Mix Pattern



Sectoral Fossil & Non-Fossil Share



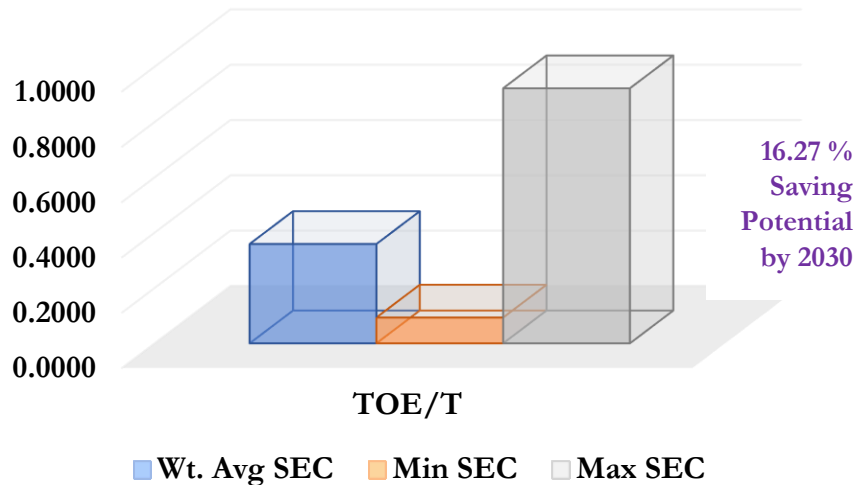


SEC & SGE Performance (FY 2023-24)



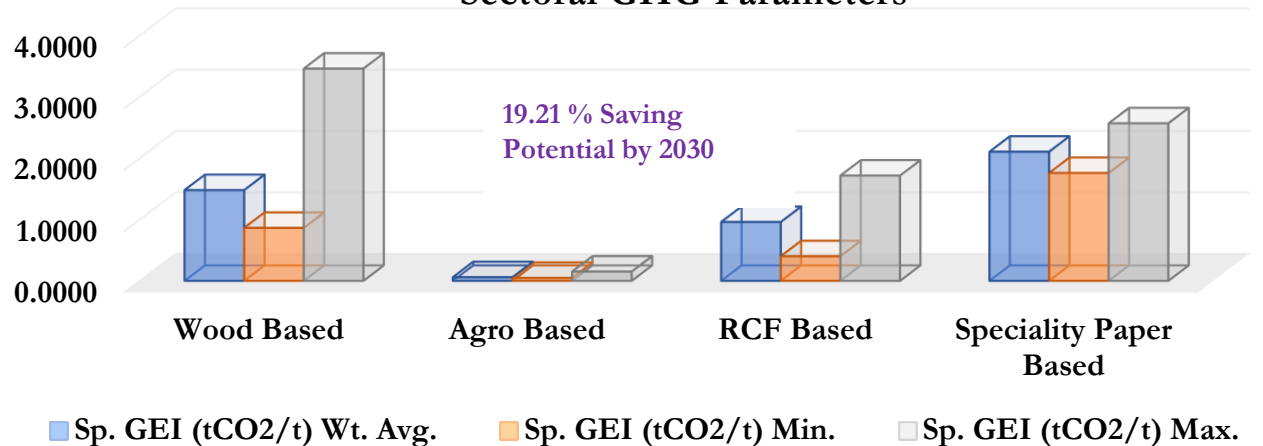
Overall Sectoral Performance (Energy)		
Item	TOE/T	% Saving Potential (Energy)
Wt. Avg SEC	0.3591	16.27
Min SEC	0.0932	
Max SEC	0.9222	

Sectoral SEC



Overall Sectoral Performance (GHG Emission)				
Sp. GEI (tCO ₂ /t)				Major Product
Category	Wt. Avg.	Min.	Max.	
Wood Based	1.4791	0.8631	3.4587	WP, PB&KP
Agro Based	0.0592	0.0473	0.1511	WP, PB&KP
RCF Based	0.9590	0.4010	1.7149	PB & KP, NP
Speciality Paper Based	2.1042	1.7576	2.5675	SP
Overall Sectoral	1.2296	0.4010	3.4587	WP, PB&KP
Overall Saving Potential w.r.t. Wt. Avg. Analysis				19.21%

Sectoral GHG Parameters

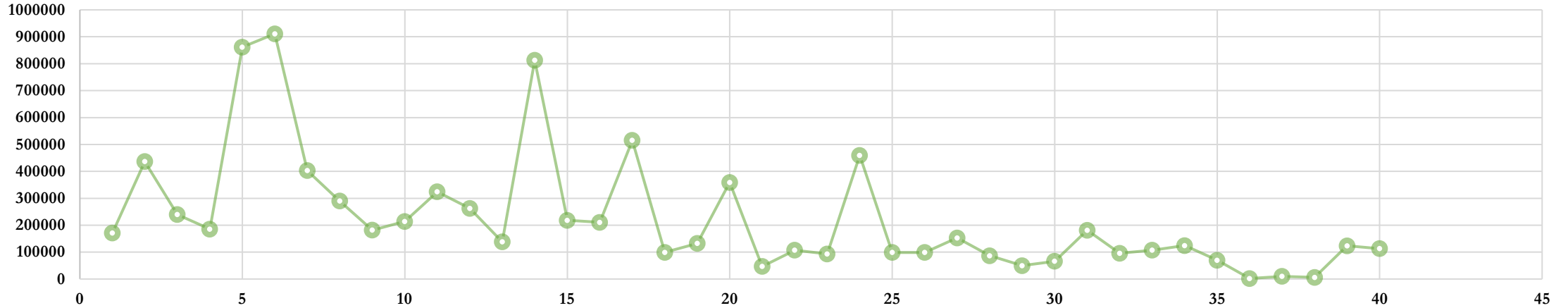




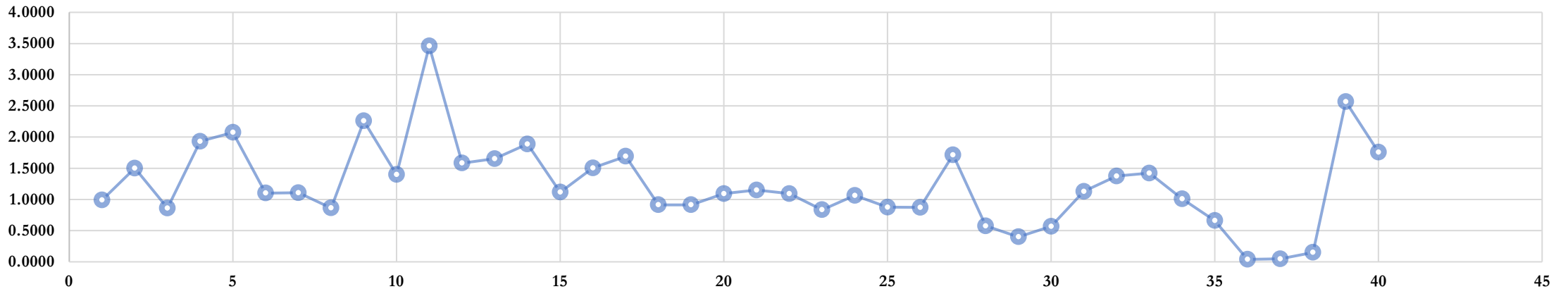
Existing Plants GHG Profile (FY 2023-24)



Total GHG Emission tCO₂eq



Sp. GHG Emission Intensity tCO₂eq/t





Summary



- ❑ ~10-12 % Efficiency Improvement Scope in Co-Gen/Process Boilers.
- ❑ ~17 % Efficiency Improvement Scope in Co-Recovery Boilers.
- ❑ ~16 % Heat Rate Improvement Scope in Heat Rate.
- ❑ ~16.27 % Scope of Improvement in SEC.
- ❑ ~ 19.21 % Scope of Improvement in SGE
- ❑ Present RE share is 1.13 % = Scope of enhancement.
- ❑ 23 % more biomass share may be added in current fuel mix.

No Technology Upgradation Required as the improvement requires in existing system

RE Share, Technology Upgradation, OEM Collaboration, Policy Level Interventions etc. will be required to achieve by FY 2030 from BY 2023-24



CCTS – Proposed Approach for Target Setting



Compliance Mechanism – GHG Coverage



- **GHGs to be included** : CO₂ and PFC
- CO₂ – From fuel combustion and process emissions
- PFC – From aluminium smelting operations
- GHGs to be converted into CO₂e by using GWP as referred in India Biennial Update report to UNFCCC

Rationale for not including CH₄ and N₂O:

- Currently CH₄ and N₂O currently not been monitored
- Even if to include – will require to apply default factors
- E.g. – EU ETS Covers – CO₂, N₂O (Nitric Acid) and PFC
- Other gases contribution minimum in overall emissions

Proposed GHGs to be covered

GHGs	Combustion	Process
CO ₂	Yes	Yes
CH ₄	No	-
N ₂ O	No	-
PFC	-	Yes

Direct and Indirect Definition – ISO 14064-1: 2018



Emissions to be considered



- (i) **Direct GHG emissions** are emissions from sources that are owned or controlled by the obligated entity and includes emissions from combustion of any type of fuel (fossil) burnt in stationary (fixed) equipment, such as boilers, gas turbines, kiln, or furnaces to generate heat, mechanical work, and steam.
- (i) **Direct process emissions** from industrial processes means emissions other than combustion emissions occurring because of chemical reactions between substance or their transformation
- (ii) **Indirect GHG emissions** means GHG emissions that are a consequence of the activities of the obligated entity but occurred at sources outside the obligated entity establishment and shall include – indirect emissions from electricity purchased from grid, and emissions from electricity and heat imported outside plant boundary.

Note: GHG emission intensity targets within 2024-27 for the obligated entities shall be calculated only on the basis of emission related to sources as (i) and (iii) highlighted above, subsequently targets will be calculated based on (i), (ii) and (iii)

As per GHG Protocol	Covered under CCTS	Terminology used in CCTS
Scope 1	Yes	Direct
Scope 2	Yes	Indirect
Scope 3	No	-



GHG Emission Trajectory



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

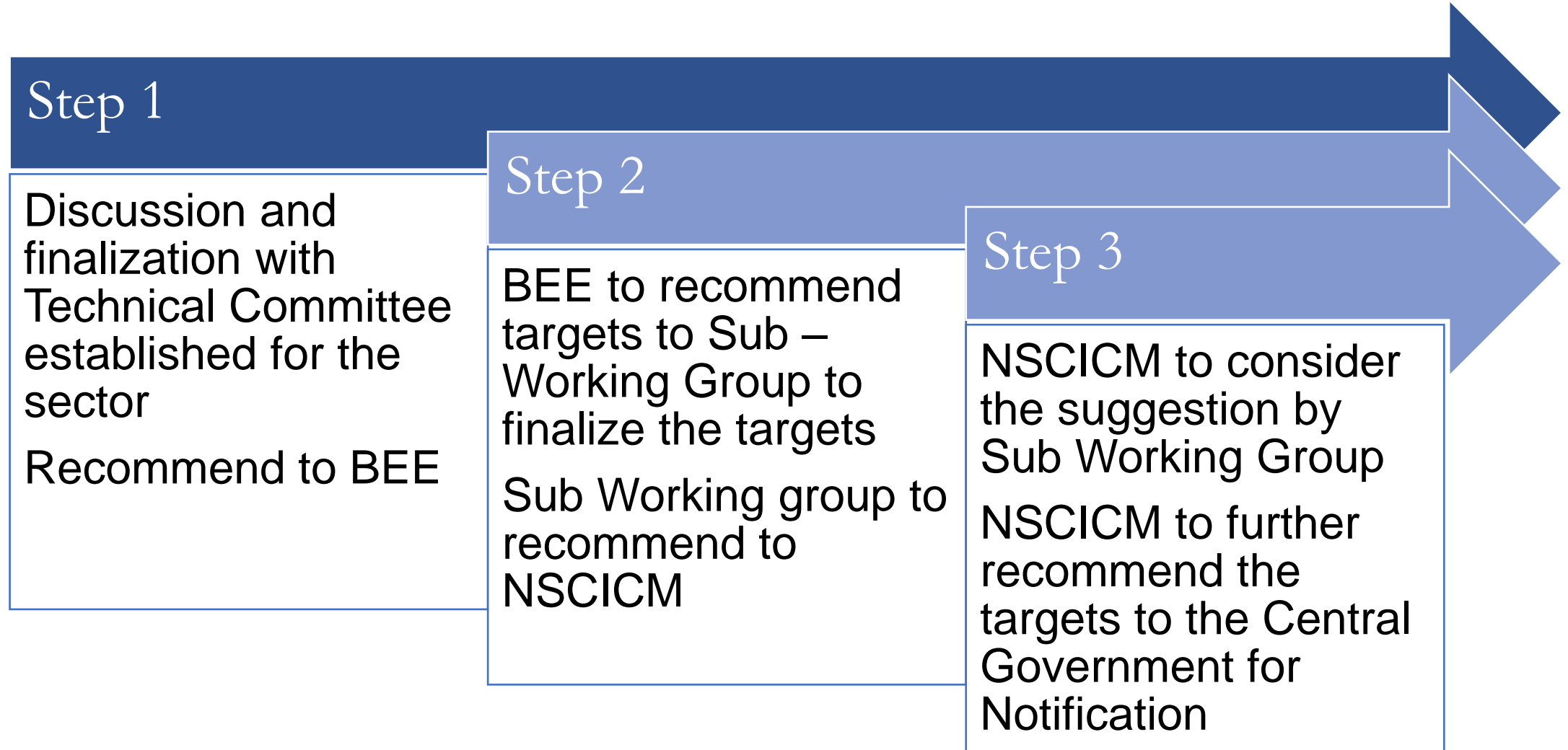
- a) India's nationally determined contribution commitments.
- b) Potential for fuel switch, use of non-fossil fuel energy/feedstock and decarbonisation in the sector.
- c) Available technology and associated cost of their implementation.

Technical Potential

Economic Potential

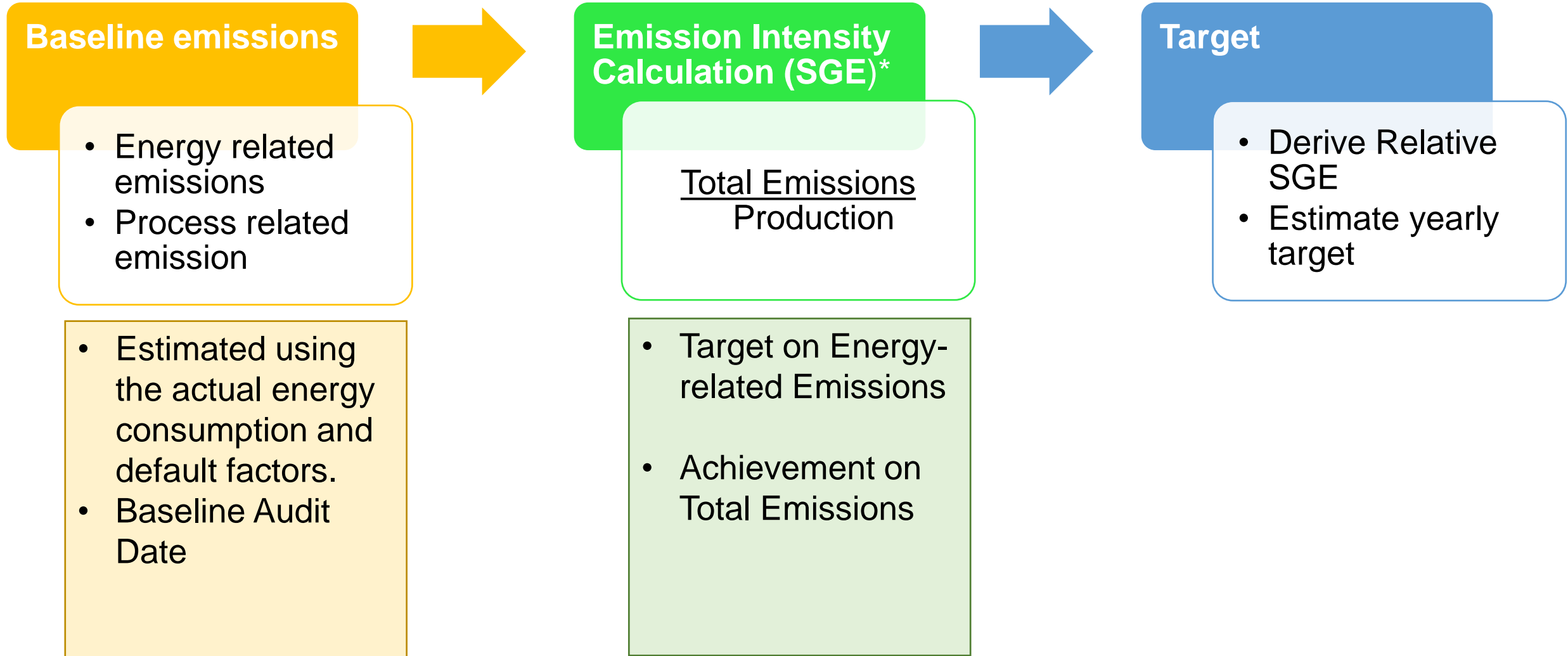


Procedure for Target





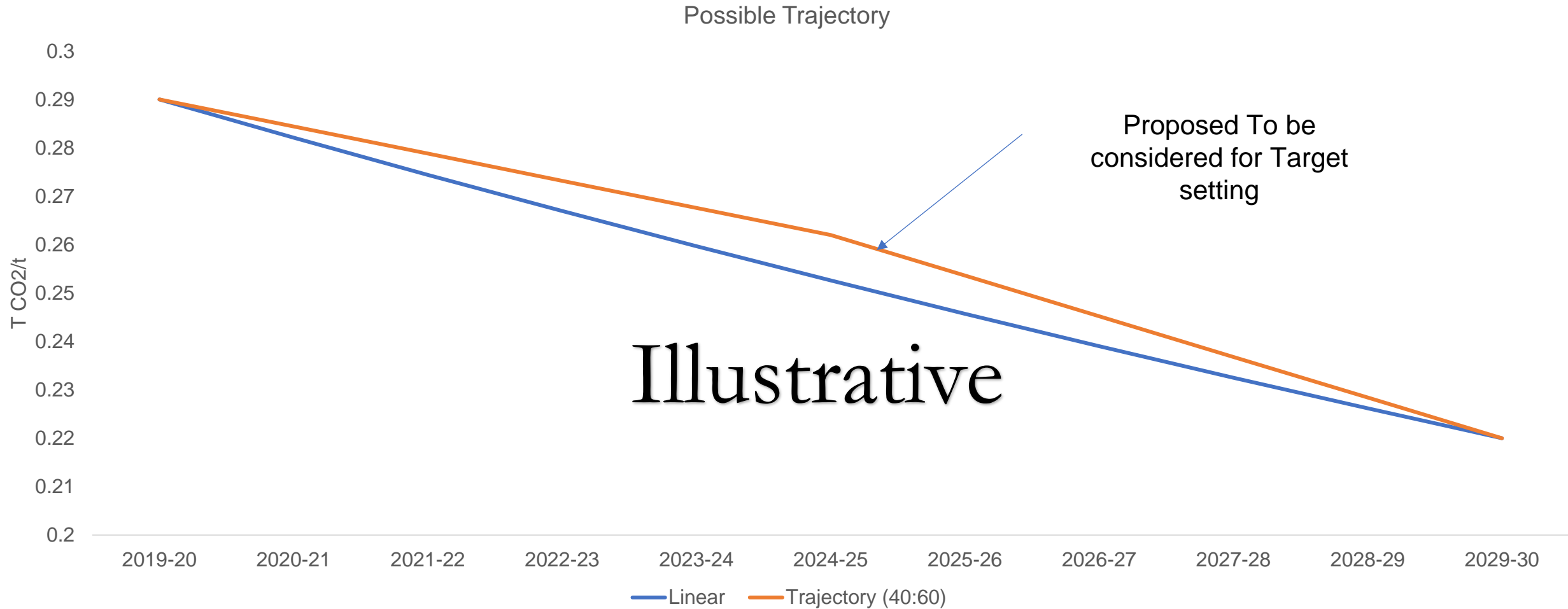
Target Setting Approach



*SGE – Specific GHG Emissions



Possible Trajectory





Step 1 – Baseline Emissions



Unit	GHG Emission - energy (t CO2)	GHG Emission - process (t CO2)	Total GHG Emissions (t CO2)
Unit 1	245,688	No Process emissions Illustrative	245,688
Unit 2	803,310		803,310
Unit 3	870,904		870,904
Unit 4	345,629		345,629
Unit 5	309,933		309,933
Unit 6	363,991		363,991
Unit 7	899,950		899,950
Unit 8	940,885		940,885
Unit 9	347,798		347,798
Unit 10	1,132,859		1,132,859
Unit 11	435,181		435,181
Unit 12	187,243		187,243
Unit 13	215,975		215,975



Step 2 – Emission Intensity – Baseline



Unit	Production (t)	SGE - Energy (t CO2/t)	SGE Process (t CO2/t)	SGE Total (t CO2/t)
Unit 1	621,629	0.395		0.395
Unit 2	2,803,293	0.287		0.287
Unit 3	3,027,000	0.288		0.288
Unit 4	1,086,642	0.318		0.318
Unit 5	782,419	0.396		0.396
Unit 6	966,642	0.377		0.377
Unit 7	3,122,673	0.288		0.288
Unit 8	2,810,708	0.335		0.335
Unit 9	1,065,680	0.326		0.326
Unit 10	5,121,175	0.221		0.221
Unit 11	2,024,572	0.215		0.215
Unit 12	630,578	0.297		0.297
Unit 13	577,173	0.374		0.374

Illustrative



Step 3 – Calculate Relative SGE & % Target



Obligated Entity	Baseline SGE (tCO ₂ /t) – only energy component	Relative SGE with respect to best	Target Calculation	% Reduction
Unit 11	0.215	1	1.0X	6.64%
Unit 10	0.221	1.03	1.03X	6.82%
Unit 2	0.287	1.33	1.3X	8.86%
Unit 3	0.287	1.34	1.3X	8.86%
Unit 7	0.288	1.34	1.3X	8.89%
Unit 12	0.297	1.38	1.4X	9.17%
Unit 4	0.318	1.48	1.5X	9.82%
Unit 9	0.326	1.52	1.5X	10.06%
Unit 8	0.335	1.56	1.6X	10.34%
Unit 13	0.374	1.74	1.7X	11.55%
Unit 6	0.377	1.75	1.8X	11.64%
Unit 1	0.395	1.84	1.8X	12.19%
Unit 5	0.396	1.84	1.8X	12.23%

Illustrative

SGE – Specific GHG emission

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



Step 4 – Yearly Targets for GHG Reduction



Obligated Entity	Baseline GHG intensity	Target - Year 1 (20%)	Target Year 2 (35%)	Target Year 3 (45%)
Unit 1	0.395	Illustrative	0.385	0.369
Unit 2	0.287		0.282	0.273
Unit 3	0.287		0.282	0.273
Unit 4	0.318		0.312	0.301
Unit 5	0.396		0.386	0.369
Unit 6	0.377		0.368	0.353
Unit 7	0.288		0.283	0.274
Unit 8	0.335		0.328	0.316
Unit 9	0.326		0.319	0.308
Unit 10	0.221		0.218	0.213
Unit 11	0.215		0.212	0.207
Unit 12	0.297		0.292	0.282
Unit 13	0.374		0.365	0.350
Wt. Average	0.288	0.282	0.273	0.261

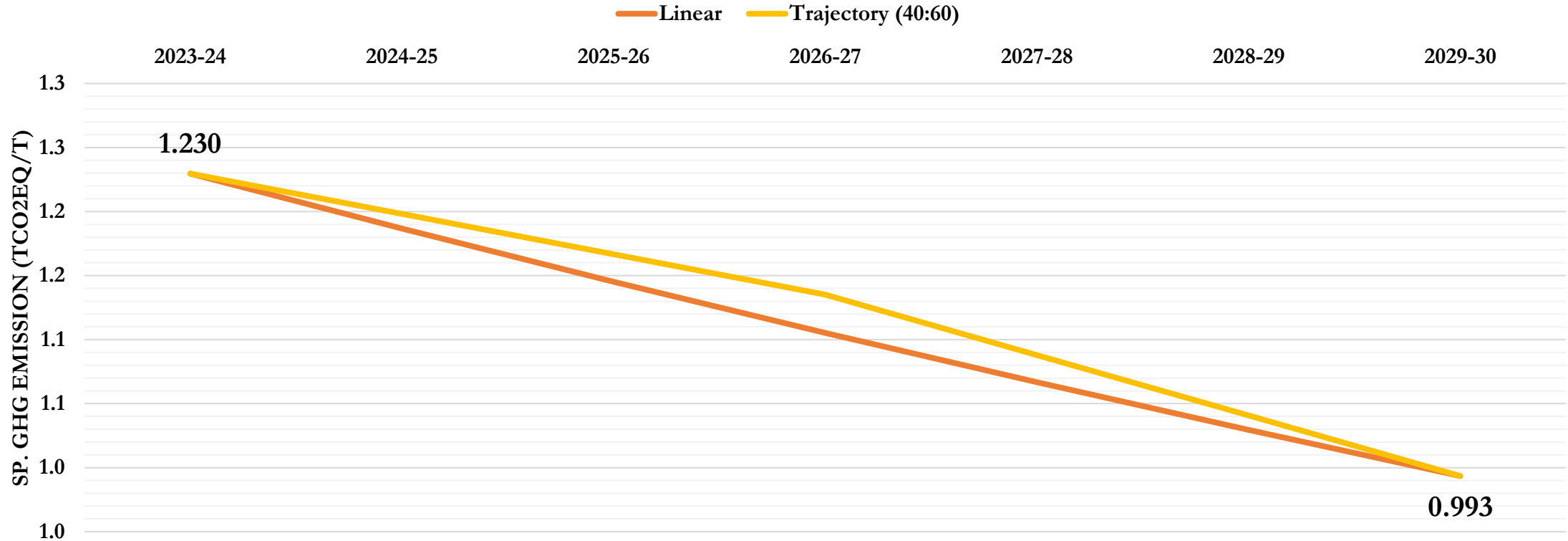
All units in t CO₂e/t -



Trajectory for Pulp & Paper Sector



Sectoral Target Trajectory (FY 2023-30)



Annual GHG Intensity Reduction of 2.74% till trajectory period 2029-30



Way Forward for Pulp & Paper Sector



FY 2024-25



- Baseline Emission & Energy Audit
- Feasibility Study for RCF Based Mill

FY 2025-26



- Study: Net Zero Path for Pulp & Paper Sector
- Study: Technology Mapping for CCTS



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