AFRICAN DEVELOPMENT BANK GROUP
GROUPE DE LA BANQUE AFRICAINE DE DÉVELOPPEMENT

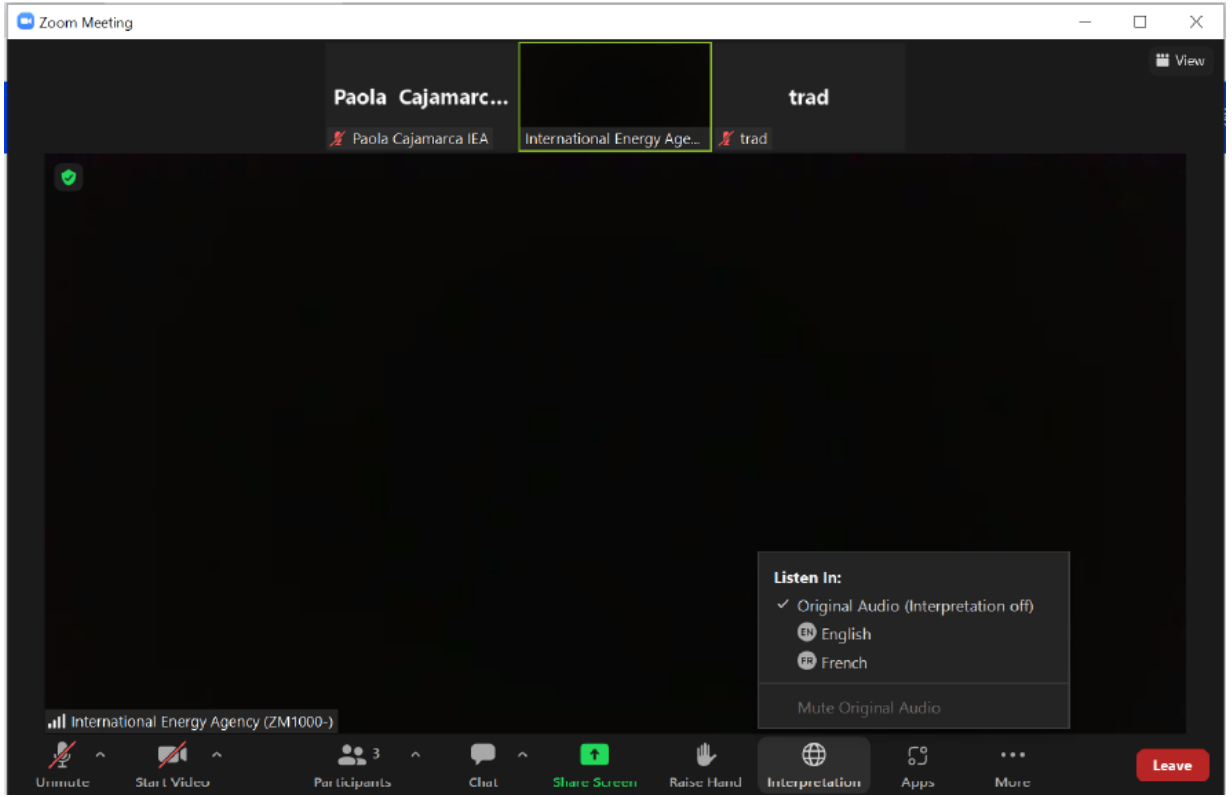
Introduction to Energy Efficiency Policy Packages for Sub Saharan Africa Training Week – Industry Day

21 to 25 November 2022

International Energy Agency

Housekeeping rules

- Please keep in mind that this event is both in French and English and that translation is available.
- Please keep your mics **on mute**, and leave your camera on if you are able to.
- Do not hesitate to ask questions through the chat and we will try to address them if time allows.In case of technical issues please contact us through the chat or send us an email at: energy.efficiency@iea.org
- We will be engaging through menti polls and encourage everyone to participate.



Regional Training on Energy Efficiency Policy Packages for Sub Saharan Africa

21-25 November 2022

Day 4 – Industry

AFRICAN DEVELOPMENT BANK GROUP
GROUPE DE LA BANQUE AFRICAINE DE DÉVELOPPEMENT

Melanie Slade

Senior Programme Manager
Energy Efficiency Division IEA

Day 3: Industry Speakers

Hugo Salamanca
Policy Analyst
Energy Efficiency in Emerging Economies (E4)
International Energy Agency

Saurabh Diddi
Director of Bureau of Energy Efficiency (BEE),
Ministry of Power,
India

Stalin Ndlovu
Senior Advisor
Measurement & verification,
South African National Energy Development Institute (SANEDI)

Engr. Okon Nsekenyin Ekpenyong
Director,
Energy Commission,
Nigeria

Programme for today

Training Day 4:

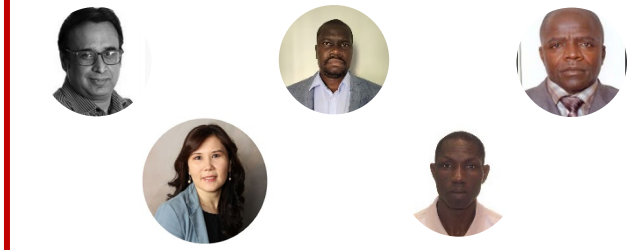
- Opening presentation 
- International best-practice: India 
- Country focus: South Africa 
- Country focus: Nigeria 

Nurzat Myrsalieva

United Nations Industrial Development Organisation (UNIDO)

Charles Diarra
ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE)

PANEL DISCUSSION



MENTI #1 & 2

1. In one or two words describe what is the first thing that comes to your mind when you think about energy efficiency in Industry?

2. Adopting your country's industry point of view, what would be the main reason to improve energy efficiency?

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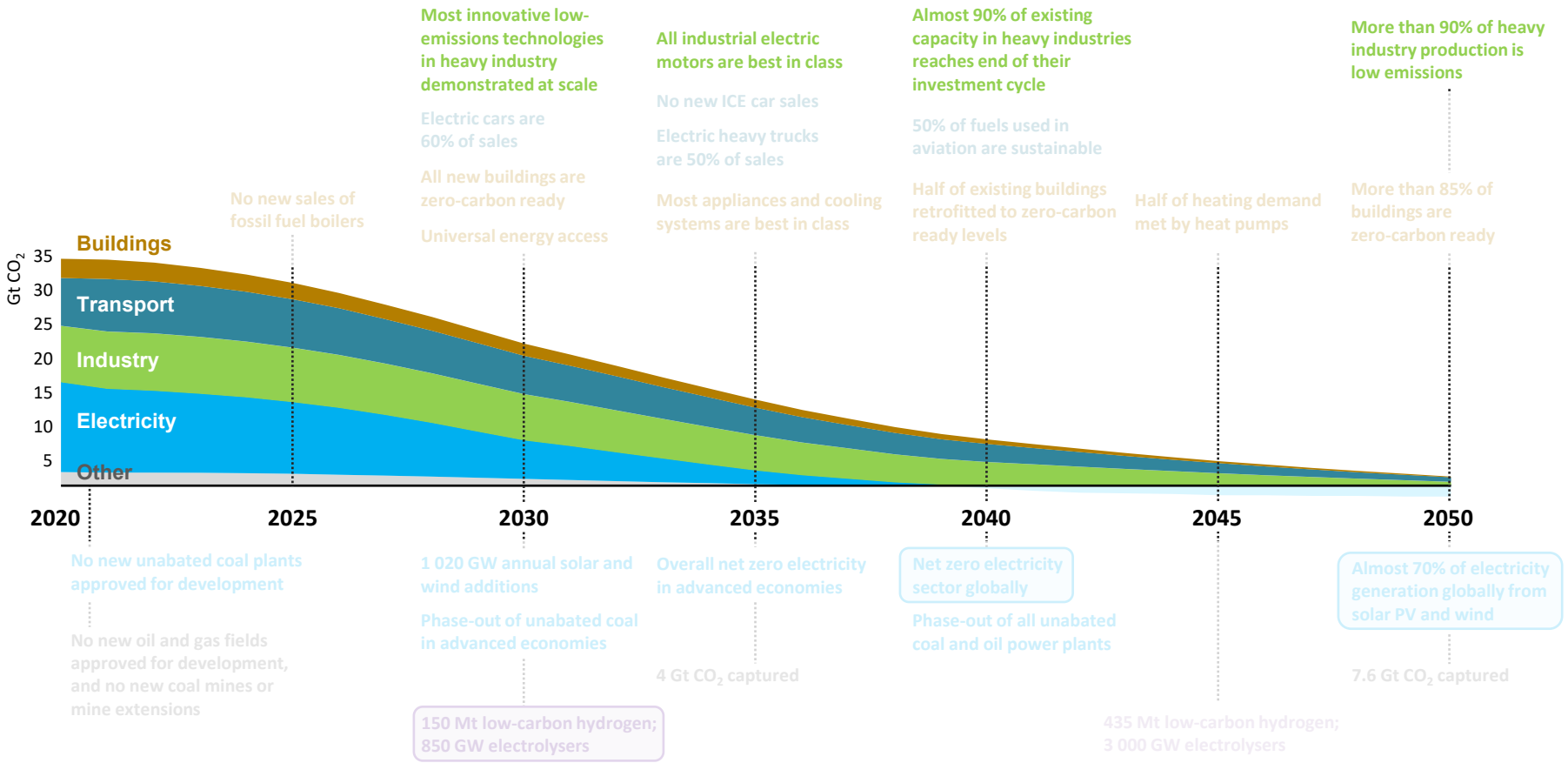
Introduction to Industry Energy Efficiency Policy Package in Sub Saharan Africa

Hugo Salamanca

24 November 2022

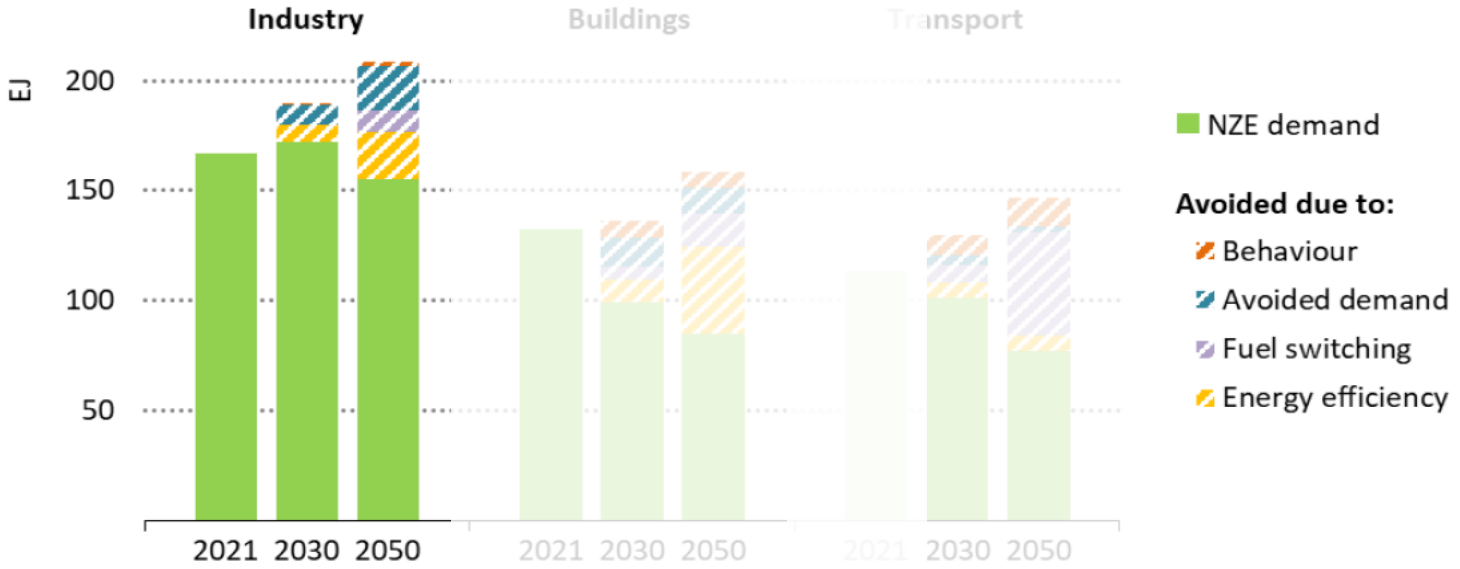
International Energy Agency

Emissions in industry in IEA's Net Zero scenario



Net Zero by 2050
https://www.iea.org/reports/net-zero-by-2050

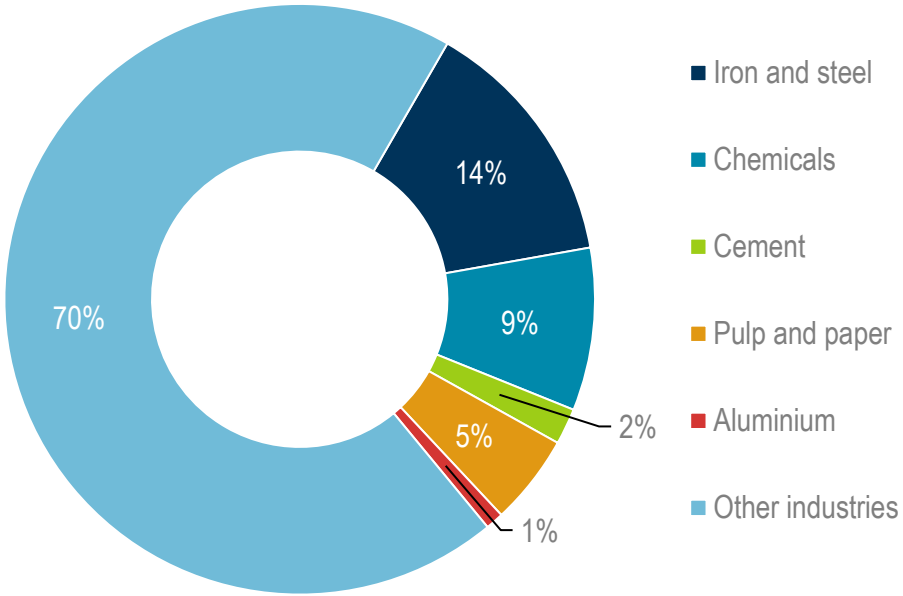
Total final consumption in the STEPS and demand avoided by measure in the NZE Scenario



Around 40% of emissions savings in 2030 occur in industry because of improvements in materials efficiency and increased recycling, with the biggest impacts coming from reducing waste and improving the design and construction of buildings.

Efficiency can improve across all industry sub-sectors

Percentage improvement in energy intensity by industry sub-sector (left) contribution to total energy savings in 2040 (right)



Energy efficiency improvements are possible across all sub-sectors.
Light industry (e.g. food beverage and textile manufacturing) represent the bulk (70%) of savings

Policy Package for industry

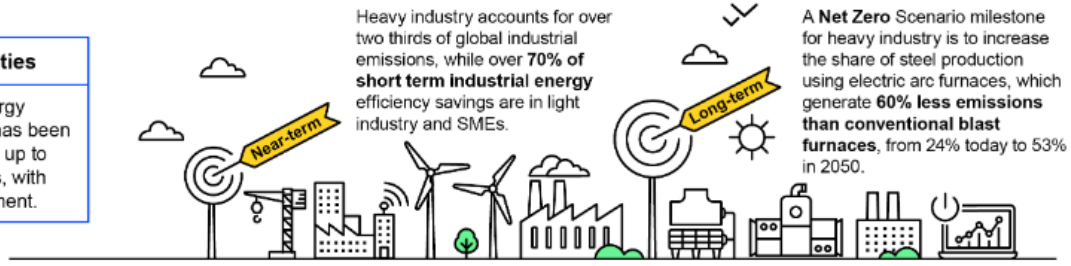
Industry Energy Efficiency Policy Package

Immediate opportunities

Implementing better energy management practices has been shown to deliver savings up to 15% in the first 1-2 years, with little or no capital investment.

Heavy industry accounts for over two thirds of global industrial emissions, while over **70% of short term industrial energy** efficiency savings are in light industry and SMEs.

A **Net Zero** Scenario milestone for heavy industry is to increase the share of steel production using electric arc furnaces, which generate **60% less emissions than conventional blast furnaces**, from 24% today to 53% in 2050.



REGULATION

- **Minimum Energy Performance Standards** for key equipment, such as motors and pumps, can drive up overall industrial efficiency levels.
- **Regulation to reduce energy use** extends beyond technology to target areas such as research and development, energy auditing, mandatory consumption reporting, energy management systems, and upskilling of the workforce.
- **Regulatory Instruments** yield best results when rooted in a good understanding of local context and include ambitious, regularly updated, standards.

INFORMATION

- **Benchmarking, indicators and other forms of detailed data**, allow governments to track the progress and success of policies and allow industries assess their energy performance, compare it to that of their peers and establish key areas for intervention.
- **Digital technologies** enable industries to track energy use in real time and unlock substantial energy and cost saving opportunities.
- **Sharing information on energy efficiency best practice** and industrial energy transition, through industry networks, helps industries raise ambition and improve energy performance.

INCENTIVES

- **Incentives** such as preferential finance, links to carbon trading, obligations and tax based measures can motivate crucial energy efficient decisions at the process design and equipment selection stage, supporting industry transition to near zero emission technologies.
- **Free or subsidised energy audits**, often targeted at SMEs and other sectors of strategic importance, can help rapidly increase energy efficiency.
- **Policies to foster Energy Service Companies** provide industry with access to significant external energy expertise and attractive structured financial packages.

Mandatory regulation

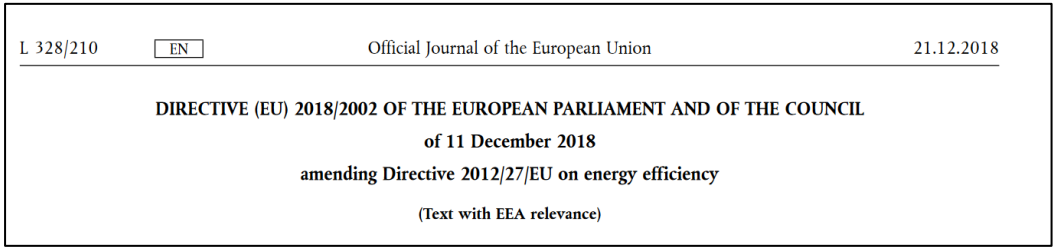
- **Energy audits and energy management systems:** regulations to require the main energy consumers to carry out energy audits or implement energy management systems (EnMS).
- **Mandatory data reporting:** regulations can require selected industries to report energy consumption data.
- **Minimum energy performance standards (MEPS)** for specific equipment: electric motors, pumps.

Obligations

- **Sector specific targets:** regulation for specific industries sub sectors or large energy users can be developed
- **Specific energy efficiency requirements** could be established for new built industry plant: so as to ensure the best processes are developed right from the beginning.

Example of Regulations

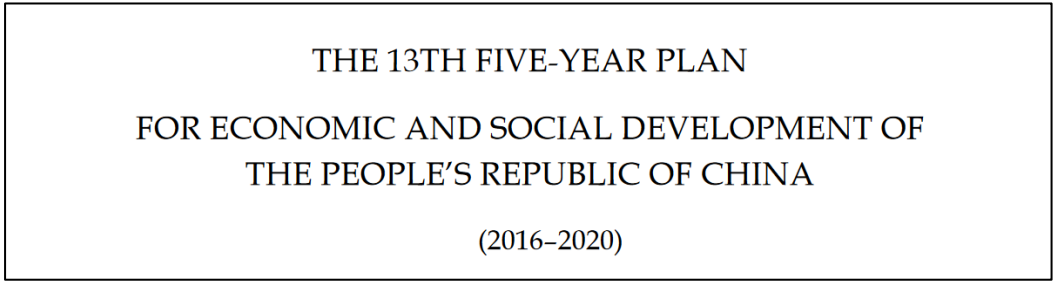
The EU: the EU has set specific directives concerning energy efficiency setting obligations on energy savings to be achieved by member states covering all end uses. Specific requirements are set for large industries.



L 328/210 EN Official Journal of the European Union 21.12.2018

DIRECTIVE (EU) 2018/2002 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 11 December 2018
amending Directive 2012/27/EU on energy efficiency
(Text with EEA relevance)

China: China has develop the Top 100 -1000 and 10 000. Under this program, energy consumption targets were determined for each enterprise to be met with specific deadlines.



THE 13TH FIVE-YEAR PLAN

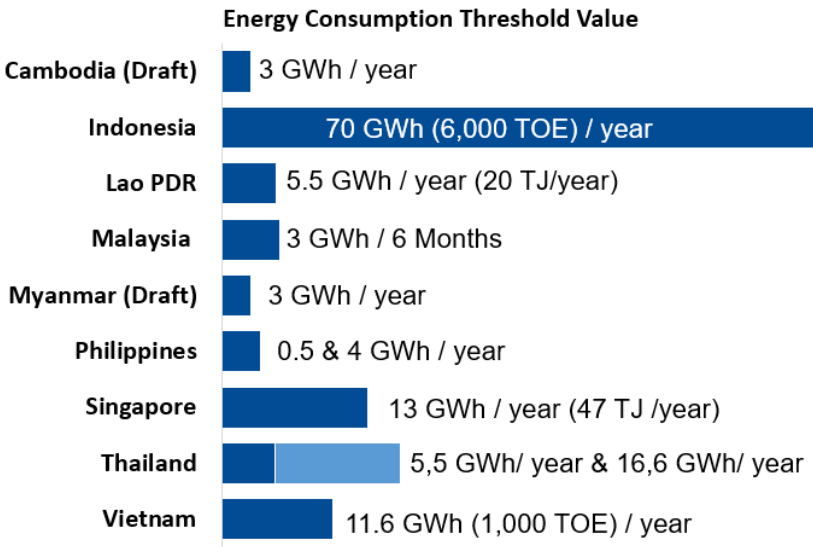
FOR ECONOMIC AND SOCIAL DEVELOPMENT OF THE PEOPLE'S REPUBLIC OF CHINA

(2016–2020)

Example of Regulations

ASEAN

Findings 3: Energy Management System is a common policy for the application of energy efficiency and conservation practices in industry….



- **AMS required the energy intensive factories to implement EMS** in their respective energy efficiency Law, Act, or Decree.
- **The threshold value and units are varied among the countries**. Indonesia has the highest threshold value.
- Philippines and Thailand has set **two types of thresholds**, type 1 and type 2. Each type has different levels of obligation, such as the number of appointed energy managers.

Source : ASEAN Centre for Energy

Data and information

- **Benchmarking indicators:** documentation of most buildings data and information, including basic information, construction materials, systems, renovations and energy use.

Awareness

- **Industry learning networks**: industry networks allow to share best practices and disseminate information

- **Specific websites:** websites that provide industry with the key information on available resources (incentives) to push energy efficiency.

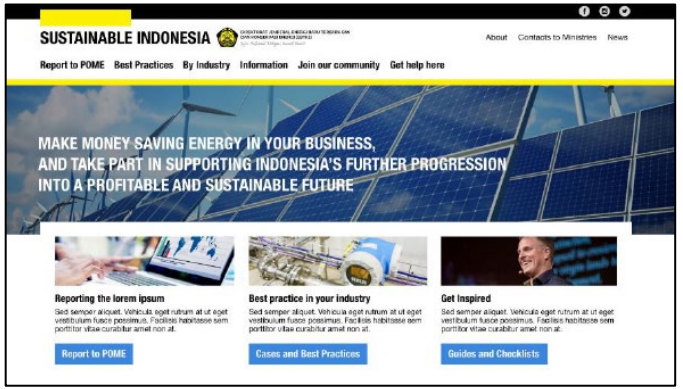
Capacity building

- **Education and training:** for energy efficiency professionals (auditors, energy managers).

Example of Information instruments

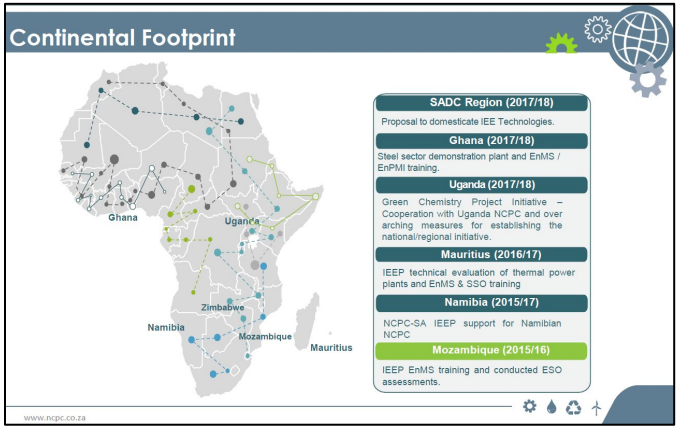
Indonesia:

- Business website: the IEA has been supporting Indonesia's efforts to develop a business website to provide all the relevant information to companies wanting to improve energy efficiency.



South Africa:

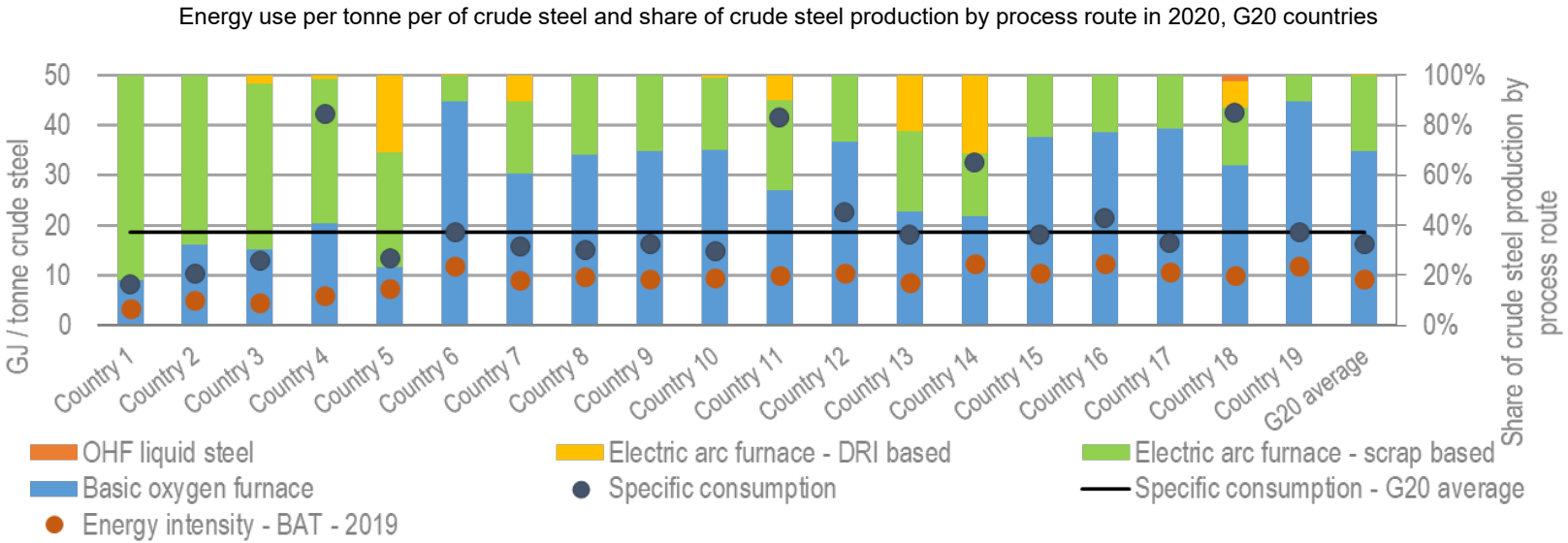
- Capacity building of auditors : To create an enabling environment across the South African industrial sector by mainstreaming Energy Management Systems, Energy Systems Optimization and the Energy Management Standard ISO 50001,to realize increased investment in industrial energy efficiency.



Example of Information instruments

Benchmarking work from IEA:

- The IEA has been working towards more data sharing in energy intensive sectors to be able to highlight best practices and support international goals.



Non-financial incentives

- **Company's image:** with increasing climate targets and ambitions, private companies are now subject to more pressure by society to also commit to climate change goals.

Financial incentives

- **Tax exemptions and discounts:** eg**.** reducing energy taxes for industry complying with specific energy efficiency requirements.

- **White certificates:** white certificates certify a certain reduction in energy consumption has been achieved. These certificates are linked to a market where they can be traded. This measure often goes hand in hand with energy savings obligations.

- **Direct support to specific energy efficient equipment:** eg. developing technology lists to facilitate their uptake on the market.

- **Finance:** eg. enabling private investment, including through loan guarantees, preferential loan terms and increased access to funds.

Example of financial incentives

White certificates and tax incentives in Europe:

- White certificates in France and Italy.
- Tax incentives for ISO 50001 EnMS in Germany.

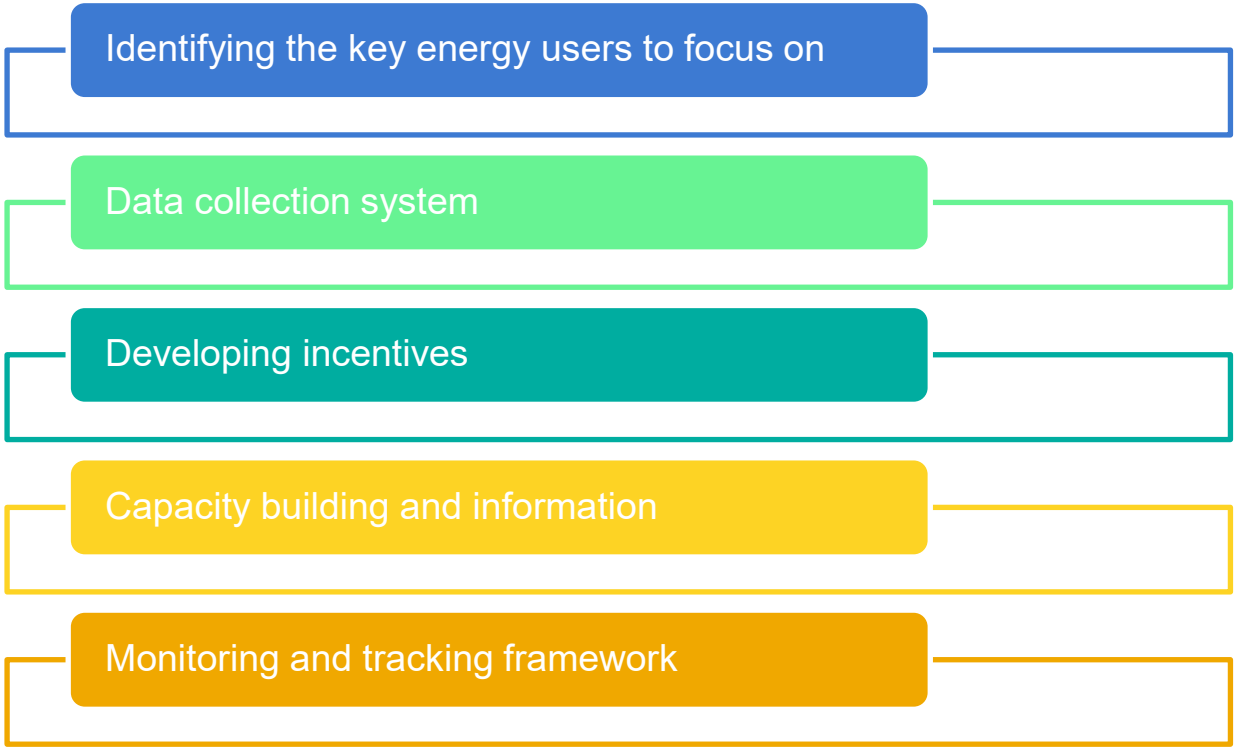
12L tax in South Africa

- Provides an allowance for businesses to implement energy efficiency savings. The savings allow for tax deduction of 95c/kWh saved on energy consumption

Technology lists in the UK

- The Energy Technology List (ETL) is a government approved list of approximately 14,000 energy efficient products. The ETL aims to encourage UK businesses to invest in high performance energy efficient equipment by reducing the financial and transactional costs associated with purchasing energy efficient products.

Recommendations for policy package development



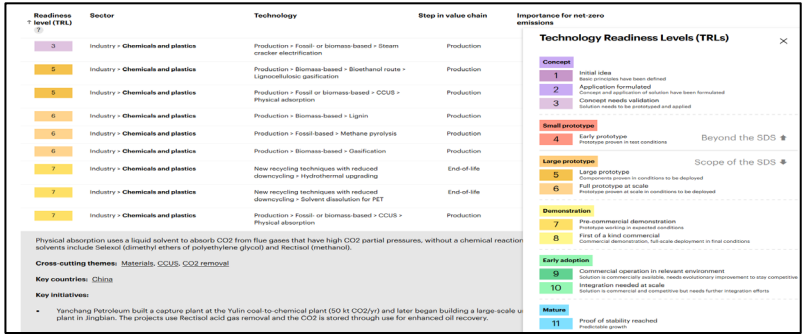
IEA Energy Efficiency in industry resources

Online courses – Energy Efficiency Indicators
- Essentials for Policymakers
- Fundamentals of Statistics

English / Portuguese / Spanish

Open to everyone; enrol any time
https://es.edx.iea.org/courses

ETP Clean Energy Technology Guide



https://www.iea.org/articles/etp-clean-energy-technology-guide

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Saurabh Diddi

Bureau of Energy Efficiency (BEE),
Ministry of Power, India

MENTI #3

3. Please evaluate how strong are the following barriers to improving energy efficiency in industry in your country / region?

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Stalin Ndlovu

South African National Energy Development Institute (SANEDI)

MENTI #4

4. What could be the most important policy instrument to accelerate energy efficiency in industry in your country right now? ?

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Engr. Okon Nsekenyin Ekpenyong

Energy Commission of Nigeria

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Panel Discussion

Saurabh Diddi
Director of Bureau of Energy Efficiency (BEE), Ministry of Power,
India

Nurzat Myrsalieva
Senior Programme Specialist /Energy, Climate Change, and Industry Decarbonization
United Nations Industrial Development Organisation (UNIDO)

Stalin Ndlovu
Senior Advisor Measurement & verification,
South African National Energy Development Institute (SANEDI)

Charles Diarra
ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE)

Engr. Okon Nsekenyin Ekpenyong
Director (Linkages, Research & Consultancy)
Energy Commission, Nigeria

PAT Mechanism

Saurabh Diddi, Director
Bureau of Energy Efficiency
Ministry of Power

About Bureau of Energy Efficiency, India

- The Bureau of Energy Efficiency (BEE) is a statutory body of Government of India, under the Ministry of Power, created in March 2002.

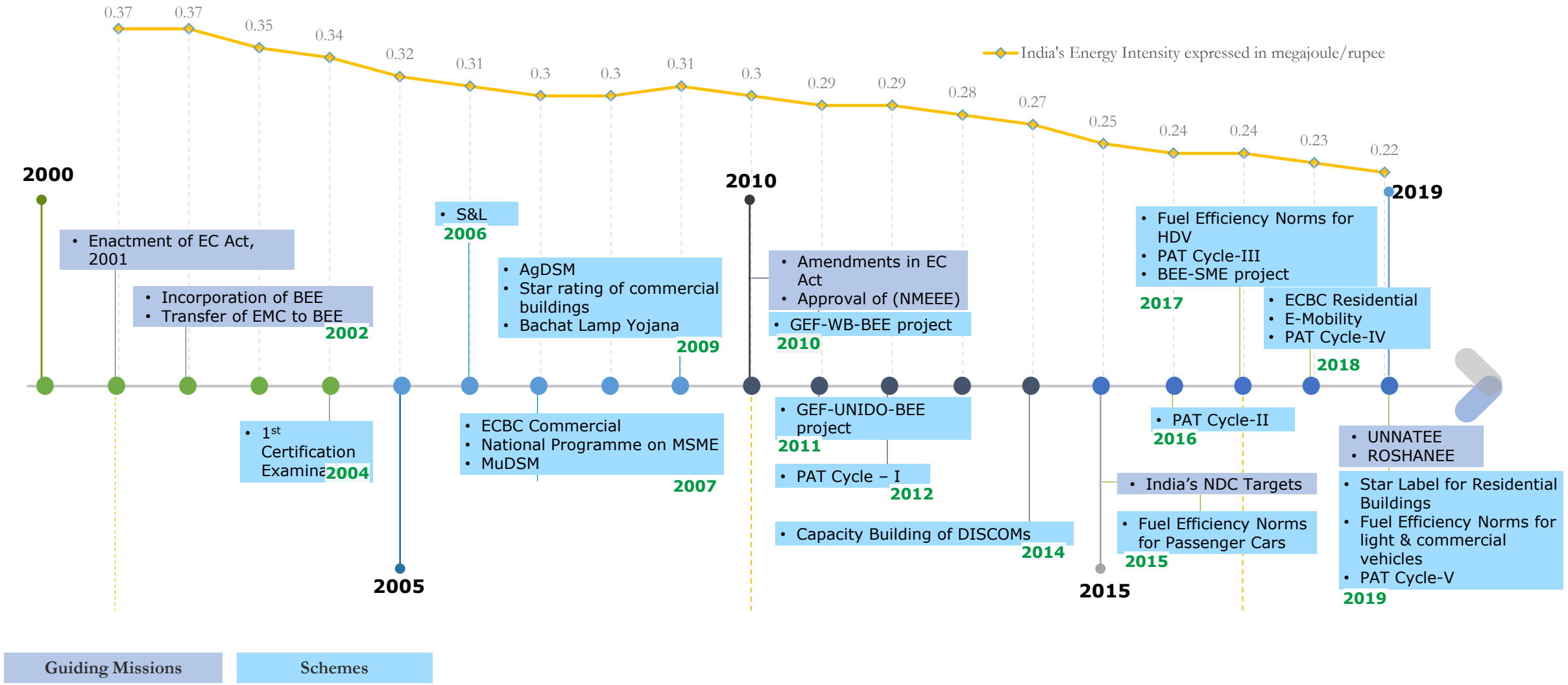
- Energy Conservation Act, 2001 led to its creation to reduce energy intensity of the Indian economy.

- It facilitates and enforces efficient use of energy and its conservation in all sectors.

Mandate of BEE

- Regulatory framework for energy conservation
- Develop policy and programmes
- Establishment of State Designated Agencies
- Creation of Professionals and Awareness

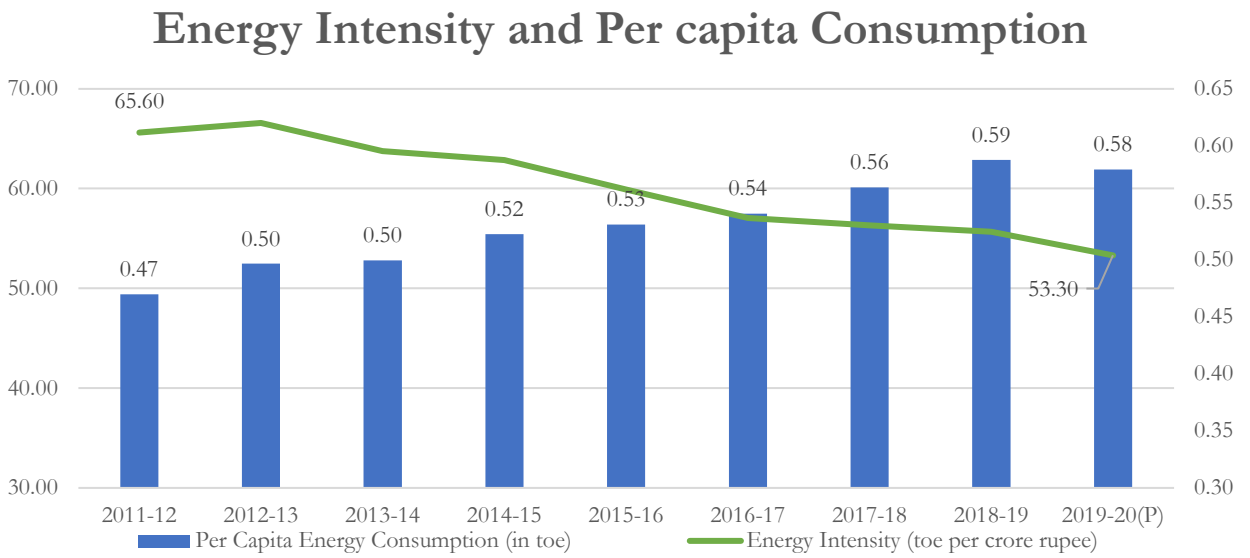
Journey of BEE towards making an Energy Efficient India…



Energy Efficiency Impact (2019-20)

Impact (2019-20)

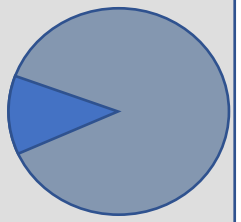
- Annual Electrical energy savings of 145.03 Billion Units, worth INR 87,019 Crores
- Annual Thermal energy savings of 15.587 Million Tonnes of oil Equivalent, worth INR 28,683 Crores.
- Total Annual energy savings of 28.06 Million Tonnes of oil Equivalent i.e. 3.03% of total primary energy supply of the country
- Total cost savings worth INR 115,702 crores approximately
- Total reduction in CO2 emission is around 177.6 Million Tonnes
- Total CO2 reduction including LED bulbs sold by private industry is 310 Million Tonnes.



2010

TPES: 515 mtoe
Electricity: 793 BU
C02: 1583 Mt

Covered by BEE **15%**



Energy Savings

2.5 Mtoe

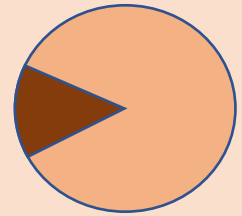
8.7 BU

Energy Audits	Voluntary
Examinations	9000
PAT	Draft stage
Star Labeling (V)	8
Star Labeling (M)	4
Buildings	Commercial
DSM	Agri, Municipal
Other Sectors	Nil

2015

TPES: 661 mtoe
Electricity: 948 BU
C02: 2092 Mt

Covered by BEE **25%**



Energy Savings

12 Mtoe

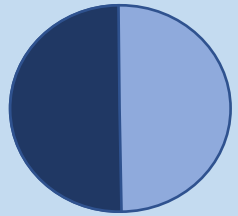
140 BU

Energy Audits	Mandatory
Examinations	13368
PAT(Sector/DC)	8 /478
Star Labeling (V)	11
Star Labeling (M)	8
Buildings	Commercial
DSM	Agri, Municipal, SME
Other Sectors	Transport, DISCOM

2020

TPES: 930 mtoe
Electricity: 1252 BU
C02: 2900 Mt

Covered by BEE **50%**



Energy Savings

28 Mtoe

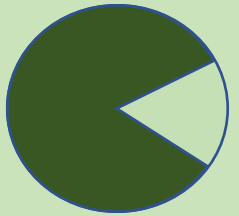
326 BU

Energy Audits	Mandatory
Examinations	19796
PAT (Sector/DC)	13 /1073
Star Labeling (V)	16
Star Labeling (M)	10
Buildings	Comm & Resi.
DSM	Agri, Municipal, SME,DISCOM
Other Sectors	Cooling, Trnsp, EV, Airports

2030

TPES: 1450 mtoe
Electricity: 2455 BU
C02: 5400 Mt

Covered by BEE **75%**



Energy Savings

129 Mtoe

379 BU

Energy Audits	Mandatory
Examinations	50000
PAT(Sector/DC)	20/3000+
Star Labeling (V)	30
Star Labeling (M)	20
Buildings	All Category
DSM	Agri, Municipal, SME,DISCOM
Other Sectors	Cooling, Trnsp, EV, RD, Bat Stg, Hydogen,CCUS

Major Programmes on Energy Efficiency

BEE Programmes

Strengthening Institutional Capacity of Partners

- Strengthening of State Designated Agencies (SDAs)
- International Cooperation

Awareness Programs

- General Awareness
- Energy Conservation Awards
- Painting Competition

Demand Side Management

- Agriculture DSM
- Municipal DSM
- Energy Efficiency in SMEs
- Capacity Building of DISCOMs

National Mission for Enhanced Energy Efficiency (NMEEE)

- Perform, Achieve and Trade (PAT)
- Market Transformation for Energy Efficiency (MTEE)
- Framework for Energy Efficiency Economic Development (FEEED)
- Energy Efficiency Financing Platform (EEFP)

Transport Sector

- Fuel Efficiency Norms
- Plug-in Electric Vehicle (PEV)

Buildings EE

- ECBC Commercial
- ECBC Residential
- Star Labelling of Buildings

Equipment & Appliances

- Standards & Labelling
- Super Energy Efficient Programme (SEEP)

Standards & Labelling Programme

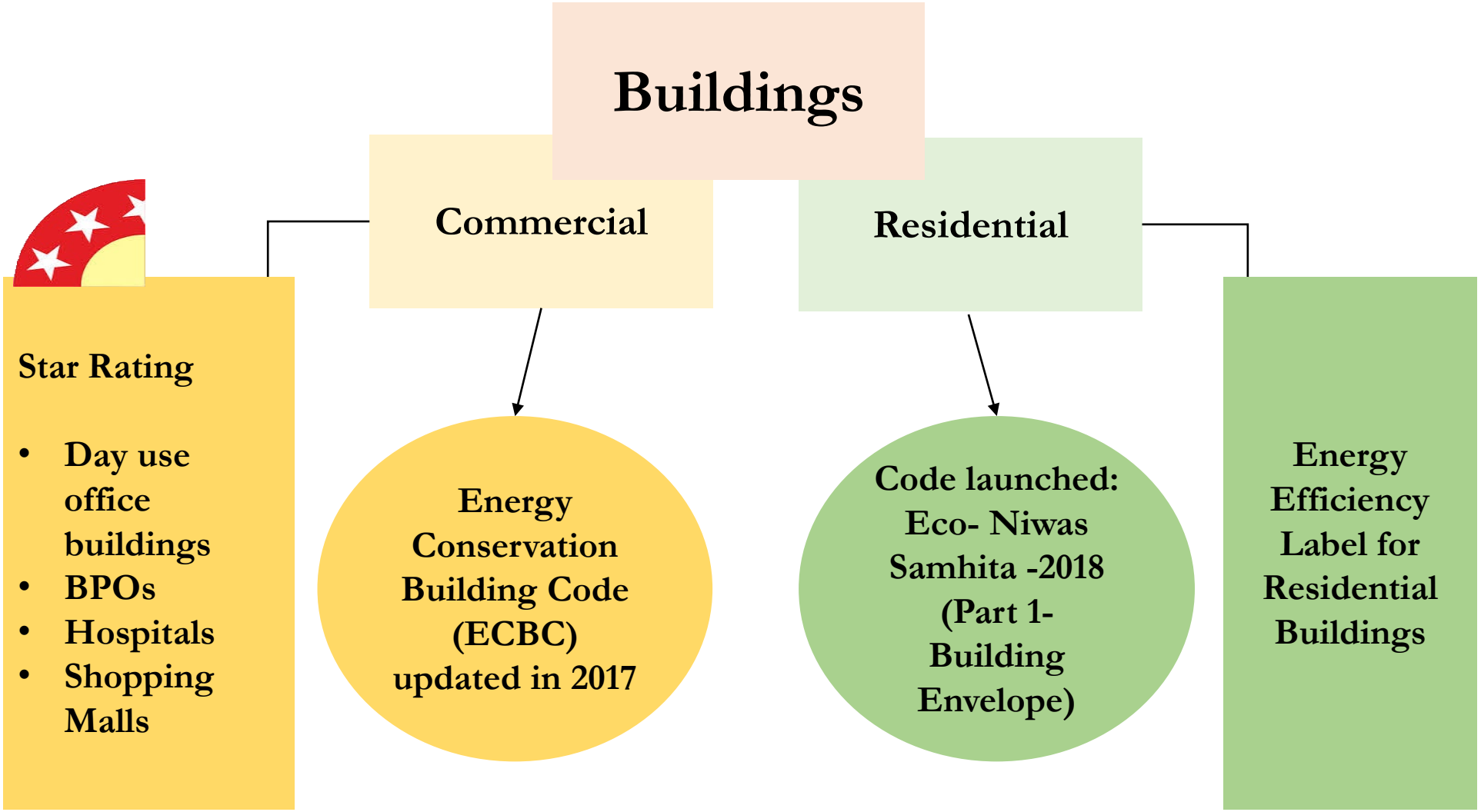
- An approach towards selection of an appliance/equipment covers 4 key factors as following :
  a) Market Transformation Potential
  b) Techno-economic analysis
  c) Test Procedures, Standards and availability of laboratories
  d) National and International presence of vendors

Initially, BEE launches the star labelling program for an appliance under voluntary regime only. However, after a period of 2-3 years, the star labelling program is assessed for changeover to mandatory regime based on the market transformation, technology improvement and related institutional requirements for such changeover.

Standards & Labelling (S&L) Programme

Mandatory Regime	Voluntary Regime	
1. Room Air Conditioners	1. Induction Motors	11. DG Sets
2. Frost Free Refrigerator	2. Pump Sets	12. Chillers
3. Tubular Florescent Lamp	3. Ceiling Fans	13. Microwave Ovens
4. Distribution Transformer	4. LPG-Stoves	14. Solar Water Heater
5. Room Air Conditioner (Cassette, Floor Standing)	5. Washing Machine	15. Light Commercial Air Conditioners
6. Direct Cool Refrigerator	6. Computer (Notebook/Laptops)	16. Deep Freezers
7. Color TV	7. Ballast (Electronic/Magnetic)	17. UHD TV
8. Storage type Electric Water Heater	8. Office Equipment's (Printer, Copier, Scanner, MFD's)	18. Air Compressors
9. Inverter Air Conditioner	9. Diesel Engine Driven Mono-set Pumps	19.Li-ion traction batteries and Systems
10. LED lamps	10. Solid State Inverter	20. Tyres

Building Energy Efficiency Program



Energy Conservation Building Codes (ECBC)

Status

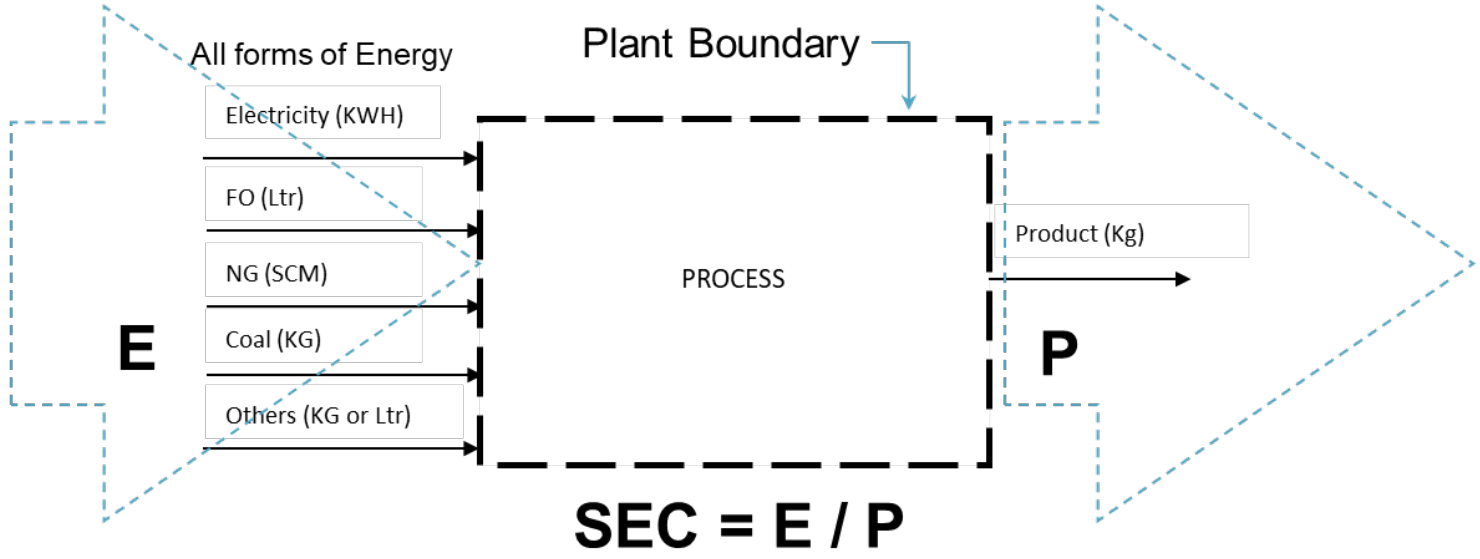
Notified States/UTs	
1. Andaman & Nicobar,	11. Odisha,
2. Andhra Pradesh,	12. Punjab,
3. Assam,	13. Puducherry,
4. Arunachal Pradesh,	14. Rajasthan,
5. Haryana,	15. Sikkim,
6. Himachal Pradesh,	16. Telangana,
7. Karnataka,	17. Tripura,
8. Kerala,	18. Uttarakhand,
9. Madhya Pradesh,	19. Uttar Pradesh
10. Mizoram,	20. West Bengal

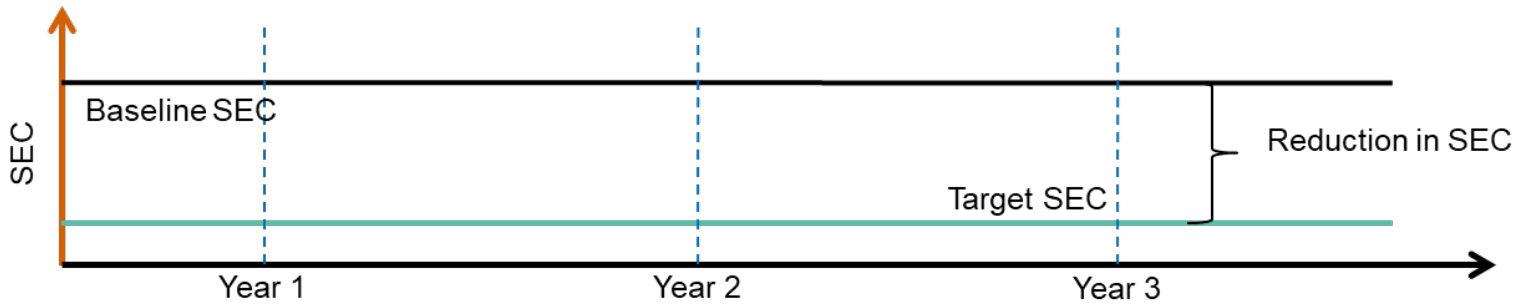
In Final Stage of Notification	Code Amended and in approval phase
21. Bihar,	30. Chhattisgarh,
22. Gujarat,	31. Ladakh,
23. Jammu & Kashmir,	32. Lakshadweep,
24. Jharkhand,	33. Meghalaya,
25. Maharashtra,	34. Delhi,
26. Manipur,	35. Daman & Diu,
27. Nagaland,	36. Dadar and Nagar Haveli
28. Goa,	
29. Tamil Nadu	

Industries

Specific Energy Consumption

- As the SEC is calculated on a Gate-to-Gate concept, the definition of plant boundary plays an important role.

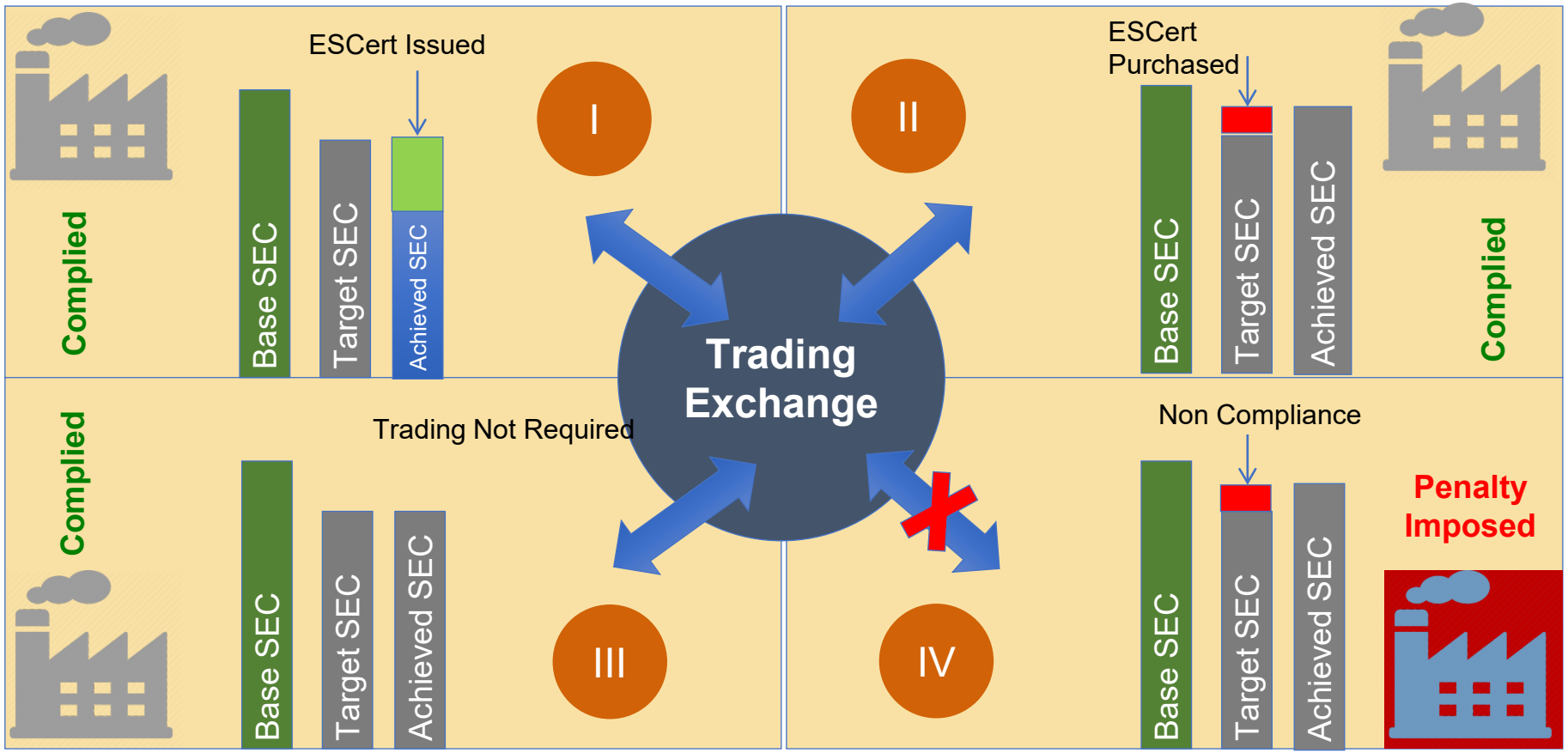




SEC (Specific Energy Consumption): Energy Consumed per unit production

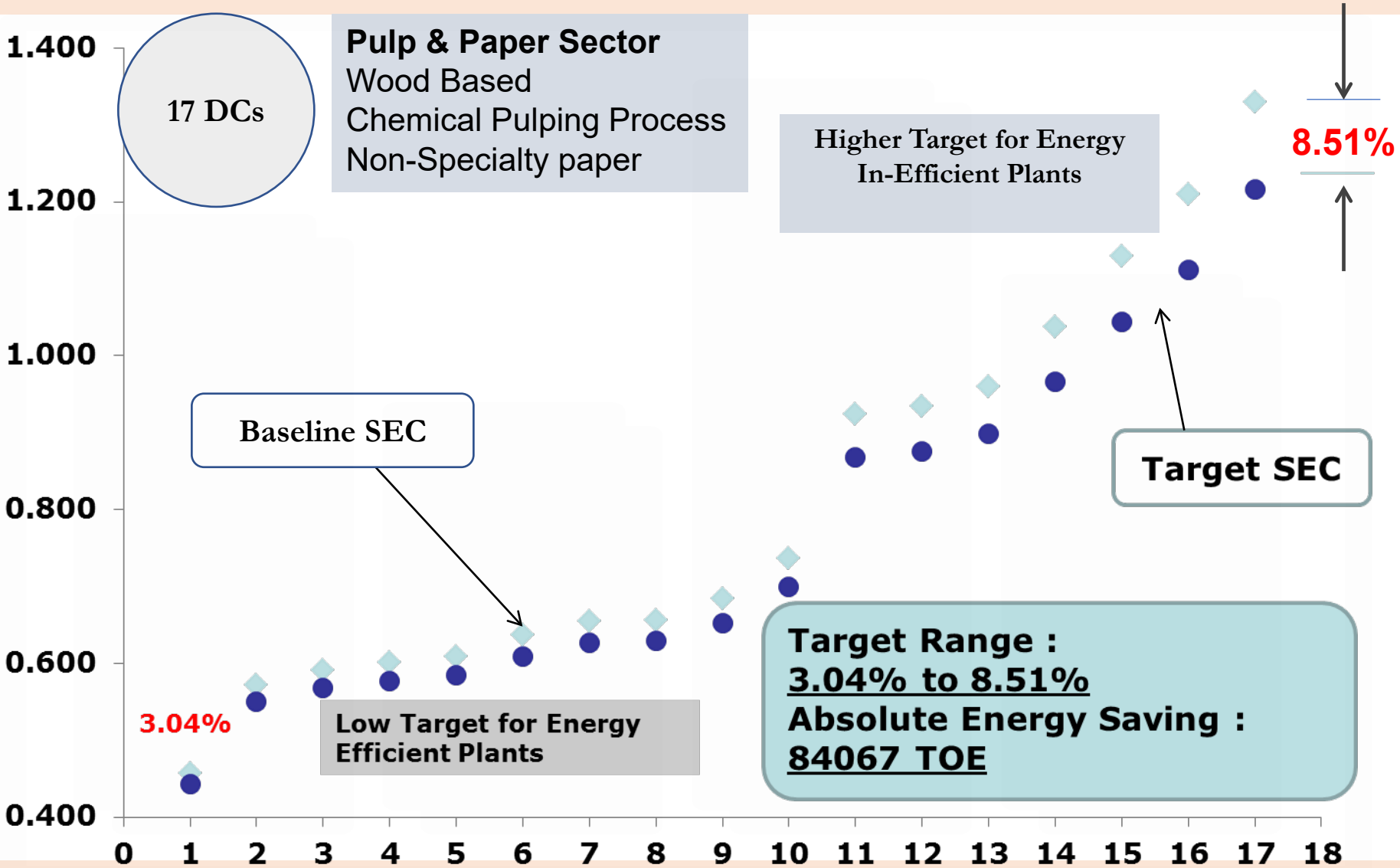
Perform, Achieve and Trade (PAT)

Perform Achieve and Trade (PAT): A **regulatory instrument** to reduce specific energy consumption in energy intensive industries, with an associated **market based mechanism** to enhance the cost effectiveness through certification of excess energy saving which can be traded.

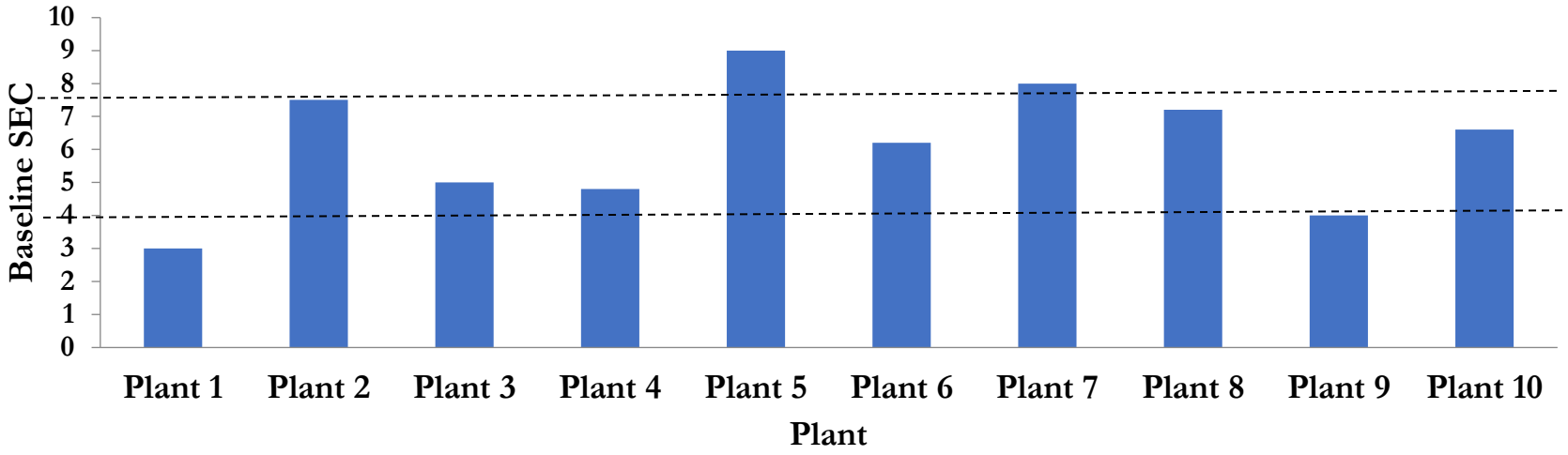


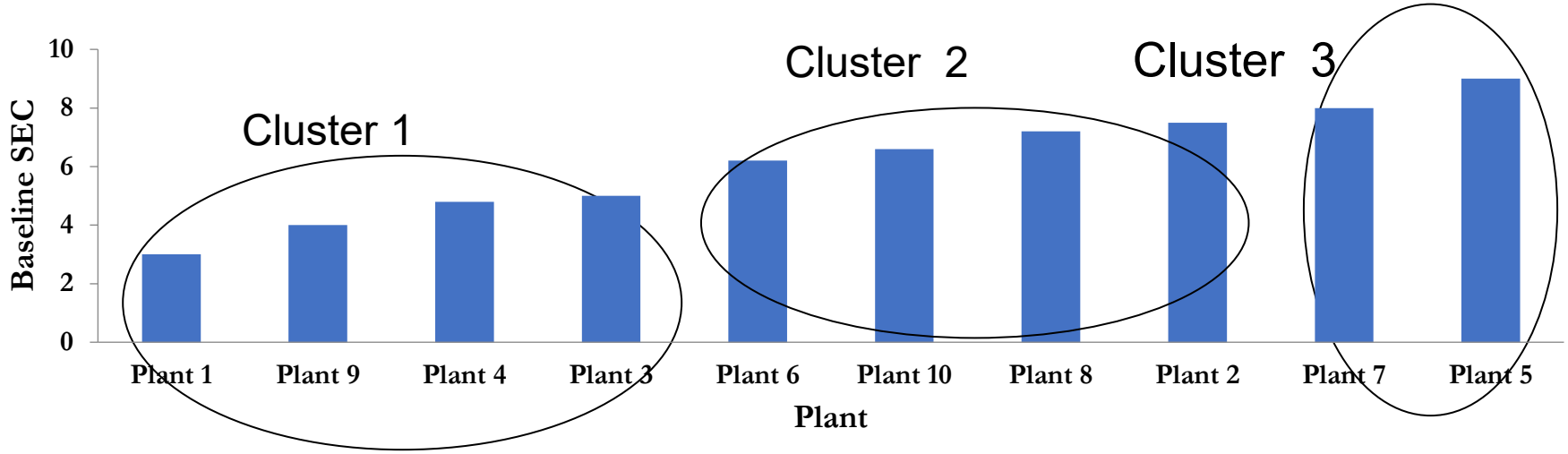
SEC (Specific Energy Consumption): Energy Consumed per unit production

PAT Target Setting Mechanism

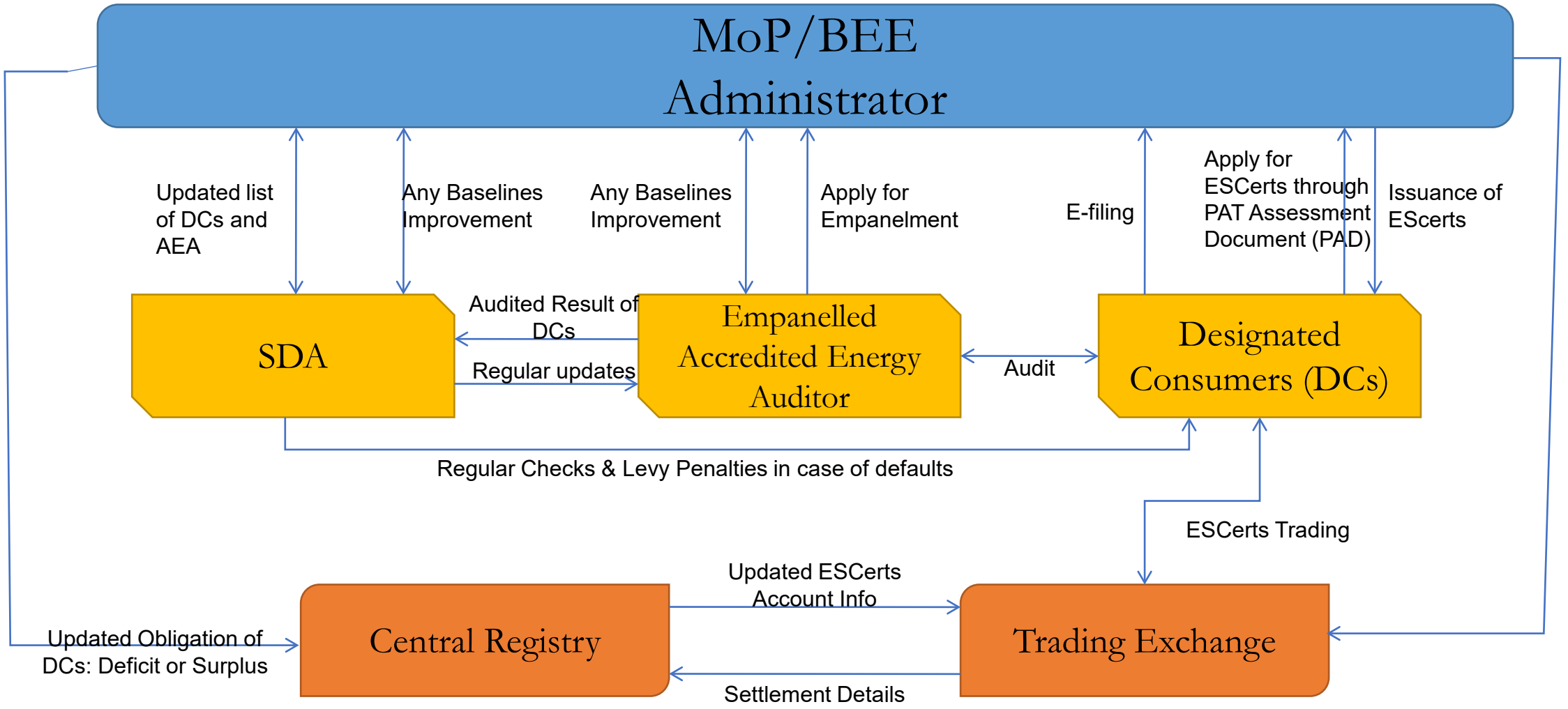


PAT Target Setting Mechanism

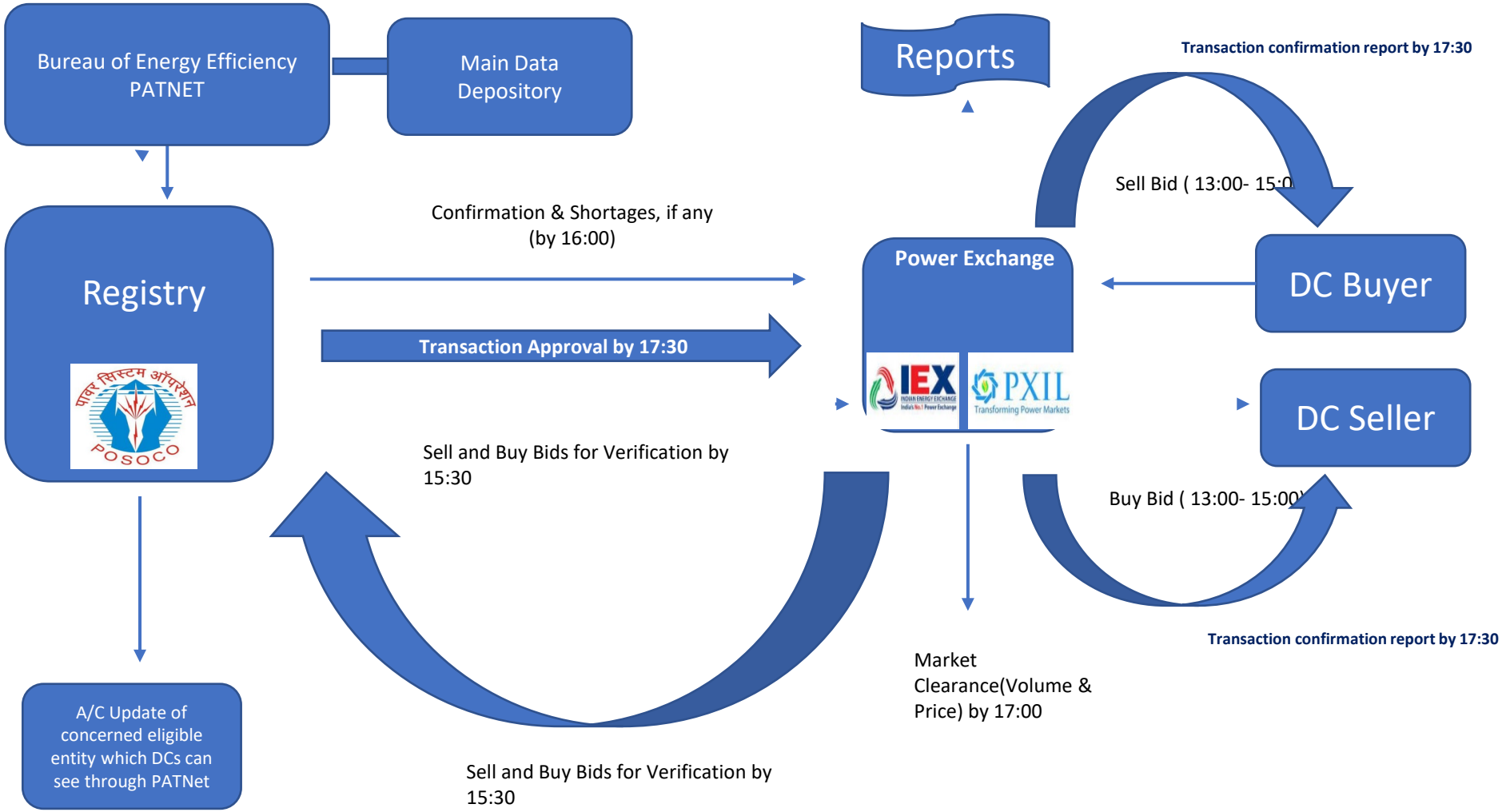




PAT Mechanism



Process for ESCerts trading



Perform, Achieve and Trade (PAT)

Energy Saving Certificates (ESCerts)

- Trading Exchanges: India Energy Exchange (IEX) and Power Exchange India Limited (PXIL)
- Market Regulator: Central Electricity Regulatory Authority (CERC)
- Registry: Power System Operation Corporation Limited (POSOCO)

- **Under PAT cycle –I, 1.3 million ESCerts traded & transaction of about USD 14.3 million. The price per ESCert ranged from Rs. 200 to Rs. 1200 with an average price of Rs. 760 per ESCert.**
- **Under PAT cycle –II, 5.7 million ESCerts issued to 349 DCs and 193 DCs have been directed to purchase about 3.7 million ESCerts**

Form -1

❑ **What??**

Form 1 is a specially designed form to capture the complete energy and production profile of a Designated Consumer (DC).

❑ **Why??**

It has to be submitted to communicate the energy scenario of a plant for a particular financial year to Government of India for the purpose of energy policy decision .

❑ **Who??**

Each industrial units covered under the notified sectors of EC Act, 2001 consuming above the notified threshold limit of that sector has to submit this form duly signed and stamped by the plant head and plant's energy manager.

❑ **When??**

The **Energy Conservation (the form and manner for submission of report on the status of energy consumption by the designated consumers) Amendment Rules, 2015** directs every Designated Consumer (DC) to furnish in electronic form, the status of energy consumption on or before the 30th June of the said calendar year in Form 1.

❑ **Where??**

The submission has to be made to the concerned State Designated Agency (SDA) and to Bureau of Energy Efficiency (BEE).

Sector Specific Pro-forma

	Sector	No of Pro-forma	Name of Pro-Forma for Sub-Sector	Sub-Sector
1	Aluminium	2	Sa1, Sa2	Smelter & Cold Sheet
2	Cement	1	Sb	Cement
3	Chlor- Alkali	1	Sc	Chlor- Alkali
4	Fertilizer	1	Sd	Fertilizer
5	Iron & Steel	2	Se1, Se2	Integrated steel & Sponge Iron
6	Paper & Pulp	1	Sf	Paper & Pulp
7	Textile	4	Sg1, Sg2, Sg3, Sg4	Composite, Fiber, Spinning & Processing
8	Thermal Power Plant	1	Sh	Thermal Power Plant
9	Railways	General format for data collection of these three Sectors are available on BEE website https://beeindia.gov.in/content/pat-performa The sector specific pro-froma for these sectors are under finalisation.		
10	DISCOMM			
11	Petroleum Refinery			
	Total	13		

Sector Specific Pro-forma – Thermal Power Plant

- Instruction for Pro-forma filling (Locked)
- General Information Sheet (With facility to choose between Coal/Gas/Diesel based Power Plant from Drop down list)
- Sector Specific Pro-forma Form Sh (Unit Wise details)
  - Design Parameters Details
  - Operating Parameters Details
  - Generation and Other Details (Coal/Gas/Oil based)
  - APC and related Curve details
  - Coal Analysis and Gas Analysis details
  - Fuel Consumption (Solid/Liquid/Gas) details
  - Unit Loading Factor details for PLF normalisation
  - Start-up and Shut down details
  - Miscellaneous Data for Normalisation purpose
- Summary Sheet
- Normalization calculation sheets

Gross Heat Rate and Coal Details

- Gross Heat Rate of DG/CPP/GT will be automatically calculated based on the Energy Consumption and generation provided

- The quality parameters of coal used in CPP will be inserted for Coal quality Normalisation

- The elemental analysis such as proximate and ultimate shall be provided on yearly weighted basis

- The formulae provided for conversion from proximate to Ultimate will be used for finding out the value of H2 in the baseline year, if ultimate analysis has not been performed for coal during baseline year

Performance Indicator and GHR

H	Gross Heat Rate		Unit	Previous Year	Current Year	Source of Data
H.1	Gross Heat Rate of DG Set	E.6x10/C.2.1.(ii)	kcal/kWh	0.00	0.00	
H.2	Gross Heat Rate of CPP (Steam Turbine)	(D.8+E.7+F.3)x10/C.2.2.(ii)	kcal/kWh	0.00	0.00	
H.3	Gross Heat Rate of CPP (Gas Turbine)	F.3/10*C.2.3.(ii)	kcal/kWh	0.00	0.00	
H.4	Gross Heat Rate of Co-Gen(Extraction cum Condensing)	Formula	kcal/kWh	0.00	0.00	
H.5	Gross Heat Rate of Co-Gen(Extraction/Back Pressure)	Formula	kcal/kWh	0.00	0.00	
H.6	*Weighted Average Heat Rate*	*Formula*	*kcal/kWh*	*0.00*	*0.00*	

I	Coal Quality in CPP (As Fired Basis)		Unit	Previous Year	Current Year	Source of Data
i	Ash	Annual	%			
ii	Moisture	Annual	%			
iii	Hydrogen	Annual	%			
iv	GCV	Annual	kcal/kg			

Additional Information

I.1	Coal Quality in CPP (As Fired Basis)		Unit	Previous Year	Current Year	Source of Data
i	Ash	Annual	%			
ii	Moisture	Annual	%			
iii	Hydrogen	Annual	%			
iv	GCV	Annual	kcal/kg			

I.2	Un Scheduled Plant Shutdown		Unit	Previous Year	Current Year	Source of Data
i	Hot to Cold stop due to external factor	Annual	Hours			
ii	Hot to Cold stop due to external factor	Annual	Nos			
iii	Hot to Cold stop due to external factor (Electrical Energy Consumption)	Annual	Lakh kWh			
iv	Cold to Hot start due to external factors	Annual	Hours			
v	Cold to Hot start due to external factors	Annual	Nos			
vi	Cold to Hot start due to external factors (Electrical Energy Consumption)	Annual	Lakh kWh			

Normalization Factors- Broad Categorization

- **Capacity Utilization**
  - **Availability of Fuel/Raw Material** (Effect on Capacity Utilisation)
  - **Natural Calamity/Rioting/Social Unrest/Labor Strike/Lockouts** (Effect on Capacity Utilisation)
  - **Start/Stop**
- **Product Mix & Intermediary Product** (Import/Export)
- **Fuel Mix (Pet Coke Utilization in Kiln)**
- **Power Mix** (Imported & Exported from/ to the grid and self-generation from the captive power plant)
- **Fuel Quality**
- **Low PLF**
- **Raw Material Quality**

- **Environmental Concern** (Additional Environmental Equipment requirement due to major change in government policy on Environment)
- **Biomass/Alternate Fuel Unavailability**
- **Construction Phase or Project Activities**
- **Addition of New Line/Unit** (In Process & Power Generation)
- **Unforeseen Circumstances**
- **Renewable Energy**
- **APC Normalization**
- **Start-up/ shut downs due to external factors**

Miscellaneous Data for Normalization

- Separate Sheet to be filled for additional equipment installation due to Environmental concern and on going project activities

- The sheet will automatically calculates the Energy to be normalized

- The consumption thus entered will be calculated in a separate Normalisation sheet

Impact and Coverage

Realized Impacts – PAT I (2012-2015)

Energy Saving

8.67 mtoe

~1% of India's

Total primary energy supply

Emission Reduction

31 million tonnes of CO2

1.1 % of India's

emissions

Skill Development

Capacity building: **5000+** Engineers and operators

13718 Energy Auditors & Managers

219 Accreditation

ESCerts Trading

12.98 lakhs

ESCerts traded. Resulting Business of

INR 100 crore

Investment

Encouraged investments for energy efficient technologies for domestic manufacturing

Rs 26,100 Crore invested

Savings

Rs 9,500 Crores

from saved **energy consumption**

Realized Impacts – PAT II (2016-2019)

Energy Saving

14.08 mtoe

1.57% of India's

Total primary energy supply

Emission Reduction

68.43 million tonnes of CO_2

2.4% of India's

emissions

Skill Development

Capacity building:
12000+
Engineers and operators

17975 Energy Auditors & Managers

285 Accreditation

ESCerts Trading

57.38 lakhs

ESCerts were awarded.

36.68 lakhs

ESCerts entitled to Purchase

Investment

Encouraged investments for energy efficient technologies for domestic manufacturing

Rs 30,000 Crore invested

Savings

Rs 42020 Crores

from saved **energy consumption**

Realized Impacts – PAT Scheme (2012-2019)

Energy Saving

22.75 mtoe

2.56 % of India's

Total primary energy supply

Emission Reduction

99.43 million tonnes of CO_2

3.49% of India's

emissions

Skill Development

Capacity building:
12000+
Engineers and operators

17975 Energy Auditors & Managers

285 Accreditation

ESCerts Trading

95.63 lakhs
ESCerts were awarded.

50.71 lakhs
ESCerts entitled to Purchase.

12.98 lakhs ESCerts traded in PAT-I

Investment

Encouraged investments for energy efficient technologies for domestic manufacturing

Rs 56,100 Crore invested

Savings

Rs 51520 Crores

from saved **energy consumption**

Total PAT DCs Cycle wise

Sector / No. of DCs	Annual energy consumption Norm to be DC (TOE)	PAT Cycle I (Apr'12)	PAT Cycle II (Apr'16)	PAT Cycle- III (Apr'17)	PAT Cycle- IV (Apr'18)	PAT Cycle- V (Apr'19)	PAT Cycle- VI (Apr'20)	PAT Cycle- VII (Apr'22)	Total Notified DCs as on date
Thermal Power Plant	30000	144	154	37	17	17	-	119	238
Iron & Steel	20000	67	71	29	35	23	5	69	168
Cement	30000	85	111	14	1	12	37	106	175
Aluminium	7500	10	12	1	-	1	-	11	14
Fertilizer	30000	29	37	-	-	-	-	-	37
Paper & Pulp	20000	31	29	1	2	8	2	23	48
Textile	3000	90	99	34	7	16	7	90	168
Chlor- Alkali	12000	22	24	-	2	2	-	24	28
Refinery	90000	-	18	-	-	-	20		20
Railways	70000	-	22	-	-	-	-	24	24
DISCOMs	All	-	44	-	-	-	-	43	43
Petrochemical	100000	-	-	-	8	-	-	-	8
Buildings	500	-	-	-	37	31	64	-	133
Total	**-**	**478**	**621**	**116**	**109**	**110**	**135**	**509**	**1104**

Thank You

sdiddi@beeindia.gov.in

Overview of South African Energy Efficiency Policies for Industry

Sub Saharan Africa Energy Efficiency Policy Training

24 November 2022

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OUTLINE

1. Overview Different Instruments for Energy Efficiency in the SA context
2. Post-2015 National Energy Efficiency Strategy (NEES) and
3. Energy Efficiency Targets, 2015 - 2030
4. Industry Stakeholder Engagement & Energy Data collection
5. 12L Tax incentives in support to the NEES Targets
6. Key Recommendations for Policy Package
7. Lessons learnt

Overview Different Policy and Legislative Instruments

- Legislation and Regulation
  - Electricity Regulation Act 4 of 2006 and Electricity Regulation Amendment Act 28 of 2007 (ERA)
  - National Energy Act 34 of 2008
  - **National Energy Efficient Strategy (NEES) 2005, 2008, post 2015**
  - Energy Mandatory reporting 2015
  - Carbon Tax Act 2019
  - Energy Performance Certificates for Buildings Regulation 700 of 2020
  - The Integrated Resource Plan 2019

- **Section 12 Tax incentives**
  - Section 12I: Additional investment and training allowances in respect of industrial policy projects
  - Section 12L : Deduction in respect of energy efficiency savings

Energy Efficiency Targets, 2015 - 2030

1. Transport Sector

20% reduction in vehicle energy intensity

2. Industry Sector

16% reduction in energy consumption

3. Mining Sector

Annual energy saving of **40PJ** in the mining sector.

4. Residential Sector

33% reduction energy consumption of new household appliances

8. Electricity Production & Generation

Electricity distribution losses below **8%** and average non-technical losses of below **0.5%.**

16% energy efficiency improvement by 2030

4. Commercial Sector

37% red. in the specific energy consumption

7. Agriculture Sector

Electricity saving of **1 PJ**

6. Municipal Services

20% reduction in energy intensity of municipal provision.

5. Public Buildings

56% reduction in the specific energy consumption.

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Overview of post-2015 National Energy Efficiency Strategy (NEES)

- Using an **energy consumption baseline of 2015**, the post-2015 NEES provide a **target of 16% reduction in energy consumption by 2030**, equivalent **to an average of 46 TWh/46,000 GWh** (165 PJ) over a five-year period (2020 – 2024).

- This results an annual average of about **9 TWh/9,000 GWh** (32 PJ) savings that should be achieved in order to reach five-year targets, and overall projected target of 138 TWh by 2030.

- **Fig.1 provide the NEES framework** on how the measures will contribute to the sectoral targets and overall impact of the energy efficiency in South Africa.

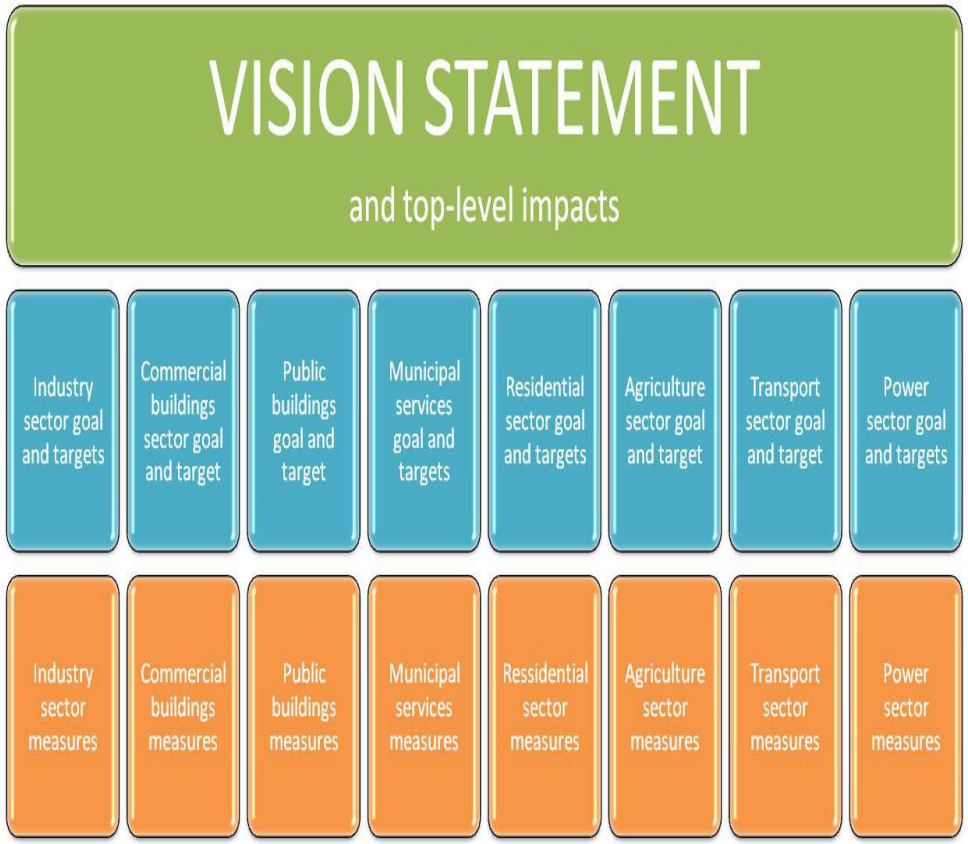


Fig.1: Post-2015 NEES Framework : Measures, Sectoral Targets and Impact

Industry Information Sharing & Energy Data collection

- The Energy Efficiency Target Monitoring System (EETMS) has been under development to allow the monitoring of progress towards achieving the targets set in the NEES.
- The Department of Mineral Resources and Energy (DMRE) has developed a comprehensive strategy to promote energy efficiency improvements in the industrial sector
- The Department introduced the mandatory energy management plans for energy-intensive users and established the mechanism for the routine collection of energy consumption and production data at the level of individual firms and facilities.
- Promotion and the widespread adoption of energy management systems (EnMS).
- The development of appropriate schemes to incentivise the introduction of EnMS and ISO 50001 certification, particularly among enterprises that are not directly reached by the Industrial Energy Efficiency (IEE) programme and are not covered by the regulation for mandatory energy management plans.
- DMRE established a inter-departmental network with relevant government departments and Agencies to alleviate Industry with the burden of multiple reporting on the same Energy data sets.
- Energy data gathering regulations require greater enforcement and supportive infrastructure

12L Tax incentives in support to the NEES Targets

- The Income Tax (12L) energy efficiency incentive provides an allowance for businesses to implement energy efficiency savings. The savings allow for tax deduction of 95c/kWh saved on energy consumption.
- The 12L tax incentives Objectives is to encourage energy efficient processes & accelerate uptake of cleaner technologies and innovation, Promote a reduction in the demand for energy and resulting reduction in CO2 emissions
- With the **Tax Incentive**, the South African government is **actively encouraging the efficient use of energy**, thereby improving **energy security** and **competitiveness**, while achieving **rapid, significant and cost-effective emission reductions** that would contribute to attaining the country's climate change and Nationally Determined Contributions (NDC) targets.
- The 12L tax incentives provides the **much-needed support to South African Industry**, enabling them to **increase their resilience against the converging pressures of economy, environment and the global investor community**.
- EETI's are a complementary mechanism ('carrot') to the proposed carbon tax. Some of the carbon tax revenue will be recycled through this Tax Incentive.
- A carbon tax and tax incentives such as the energy efficiency tax incentive, would provide appropriate price signals to help nudge the economy towards a more sustainable growth path.

S12L of the Income Tax Act of 1962(Energy Efficiency Savings Allowance)

Contents of s12L Regulations 2013
1. Definitions
2. Procedure for claiming allowance
3. SANEDI responsibilities
4. Content of Certificate to be issued by SANEDI (Regulation 3(2))
5. Baseline Calculation
6. Limitation of Allowance
7. Concurrent Benefit

National Energy Act 2008
- Establishment, Functions, Constitution, funding and procedure of SANEDI

Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice 2006
- Establishment and Responsibilities of SANAS

National Treasury (CTA Regulations)

Carbon Tax Act 2019

Allowances in terms of Carbon Tax Act

1. Basic Tax-free allowance	Section 7
2. Allowance for industrial emissions	Section 8
3. Allowance in respect of fugitive emissions	Section 9
4. Trade exposure allowance	Section 10
5. Performance allowance	Section11
6. Carbon budget allowance	Section 12
7. Offset allowance	Section13

✓ Therefore, both carbon Tax Allowances and s12L allowances can be claimed, but not for the same project/activity.

S12L Regulations - 2015 Amendments:

Amendment to:
- s6 (Limitation of Allowance)
- s7 (Concurrent Benefit) - Credit, allowance, grant, cost recovery agreement or benefit through/by Government, Schedule 2/3 public entity or PPA

- Renewable sources (except energy generated from combined heat and power); and
- Captive power plant (unless savings is >35%)

Customs and Excise Act 1964
- Assesses, collects and enforces the Carbon Tax as an environmental levy

Energy Efficient DTI Allowances are concurrent benefits

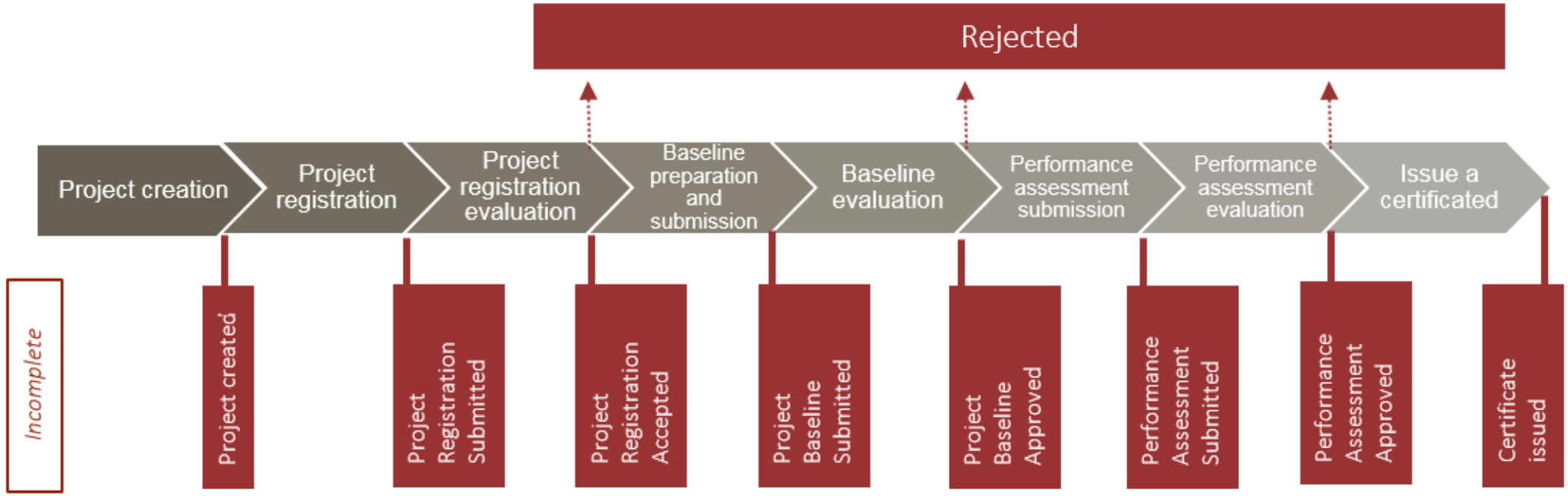
12I Tax Allowance – The Department of Trade Industry and Competition (thedtic.gov.za)

Both DTI Allowances and s12L allowances can be claimed, but not for the same project / activity

Public Finance Management Act 1999:
- Sets out Schedule 2/3 entities

Electricity Regulation Act 2006
- Defines PPA and regulates PPA standards

12L Tax Incentives Application Process



A review of the impacts from Inception to the end of June 2022 confirmed that the 12L Tax Incentive has been an effective way to **promote energy efficiency**, **improve energy productivity and reduce emission reductions** for participating businesses and the country.

	REGISTERED[2]	COMPLETED[1]
Number of companies	114	112
Number of projects	353	286
Direct[3] energy savings (TWh_e[4])	*Additional in pipeline*: 2 TWh_e	27.3 TWh_e
Direct[3] carbon emissions (Mt CO_2)	-	26.5 Mt CO_2

Sustained over five years, more than **136 TWh_e energy savings** and **132 Mt CO_2 emissions will be avoided,** with many projects suggesting a significantly longer life expectancy.

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Although companies from a diverse range of economic sectors participated in the tax incentive, many businesses in the **Mining and Quarrying** as well as **Manufacturing sectors saw opportunity to save energy** and utilise the Tax Incentive to overcome the initial tax hurdle. Accordingly, **98% of the energy savings verified and claimed** have been in these two sectors.

Energy savings claims (TWh_e)

Mining / Quarrying
15.7 TWh_e
58%

Manufacturing
10.9 TWh_e
40%

Tax Incentive claims (Rand billion)

Mining / Quarrying
R11.83 billion
53%

Manufacturing
R9.86 billion
44%

Significant opportunity for efficiency improvements remain across the economy among businesses from every sector, size and geographic location

Key Recommendations for Policy Package

- The approach of providing a comprehensive Policy package with services of targeted advice, information, assistance and subsidised energy audits has proved successful in the South African context.
- The enabling Policy Package must cover measures and activities that will support the achievement of objectives, building a strong institutional basis on which to promote, support and monitor energy efficiency
- On-going strategic planning on the Policy package, the Policy Package must be reviewed every five years to assess the progress made towards the targets, the outcomes of the measures, and to make adjustments if necessary.
- Data required for policy-making and monitoring needs to be reliable and timely, covering markets, technologies, and efficiency opportunities.
- Monitoring compliance, enforcement and evaluating of the policy measures
- Effective Information dissemination is critical for the Policy packages to succeed.

Lessons learnt

- A mixture of Incentives and mandatory regulations on Energy Efficiency has been key on voluntary compliance from the Industry.
- Partnerships and collaborations between National departments, state owned entities and Non Profit Organisations is key in raising the necessary recourse to support the policy directives.
- Localised Standards which support Energy Efficiency are an enabling tool in the implementation of the National Energy Efficiency Strategy policies and regulations.
- Constant consultation and stakeholder engagement with Industry stakeholders is critical in awareness raising and information dissemination on the NEES and the policies and regulations.
- 12L tax incentive Scheme can be restructured to allow an increased uptake for small to medium sized projects and increase the contribution from industry SME's

Thank you

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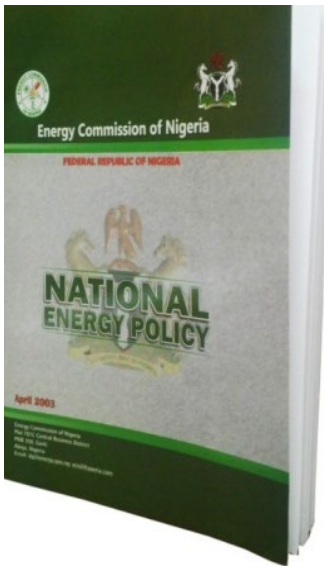
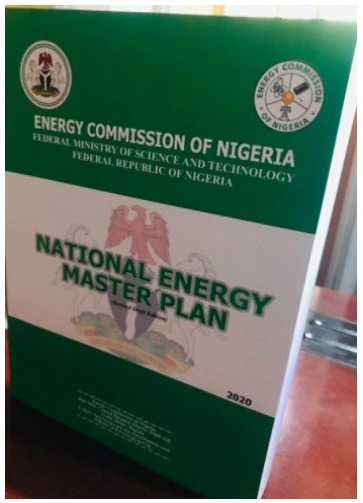
OVERVIEW OF THE CURRENT ACTION PLAN IN NIGERIA TO IMPROVE ENERGY EFFICIENCY IN INDUSTRY





By
Mr. Okon N. Ekpenyong
Director (Linkages, Research & Consultancy)
Energy Commission of Nigeria
Abuja

**Presentation at the IEA's Regional Training on Energy Efficiency Policy Packages for Sub- Saharan Africa, Abuja, 21st – 25th November 2022*

Presentation Outline

- **Introduction**
- The Key policy instruments for energy efficiency in industry?
- How do they differ in short-term vs long-term perspectives?
- The key stakeholders in Industrial Energy Efficiency?
- The Role of Regional Partnerships in the Promotion of Industrial Energy Efficiency
- Lessons Learnt
- **Conclusion**

Introduction: Key Drivers of Energy Efficiency

1. Energy contributes about 40% of production **cost** in Nigerian Industries. Hence, Nigeria's **NDC**, EE is planned to offset the highest % of CO2e.
   - **EE – 2.5% per year reduction in energy intensity across all sectors.**

- **Energy Transition Plan**
  - **25% of trucks and buses using CNG by 2030.**
  - **Reduce grid transmission and distribution loses to 8% of final consumption of electricity in 2030.**
  - **Eliminate diesel and gasoline generators for electricity generation by 2030.**
  - **Zero gas flaring by 2030.**
  - **25 million households using LPG by 2030.**

2. .

Introduction: Drivers of Industrial Energy Efficiency & Management in Nigeria

Inadequate Power Supply: Frequent power cuts and voltage fluctuations;

Every industrial establishment undertake extra investments in generators;

Over 40% of total cost of production is on energy supply that is wasted on inefficient equipment;

Capital value of generators is on the average, 25% of the total value of machinery and equipment

Key Policy Instruments for Industrial Energy Efficiency

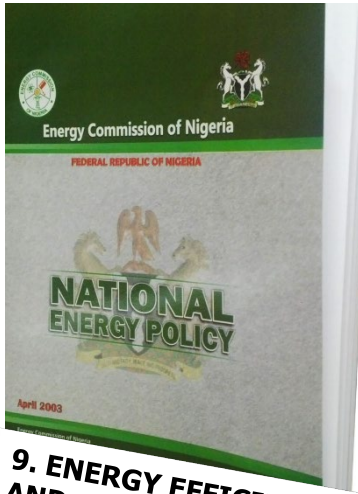
S/N	Title of Policy Document	Year	Synopsis
1.	National Energy Policy (NEP),	2003, 2013, 2018 & 2022	This policy was approved by the Federal Executive Council in 2003. After several reviews (2013, 2018 and 2022), the revised version was approvedon 27th April 2022. The objective of the policy is to guide future energy related sub-sectoral policy developments, in order to avoid policy conflicts which may, otherwise, arise.
2.	National Energy Master Plan (NEMP)	2022	NEMP approved with NEP provides a framework for the implementation of the National Energy Policy by translating the provisions of the NEP into actionable programmes, activities and projects.
3.	National Renewable Energy and Energy Efficiency Policy for Electricity Sector (NREEEP)	2015	The National Renewable Energy and Energy Efficiency Policy (NREEEP) was developed for the electricity sector by the Federal Ministry of Power, Works and Housing in and was approved by the Federal Executive Council in 2015. Global thrust of the policies and measures for the promotion of renewable energy and energy efficiency are outlined.
4.	National Building Energy Efficiency Code,	2017	The National Building Energy Efficiency Code (NBEEC) sets minimum requirements on Building Energy Efficiency and provides framework for their proper implementation, control, and enforcement.

Key Policy Instruments for Industrial Energy Efficiency – Contd….

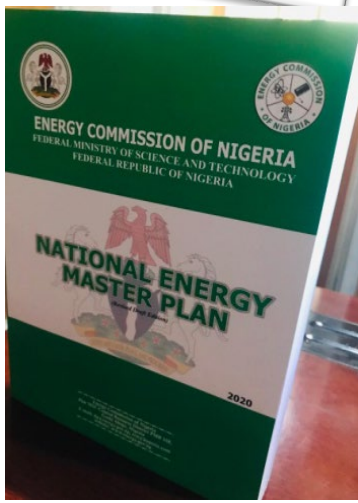
S/N	Title of Policy Document	Year	Synopsis
5.	Minimum Energy Performance Standards (MEPS)	2018	This is draft regulatory measures that state the minimum efficiency levels of RACs and lighting products in Nigeria.
6.	NIS ECOSTAND 071-1:2017	2017	The standard prohibits the manufacturing and importation of any refrigeration equipment with Energy Efficiency Index above 80.
7.	NIS ECOSTAND 071-2:2017EE , 2017	2017	Prohibit the manufacturing and importation of air conditioners with Energy Efficiency Ratio (EER) below 2.8
8.	Building Energy Efficiency Guidelines for Nigeria	2017	The aim of the BEEG is to provide practical advice to professionals on how to design, construct and operate more energy efficient buildings.
9.	National Building Energy Efficiency Code	2016	Defines a minimum EER of 2.8 for air conditioners used in residential and commercial buildings
10.	ISO 50001:2018 Energy Management System	2018	ISO 50001:2018 Energy Management System was adopted by Standards Organization of Nigeria.

Energy Efficiency Best Practices: **Entrench Energy Efficiency into the State's Energy Policy**

- **The National Energy Policy (NEP) and the National Energy Master Plan (NEMP) contain Energy Efficiency and Conservation Policies and Action Plans respectively, covering the key sectors of the nation's economy: Residential, Industrial, Transportation, Services/Commercial, Agriculture and Building Designs.**
- **The Energy Efficiency and conservation Policy contains:**
  - **Cross-Cutting Policies**
  - **Energy Efficiency Policy in Residential Sector;**
  - **Energy Efficiency Policy in Industrial Sector;**
  - **Energy Efficiency Policy in Commercial Sector,**
  - **Energy Efficiency Policy in Transport Sector**
  - **Energy Efficiency Policy in Agriculture Sector**
  - **Energy Efficiency Policy in Building Designs**
- **Each section of the EE contains policy statements, policy objectives and strategies grouped at the end into the short, medium and long-term implementation**



9. ENERGY EFFICIENCY AND CONSERVATION POLICY



Key Stakeholders

- FEDERAL MINISTRY OF ENVIROMENT (FMENV)
- ENERGY COMMISION OF NIGERIA (ECN)
- MANUFACTURER ASSOCIATION OF NIGERIA (MAN)
- ECOWAS CENTER FOR RENEWABLE ENERGY AND ENERGY EFFICIENCY (ECREE)
- FEDERAL MINISTRY OF INDUSTRY, TRADE AND INVESTMENT (FMITI).

KEY STAKEHOLDERS – CONTD..

- BANK OF INDUSTRY (BOI)
- FEDERAL MINISTRY OF POWER
- STANDARD ORGANIZATION OF NIGERIA (SON)
- NATIONAL UNIVERSITY COMMISSION (NUC)
- FOUR SELECTED NIGERIAN UNIVERSITIES
- NATIONAL INVESTMENT PROMOTION COMMISSION (NIPC)
- FEDERAL MINISTRY OF SCIENCE AND TECHNOLOGY (FMST)
- NIGERIA ENVIROMENTAL SOCIETY (NES)
- INTERNATIONAL CENTER FOR ENERGY, ENVIROMENT AND DEVELOPMENT (ICEED

CURRENT ACTION PLAN FOR IEE

PROJECT TITLE: Improving Nigeria's Industrial Energy Performance and Resource Efficient Cleaner Production through Pragmatic Approach and the Promotion of Innovation in Cleaner Technology Solution

(Nigeria RECP/IEE Project).

SUPPERVISING AGENCY: United Nations Industrial Development Organization (UNIDO)

PROJECT DURATION: 4 Years

FUNDING AGENCY: GLOBAL ENVIROMENT FACILITY (GEF)

PROJECT OBJECTIVE

The objective of this project is to accelerate the adoption of the Industrial Energy Efficiency (IEE) and to improve enterprise environmental performance under the wide umbrella of Resource Efficiency and Cleaner Production (RECP) Best Practices and Innovative Approaches within selected small, medium and large scale industrial enterprises in Nigeria.

TARGETED SECTORS

The project is targeted at five main sectorial groups;

- Food and beverages sector
- Basic metal, iron and steel sector
- Petrochemical sector
- Textile sector
- Wood and furniture sector

PROJECT COMPONENTS: The project has six distinct implementing components

- Strengthening National Industrial and Environmental Policies and Regulatory Framework for Industrial Energy Efficiency (IEE).
- Modular IEE Energy Management System EnMS/Energy System Optimization (ESO) and Resource Efficient Cleaner Production (RECP), Industrial Enterprise and Engineering Consultancy base Training and Capacity Building programs.
- EnMS, ESO, and RECP piloting and Demonstration program.
- Enhanced Investment in industrial Energy Efficiency improvement and cleaner production with relevant sections of the Nigeria industrial sector.
- Industrial and commercial EnMS, ESO and RECP awareness, promotion, services demand generation and sharing of lessons learned.
- Project Monitoring and Evaluation

Main Actions

- Awareness and Sensitization Campaigns;
- Walk-through and Detailed Energy Audit;
- Minimum Energy Performance Standards (MEPS)
- Energy Labels;
- Building the capacity of policy makers and regulators;

The Role of Regional Partnerships in the Promotion of Industrial Energy Efficiency

- The establishment of ECOWAS Center for Renewable Energy and Energy Efficiency (ECREE);
- Cross-boarder trade within the region calls for the harmonization of MEPS and Labels;
- Individual Country's differences pose a challenge

LESSONS LEARNT

Energy efficiency in the industrial sector in Nigeria is low

Over 40% of total energy used is wasted on old, obsolete and inefficient equipment

Energy Savings Potential

25% saving potential exists through good housekeeping measures alone

Retrofitting in industries could save over 35% of energy currently used

40% of electricity consumption for air conditioning could be saved through more efficient equipment and practices;

35% saving potentials can be achieved in transport sector

Source: WB's Report on MANUFACTURERS' RESPONSES TO INFRASTRUCTURE DEFICIENCIES IN NIGERIA

THANK YOU