

Perform, Achieve & Trade (PAT) (National Mission for Enhanced Energy Efficiency)

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NATIONAL MISSION FOR ENHANCED ENERGY EFFICIENCY (NMEEE)

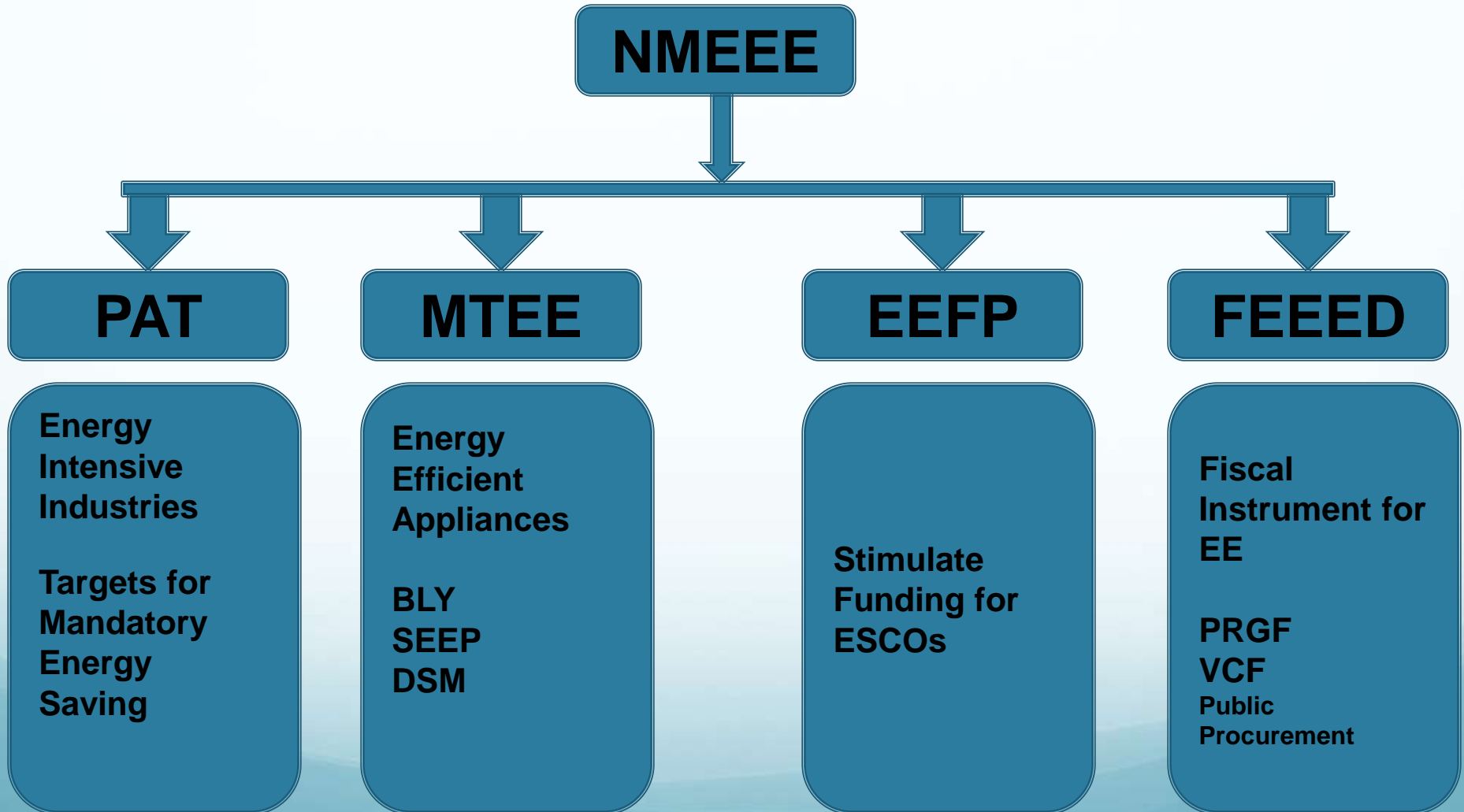


- The National Action Plan on Climate Change June 2008
- Creation of institutional and policy framework
- Industrial energy efficiency is the need of the hour
- 25% contribution in GDP with 44% energy consumption

ENERGY SAVING POTENTIAL OF DIFFERENT SECTORS

| SECTOR | SAVING POTENTIAL IN PERCENTAGE |
|-------------------------|--------------------------------|
| Agriculture | 30 |
| Industry | 25 |
| Transport | 20 |
| Domestic and Commercial | 20 |

NMEEEE – Four New Initiatives



TARGETS OF NMEEE

- Annual fuel saving of more than 23 million ToE
- Cumulative avoided electricity capacity addition of 19000 MW
- CO2 emission mitigation of 98 million tones per year

THRESHOLD OF ANNUAL ENERGY USE FOR VARIOUS INDUSTRIES

| SECTOR | MINIMUM ANNUAL ENERGY CONSUMPTION IN TONNES OF OIL EQUIVALENT |
|-----------------------------|--|
| ALUMINIUM | 7500 |
| CEMENT | 30000 |
| CHLOR-ALKALI | 12000 |
| FERTILIZER | 30000 |
| IRON AND STEEL | 30000 |
| PAPER AND PULP | 30000 |
| TEXTILE | 3000 |
| THERMAL POWER PLANTS | 30000 |

ESTIMATED ENERGY CONSUMPTION

| Sector | MTOE |
|-----------------|---------------|
| Power (Thermal) | 104.14 |
| Iron & Steel | 28.00 |
| Cement | 11.87 |
| Fertilizer | 7.86 |
| Aluminium | 7.73 |
| Paper | 2.09 |
| Textile | 1.62 |
| Chlor-Alkali | 0.84 |
| TOTAL | 164.15 |

About 70% of DCs
Contribute 97% of Total
Consumption

About 30% of DCs
contribute rest 3% of
Total Consumption



APPROACH FOR SETTING THE TARGETS

Total Saving Objective = 6.6 MTOE

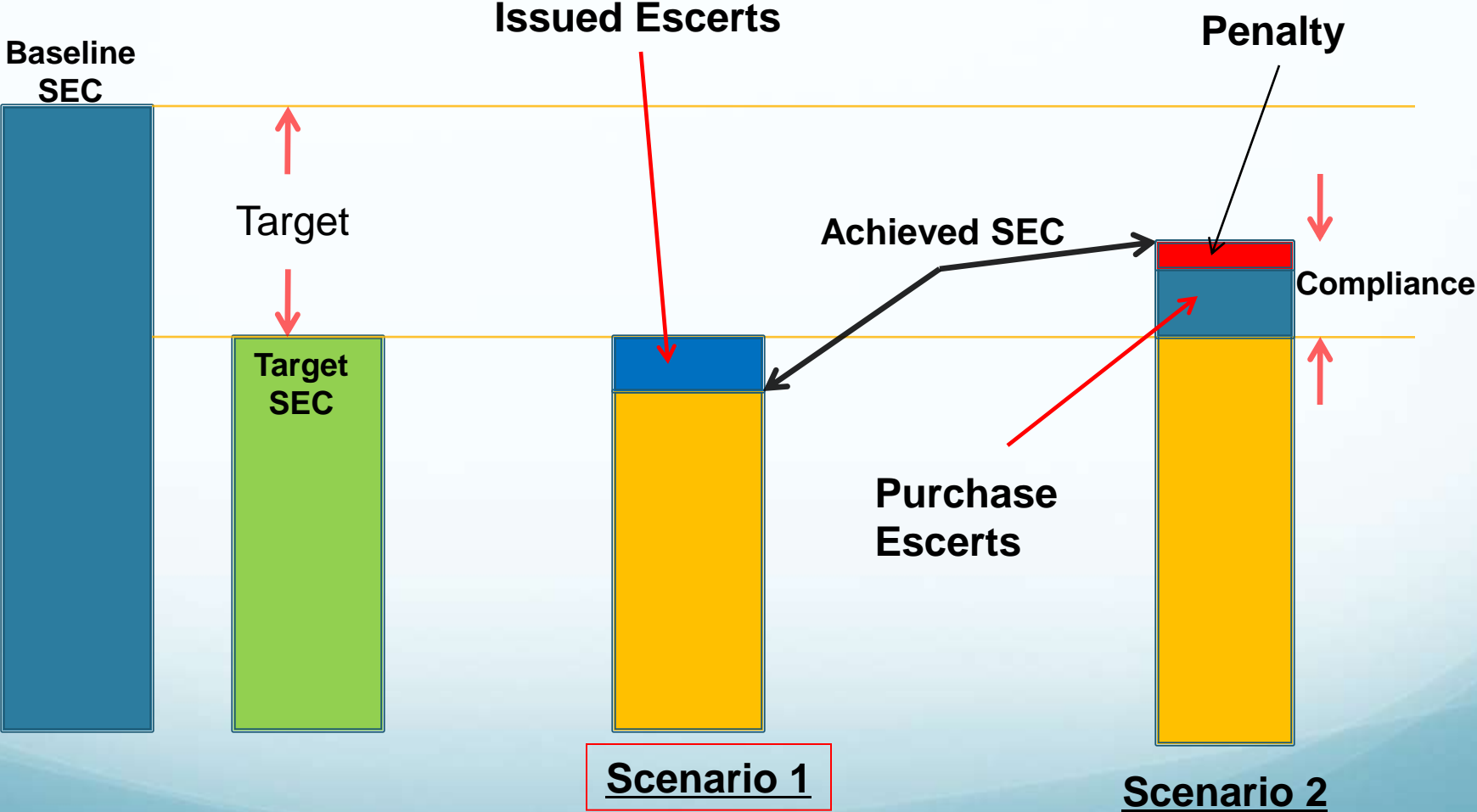
| Sector | No. of Identified DCs | Reported Energy Consumption | Share of Consumption | AppORTioned Energy reduction | Target for each Sector |
|------------------|-----------------------|-----------------------------|----------------------|------------------------------|------------------------|
| | | (MTOE) | (%) | (MTOE) | (%) |
| Iron & Steel | 76 | 28.00 | 46.66% | 1.647 | 5.88 |
| Cement | 82 | 11.87 | 19.78% | 0.698 | 5.88 |
| Fertilizers | 29 | 7.86 | 13.10% | 0.462 | 5.88 |
| Aluminium | 10 | 7.73 | 12.88% | 0.455 | 5.88 |
| Paper & pulp | 31 | 2.09 | 3.48% | 0.123 | 5.88 |
| Textile | 85 | 1.62 | 2.70% | 0.095 | 5.88 |
| Chlor-Alkali | 22 | 0.84 | 1.40% | 0.049 | 5.88 |
| Sub_Total | 335 | 60.01 | 100% | 3.53 | 5.88 |
| TPPs | 142 | 104.56 | 100% | 3.10 | 3.0 |
| TOTAL | 477 | 165.57 | | 6.63 | 4.0 |



APPROACH TOWARDS TARGET SETTING

- Sectoral Target are on pro-rata basis of energy consumption among 8 sectors to achieve National Target
- Establishment of Baseline :
 - As per reported data of last 5 years (2005-06 to 2009-10)
 - Normalization Factor (capacity utilization)
 - Arithmetic Average of last 3 years value

TARGETS, INCENTIVES AND PENALTIES



METHODOLOGY FOR ESTABLISHING BASELINE

- **Definitions:**

- Baseline Year : 2009-10
- Baseline Production (P_{base}) : Avg. of 2007-8, 2008-9 & 2009-10
- Baseline SEC (SEC_{base}) : Avg. of 2007-8, 2008-9 & 2009-10
- Baseline CU% (CU_{base}) : Avg. of 2007-8, 2008-9 & 2009-10
- Target SEC ($\text{SEC}_{\text{target}}$) : SEC as estimated in 2013-14
- Target as : % reduction from SEC_{base}

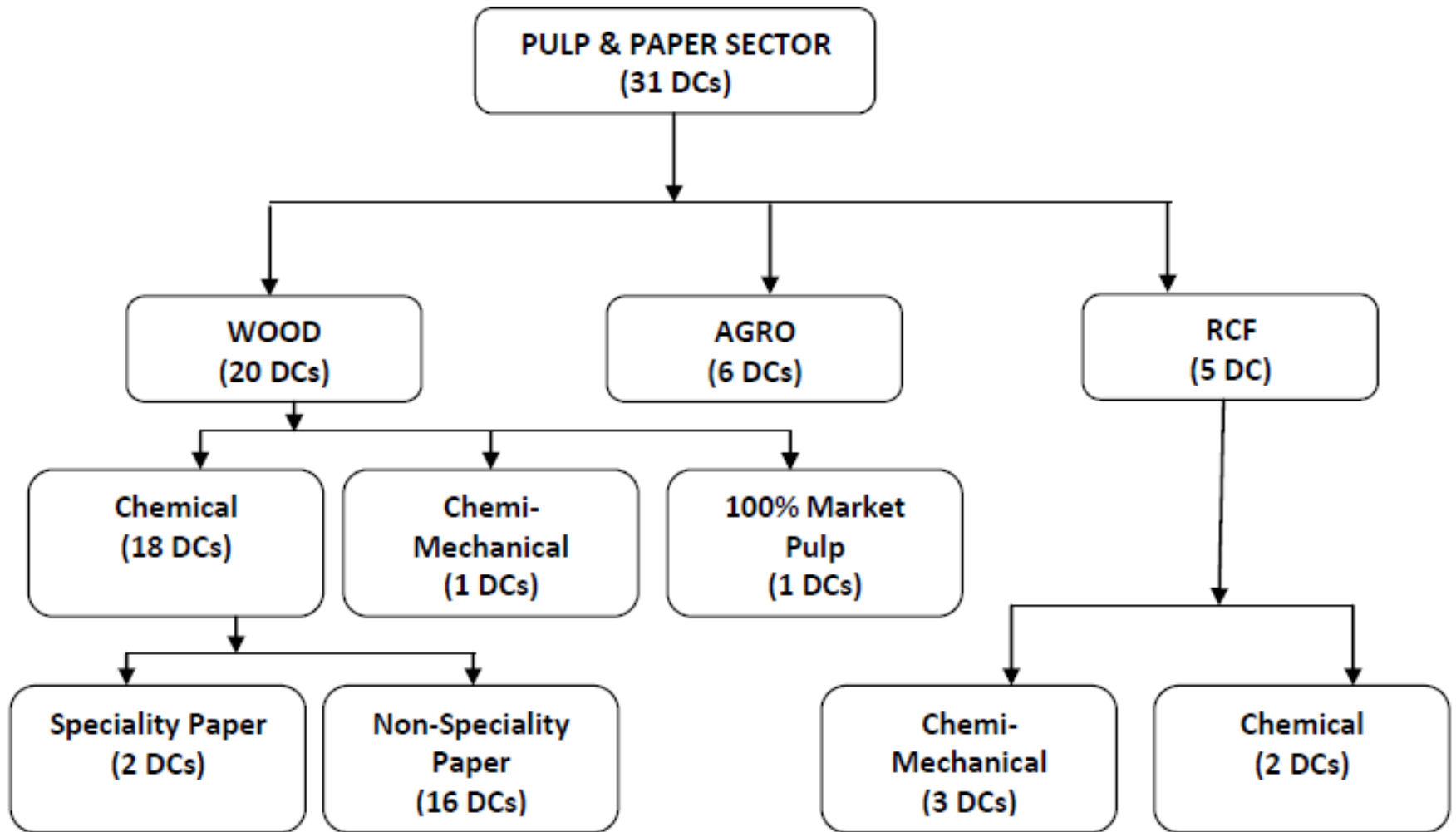
- **Estimation of Energy Saving (MTOE) :**

$$P_{\text{base}} (\text{SEC}_{\text{base}} - \text{SEC}_{\text{target}})$$

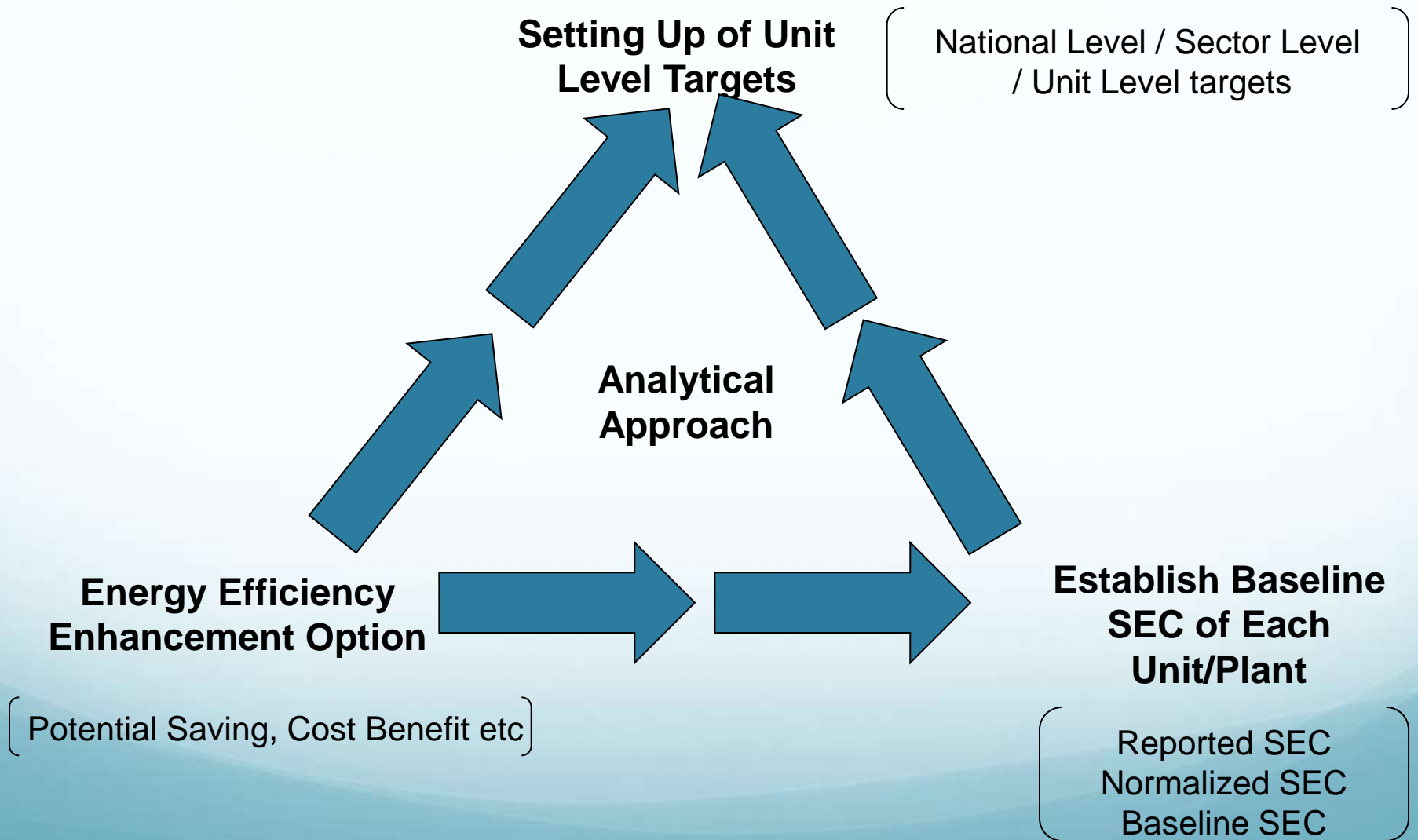
APPROACH TOWARDS TARGET SETTING

- Targets to be statistically calculated based on relative SEC approach after grouping the DCs suitably
- Estimated targets to be justified by the saving potential available
 - Baseline Energy Audits
- The target to be reviewed by an expert committee before notification

GROUPING OF DCs

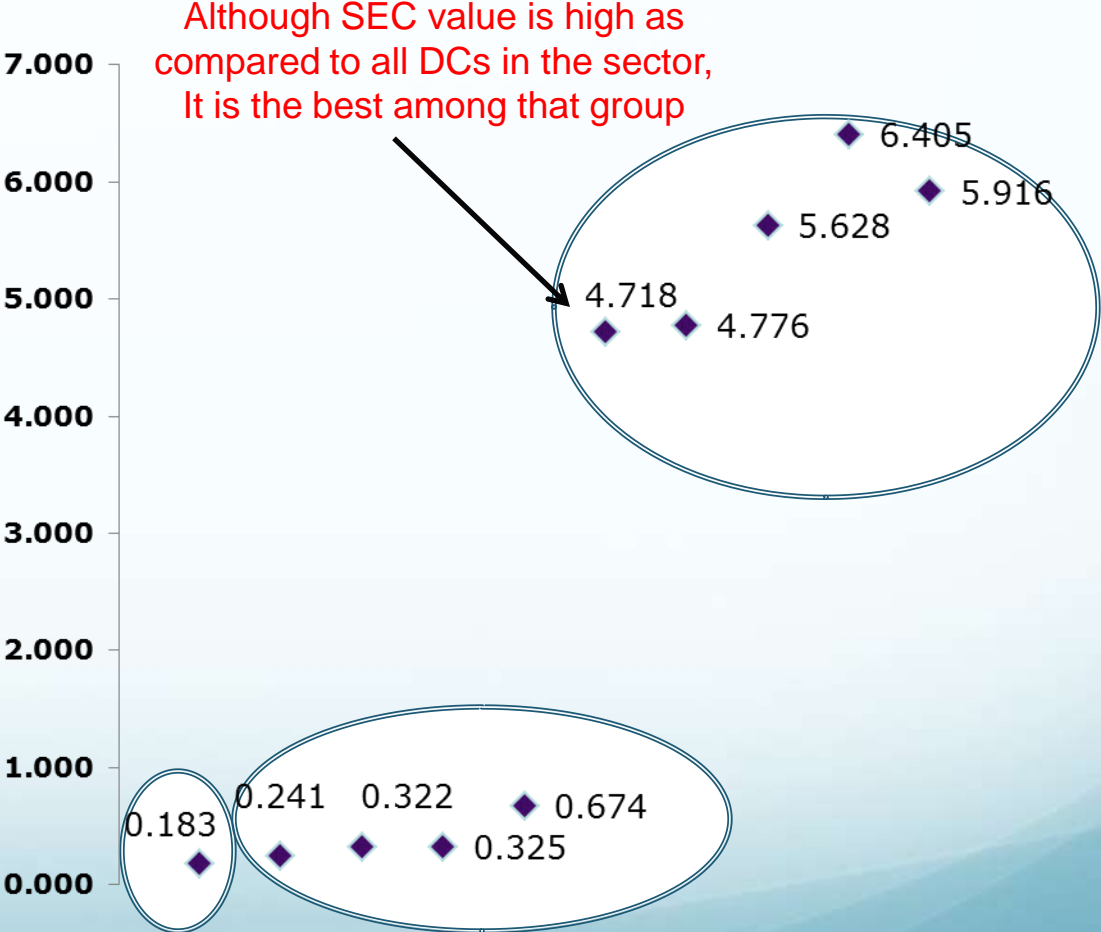


Analytical Approach for Target Setting



Suitable Grouping of DCs Done based on similar characteristics for target setting

Relative SEC concept has been adopted in DCs who are in same group after allocating group target (in absolute term) in a pro-rata basis



All values in TOE/MT

Status : PAT

- Baseline SEC on Gate-to-Gate basis has been established based on 5 years data from DCs reported through notified format
- Target for SEC reduction worked out based on :
 - Statistical Model for 6 sectors (Relative SEC and top-down approach)
 - Deviation from design Net HR for TPPs
 - Methodology suggested by FAI for Fertilizer Sector
- Report on Draft Target Setting has been approved MoP. Sectoral expert committee meetings are also held. Notification Process has been initiated

STATUS; PAT

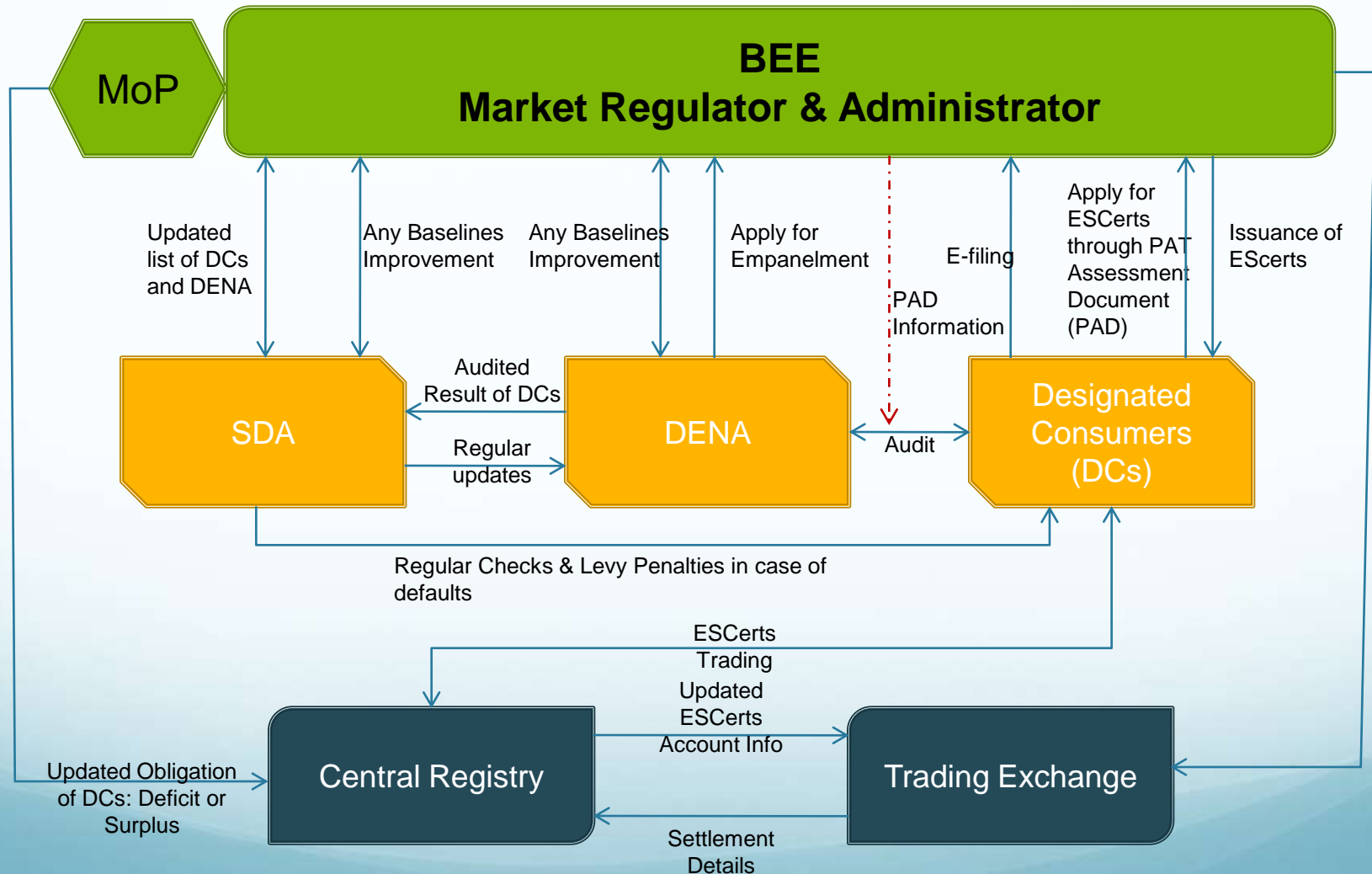
- Energy Audit has been started April 2011 by CEAs in all DCs to verify the reported data, its source and potential saving avenues
- PAT Operational Document (POD) has been prepared.
- About 40 stakeholder workshops conducted at National, State and Cluster level with participation of more than 2000 delegates

PAT LEGAL FRAMEWORK

- Furnish report of energy consumption to the Designated Authority of the State as well as to BEE (section 14(k)).
- Designate or appoint an Energy Manager who will be in-charge of submission of annual energy consumption returns of the Designated Agencies and BEE (section 14 (l)).
- Comply with the energy conservation norms and standards prescribed under section 14 (g) of the Act.
- Purchase Energy Saving Certificates (ES Certs) for compliance to section 14 (g) in the event of default. The Act has been amended with the addition of new sub-section 14A to enable this and section 14A(2) allows such trading. ES Certs are defined by adding a new sub-section

- Monitoring and Verification of compliance by Designated Energy Auditors (DENA) which will be prescribed the Government/ BEE under section 14A/13 (p) of the Act.
- Excess achievement of the target set would entail issuance of ESCerts under section 14A(1).
- Penalty for non-compliance being Rs. 10 lakhs and the value of non-compliance measured in terms of the market value of tones of oil equivalent by inserting a new section 26(1A).
- BEE to be the overall regulator and dispute resolution agency and Energy Efficiency Service Ltd. (EESL) to be the process manager.

Institutional Design Schematic



Thanks

Mission Goals

- Market-based approaches to unlock energy efficiency opportunities, estimated to be about Rs. 74,000 Crores
- By 2014-15:
 - Annual fuel savings in excess of 23 million toe
 - Cumulative avoided electricity capacity addition of 19,000 MW
 - CO₂ emission mitigation of 98 million tons per year



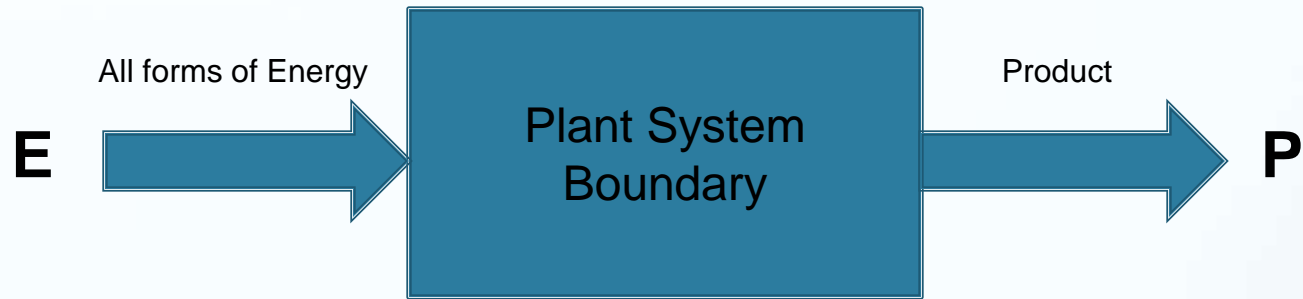
List of DCs

| Industry Sector | Annual Energy Consumption Norm to be DC (mtoe) | No. of Identified DCs |
|------------------------|---|------------------------------|
| Aluminum | 7500 | 10 |
| Cement | 30000 | 82 |
| Chlor-Alkali | 12000 | 22 |
| Fertilizer | 30000 | 29 |
| Pulp & Paper | 30000 | 31 |
| Power | 30000 | 142 |
| Iron & Steel | 30000 | 76 |
| Textiles | 3000 | 85 |

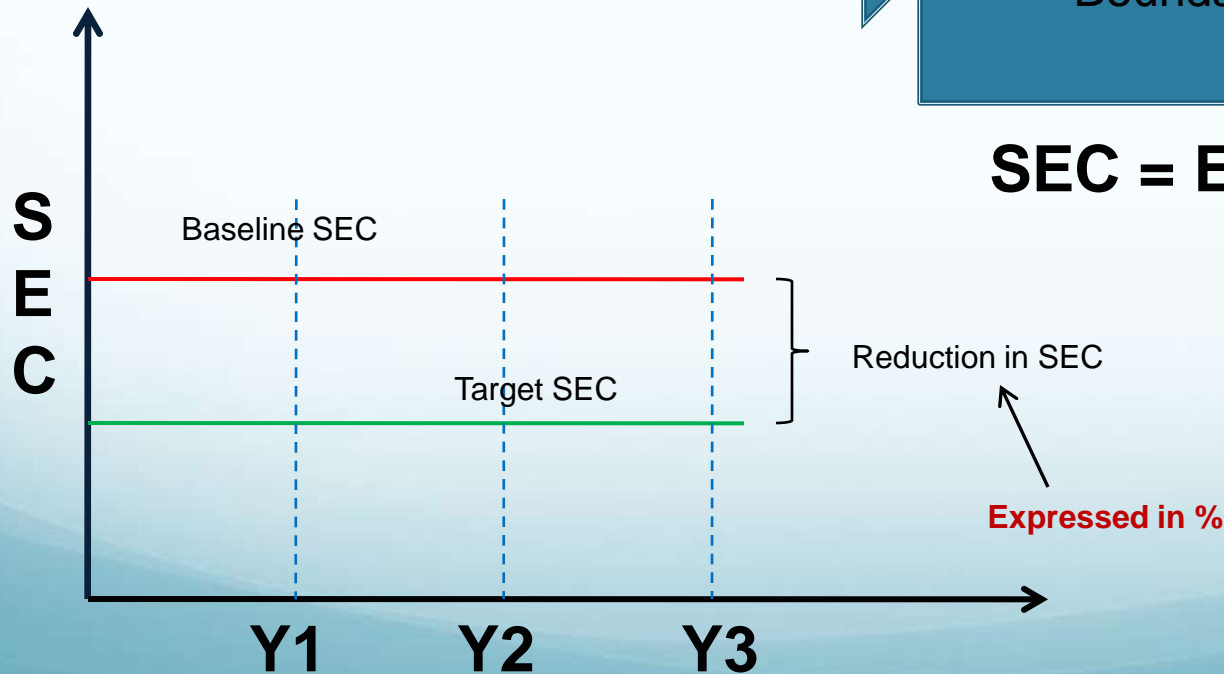


Target in PAT

Target is defined as the % reduction of 'Specific Energy Consumption (SEC)' from Baseline value.



$$\text{SEC} = E / P$$

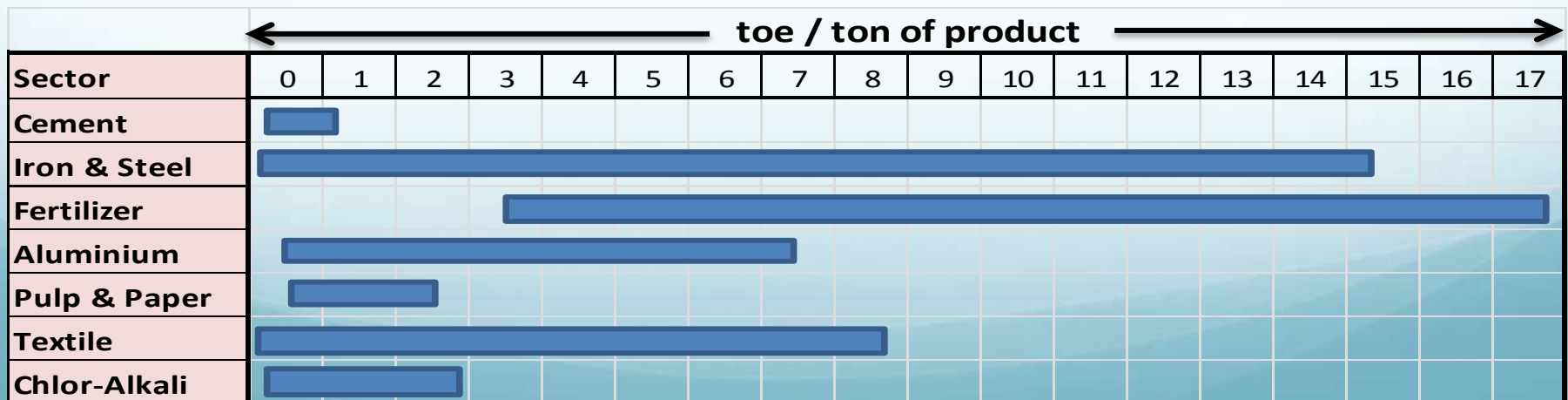


Energy Management Action
Network(EMAK)
3rd Workshop
in Guilin, China
November 15, 2011

“Sharing Best Energy
Management Practices in
Industry”

Sectoral studies by BEE on ‘Setting Up of Sectoral Bandwidth for DCs’ have revealed the impact on SEC due to above diversities

| No. of DCs | Range of SEC |
|------------|----------------------|
| 145 | 1740 - 4028 Kcal/kwh |
| 65 | 0.052 - 0.112 toe/ t |
| 80 | 0.02 - 14.75 toe/ t |
| 28 | 2.68 - 16.89 toe/ t |
| 10 | 0.183 - 6.405 toe/ t |
| 31 | 0.215 - 1.57 toe/ t |
| 85 | 0.01 - 7.8 toe/ t |
| 18 | 0.194 - 1.833 toe/ t |



Reasons for Large Energy Usage Bandwidth

The energy usage pattern varies widely in industries of a particular sector due to various **diversities** like

- Scale of Production (Installed Capacities)
- Use of Raw Material
- Process Technology
- Vintage
- O & M Practices
- Type of Product Output etc.

| Factors of Diversity | Most Affected Sectors |
|-----------------------------------|--|
| a) Raw Material Input | Pulp & Paper, Fertilizer, Power Plant, Textile |
| a) Quality of Raw Material / Fuel | All sectors |
| a) Process & Technology | Aluminium, Iron & steel, Chlor-Alkali, Paper |
| a) Final Product output | Textile, Iron & Steel, Aluminium |
| a) Vintage | All Sectors |
| a) Capacity Utilization | All sectors |



Number of Clusters depend upon the Bandwidth of Baseline SEC

