Monitoring, Reporting & Verification
23/June/2015, Jodhpur

Perform Achieve and Trade (PAT)
## National Target of Energy Saving – All Sectors

<table>
<thead>
<tr>
<th>SNo</th>
<th>Sector</th>
<th>No. of Identified DCs</th>
<th>Annual Energy Consumption (Million toe)</th>
<th>Share Consumption (%)</th>
<th>Apportioned Energy Reduction For PAT Cycle-1 (Million toe)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power (Thermal)</td>
<td>144</td>
<td>104.56</td>
<td>63.38%</td>
<td>3.211</td>
</tr>
<tr>
<td>2</td>
<td>Iron &amp; Steel</td>
<td>67</td>
<td>25.32</td>
<td>15.35%</td>
<td>1.486</td>
</tr>
<tr>
<td>3</td>
<td>Cement</td>
<td>85</td>
<td>15.01</td>
<td>9.10%</td>
<td>0.815</td>
</tr>
<tr>
<td>4</td>
<td>Aluminium</td>
<td>10</td>
<td>7.71</td>
<td>4.67%</td>
<td>0.456</td>
</tr>
<tr>
<td>5</td>
<td>Fertilizer</td>
<td>29</td>
<td>8.20</td>
<td>4.97%</td>
<td>0.478</td>
</tr>
<tr>
<td>6</td>
<td>Paper &amp; Pulp</td>
<td>31</td>
<td>2.09</td>
<td>1.27%</td>
<td>0.119</td>
</tr>
<tr>
<td>7</td>
<td>Textile</td>
<td>90</td>
<td>1.20</td>
<td>0.73%</td>
<td>0.066</td>
</tr>
<tr>
<td>8</td>
<td>Chlor- Alkali</td>
<td>22</td>
<td>0.88</td>
<td>0.53%</td>
<td>0.054</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>478</td>
<td>164.97</td>
<td>100.00%</td>
<td>6.686</td>
</tr>
</tbody>
</table>

**Sectoral Share in Energy Saving Target (%) (2012-15)**

- Power (Thermal): 48%
- Iron & Steel: 12%
- Cement: 7%
- Aluminium: 7%
- Fertilizer: 7%
- Paper & Pulp: 7%
- Textile: 1%
- Chlor- Alkali: 1%

Total EE Projects planned in 2012-15: 2057
Total anticipated investment: Rs. 27300 Crore

The direct benefit for the participating industries in this period is reductions in input costs related to energy of approximately Rs. 6800 Crore.

Reduction in India's CO2 emissions by 24 million tons / year in 2014-15.
65% has achieved their target or shown better performance than their baseline performance and achieved Net Energy saving of 4.12 mtoe
Institutional Framework

Transparency, flexibility and Industry engagement in program design help ensure effective industrial energy efficiency policy.
Monitoring & Verification (M&V)

► A reliable monitoring, reporting and verification (M&V) system forms the backbone of assessment process of the PAT scheme

► The objective of the M&V system is to streamline the activities to be carried out for verifying the energy performance achieved by the Designated Consumer in the target year.

► The Assessment of performance verification involves an independent evaluation of each activity undertaken by the DCs for compliance under PAT rules

► Verification plays a crucial role in maintaining the integrity of the scheme and ensuring transparent validation.
Specific Energy Consumption (SEC) is the division of Input Net Energy by Output Equivalent Product
## Monitoring & Verification

### What has been done so far: Capacity Building

- Capacity building of State Designated Agencies (SDA)
- More than 10,000 Certified Energy Auditor (CEA)
- Appointment of Energy Manager in DCs (Made Mandatory)
- 175 Accredited Energy Auditor (AEA)
- 53 Empanelled Accredited Energy Auditor (EmAEA)
- PAT Secretariat
- 48 Nos of Capacity Building Workshops for SDAs, DCs AEAs, EMs, EmAEA

### What has been done so far: Committee Formation

- Technical Committee formation in all the sectors
- Sub-Technical Committee formation on Normalisation
- 70 nos of committee meeting for finalization of Pro-forma and Normalisation Factors
- 18 Nos of Plant visit to understand the complexities of operation and finalization of Normalization Factors
- 10 Nos of plant visit for beta testing of data entry form and calculations
**Energy Performance Monitoring**

**PAT Cycle I: 2012-2015: Monitoring of Plant Energy Performance**
- Quarterly Energy Performance Report made via DPR/ MPR/ Power Reports/ Lab Reports.
  - Total Nos: 12 Nos
  - Total Nos: 3
  - Total No: 1

**PAT Cycle I: 2012-2015: Monitoring of Plant Energy Performance**
- Internal Energy Audit Report
- External Energy Audit Report
- Management Information System
- Energy Management System
Energy Performance Reporting

**PAT Cycle I: 2012-2015: Reporting**

- Sector Specific Data Entry Form (Micro Level) for all sectors and subsectors
- Automatic calculation of Specific Energy Consumption with and without Normalisation
- PATNet Platform for uploading the Forms Electronically
- Through Form I, Form A

**PAT Cycle I: 2012-2015: Normalisation**

- Capacity Utilization or PLF
- Intermediary products
- Product Mix
- Power Mix
- Fuel and Raw material Un-Availability
- Coal Quality
- APC linked with PLF and Coal Quality
- Sector Specific RM Quality
- Environmental Concern
- Natural Disaster & Unforeseen Circumstances
Energy Performance Verification

**PAT Cycle I: 2012-2015:**
- Verification
  - Empanelled 53 Nos of Accredited Energy Auditor
  - Verification period: 3 months
  - M&V guidelines
  - Minimum Team composition for M&V

**PAT Cycle I: 2012-2015: Documentation**
- Sector Specific Pro-forma
- Normalisation Formulae & Document
- Monitoring and Verification (M&V) Guidelines
- Reporting Format for M&V (Verification Report)
- Check List for verification
For the Work of verification, EmAEA shall constitute a team in accordance to section 10 of Energy Conservation Rules, 2012

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Designation</th>
<th>Qualification</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Team Head</td>
<td>Accredited Energy Auditor</td>
<td>In the Field of Energy Auditing of PAT Sectors</td>
</tr>
<tr>
<td>2</td>
<td>Team Member [Expert]</td>
<td>Graduate Engineer</td>
<td>Process or Technical Expert related to the specific sector, where verification will take place having experience of more than 10 years</td>
</tr>
<tr>
<td>3</td>
<td>Team Member</td>
<td>Certified Energy Auditor</td>
<td>In the Field of Energy Auditing</td>
</tr>
<tr>
<td>4</td>
<td>Team Member</td>
<td>Graduate/ Diploma Engineer</td>
<td></td>
</tr>
</tbody>
</table>

Team Composition

- The EmAEA may constitute any nos of team for verification or check-verification purpose to carry out the verification process for one or nos of Designated Consumer.
- The EmAEA shall ensure that it has formal contractual conditions of team members including technical experts for verification and check-verification so as to act in an impartial and independent manner and free of potential conflict of interest.
- The EmAEA, has the sole responsibility and signing authority on Form B, Form C
External Factor

► External factors definition: The factors over which an individual DC does not have any control but that can impact the SEC are classified as uncontrollable factors.

► External Factors should be scrutinized carefully for Normalisation applicability

► The defined external factors in the document are to be supported by external authentic documentary evidences

► Any other undefined external factor, which may affect production or energy of a DC should be brought in the Verification Report by EmAEA with authentic documentary evidences

► The external factors identified are as follows:
  ✓ Market Demand
  ✓ Grid Failure/Breakdown (Grid not Synchronized with CPP)
  ✓ Raw Material Unavailability
  ✓ Natural Disaster (Flood, Earthquake etc)
  ✓ Major change in Government policy (affect plant’s process system)
  ✓ Unforeseen Circumstances (Labour Strike/Lockouts/Social Unrest/Riots/Others etc)
Reporting Structure

Reporting Forms and Document (SDA and BEE)

- Pro-forma
- Form I
- Form A
- Form B
- Verification Report
- Supporting document

Cement Sector: ESCerts Calculation

- Elements for ESCerts calculation
  - Notified Baseline Target SEC (toe/tonne) as per notification S.O.687 (E)
  - Notified Baseline Production (tonne) as per notification S.O.687 (E)
  - Normalised Achieved SEC in Assessment year as per Pro-forma/Form I

- ESCerts Calculation
  - \[(\text{Normalised Achieved SEC in assessment year-Notified Baseline Target SEC}) \times \text{Notified Baseline Production}\]
Delta SEC: Notified Target SEC – Notified Baseline SEC

Difference SEC to be Normalised in assessment year:
Pro-forma baseline SEC - Notified Baseline SEC

Case 1: Reported (Verified in the Assessment Year) Baseline (ReBL) < Notified Baseline SEC (NoBL)

<table>
<thead>
<tr>
<th>DC Designated Consumer</th>
<th>Notified in the Baseline year</th>
<th>Verified in the Assessment Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline SEC (NoBL)</td>
<td>Baseline Production</td>
<td>Target SEC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Delta SEC (Target Saving)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reported (Verified in the Assessment Year) Baseline (ReBL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Verified variance from Reported BL to Notified BL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Remarks</td>
</tr>
<tr>
<td>Unit</td>
<td>toe/ton</td>
<td>Tonne</td>
</tr>
<tr>
<td></td>
<td>toe/ton</td>
<td>toe/ton</td>
</tr>
<tr>
<td></td>
<td>toe/ton</td>
<td>toe/Te</td>
</tr>
<tr>
<td></td>
<td>toe/Te</td>
<td>toe/Te</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>A-C</td>
<td>D</td>
</tr>
<tr>
<td>Plant 1</td>
<td>0.333</td>
<td>57808</td>
</tr>
<tr>
<td></td>
<td>0.312</td>
<td>0.021</td>
</tr>
<tr>
<td></td>
<td>0.299</td>
<td>-0.034</td>
</tr>
</tbody>
</table>

**Ex:** The Plant 1 has achieved Normalised SEC as per new modified Form I as 0.250 toe/Te in the assessment year (2014-15)

Achieved SEC Saving from Target: 0.299-0.021= 0.278, Actual Saving: 0.278-0.250 = 0.028 toe/Te

Normalised SEC for variance will be 0.250 toe/Te –(- 0.0340) toe/te = 0.284 toe/Te

Actual gain for the Plant 1 in SEC for the assessment year
- Target SEC to be achieved – SEC achieved in the assessment year
  - 0.312-0.284
  - 0.028 toe/Te
## What is Next?

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Date</th>
<th>Action and Stages of verification process</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>By June 30 [After end of 1st and 2nd Year PAT Cycle For Advance ESCerts]</td>
<td>Submission of Verified Form I and Sector Specific Pro-forma, Form A, Form B and Other Document to SDA &amp; BEE</td>
</tr>
<tr>
<td>SDA</td>
<td>By July 15 [M&amp;V phase of PAT Cycle] [or 15 days of the last date of submission of Form A]</td>
<td>Submission of Comments on Verified Form I and Sector Specific Pro-forma, Form A, Form B and Other Document to BEE</td>
</tr>
<tr>
<td>BEE</td>
<td>By July 30 [M&amp;V phase of PAT Cycle]</td>
<td>Recommendation of Energy Saving Certificates to Central Government [10 working days from last date of submission of Form A by SDA]</td>
</tr>
<tr>
<td>Central Government</td>
<td>By August 20 [M&amp;V phase of PAT Cycle]</td>
<td>Issue of Energy Saving Certificates [15 working days from date of receipt of recommendation by BEE]</td>
</tr>
<tr>
<td>DC</td>
<td>By Nov 30 [M&amp;V phase of PAT Cycle]</td>
<td>Submission of Form D to SDA and BEE [5 months from date of submission of Form A by DC to SDA]</td>
</tr>
</tbody>
</table>
Way Forward

Deepening

- Study Initiated - Lowering Threshold Limit
  - Iron and Steel
  - Pulp & Paper
- Study Initiated - for New DCs in existing 8 sectors

Widening

- Study Initiated -
  - Railways
  - Refinery
  - Discom

Trading

- Trading Regulation
- Trading Structure
- Depository Interlinking

PATNet Platform

- PAT NET Platform (PAT Cycle I)
  - User id and Password
  - Form Filling: Form I, Form A, Form B
  - Form C and Form D
- CERC Regulation on ESCerts Trading
  - Trading Methodology Document
  - Workshop

ESCerts Pricing

- Trading Platform (IEX and PXIL)
  - Aug 21-Nov 30
  - Frequency of Trading per week
- ESCerts Base Price (For Penalty purpose)
  - Based on Fuel and Electricity Prices of Assessment Year’s Last Purchase
  - Based on Energy Mix Consumption of baseline year
Web link and Document


**Proforma**

PAT Proforma & Normalization Equations

**Normalization , M&V**

- Normalization Document and M&V Guidelines for Aluminium
- Normalization Document and M&V Guidelines for Cement
- Normalization Document and M&V Guidelines for Chlor Alkali
- Normalization Document and M&V Guidelines for Fertilizer
- Normalization Document and M&V Guidelines for Iron and Steel
- Normalization Document and M&V Guidelines for Pulp and Paper
- Normalization Document and M&V Guidelines for Textile
- Normalization Document and M&V Guidelines for Thermal Power Plant

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Thank You