

## Monitoring and Verification(M&V)

### Purpose

A reliable monitoring and verification (M&V) system forms the backbone of PAT's assessment process. Its objective is to streamline the process to verify the energy efficiency of a designated consumer in the target year. It gives the requisite framework for monitoring and verification under PAT.

Verification involves independent evaluation of each activity the designated consumer undertook to comply with energy reduction targets. Verification plays a crucial role in maintaining the integrity of PAT and ensuring transparent validation.

The verification process will ensure that the information and data in Form 1 and Pro-forma are free from material omissions, misrepresentations and errors. The process requires an EmAEA to verify the energy performance of designated consumers taking normalization and other relevant factors into consideration as defined by the PAT rules.

The verification must be completed between 1 April and 30 June of the year following the assessment year. The designated consumer will submit the final verification report, verified annual Form 1, Sector Specific Pro-forma, EmAEA's verification report along with authentic supporting documents to the state designated agency (SDA) and the Bureau of Energy Efficiency before 30 June.

### Definition of M&V:

M&V is the process to verify the specific energy consumption of a designated consumer through verifiable means in the baseline year and in the assessment year by an empanelled accredited energy auditor.

The underlying principles for monitoring and verification include:

- ▶ **Consistency:** Applying uniform criteria to meet the requirements of the sector specific methodology throughout the assessment period.
- ▶ **Transparency:** Information in the verification reports shall be presented in an open, clear, factual, neutral and coherent manner based on documentary evidence
- ▶ **Acceptability:** The empanelled accredited energy auditors shall base their findings and conclusions upon objective evidence, conduct all activities in connection with the validation and verification processes in accordance with the rules and procedures laid down by BEE, and state their validation or verification activities, findings, and conclusions in their reports truthfully and accurately.
- ▶ **Measurability:** Measurement is a fundamental starting point for any kind of data captured for the Energy Performance Index.

- i. Measurement in energy saving projects: The energy saving from any project is determined by comparing measured parameters before and after implementation of a project, making appropriate adjustments for changes in conditions.
- ii. Measurement of parameters for data captured in Pro-forma: The parameters entered in the pro-forma shall be taken from the measured logs with supporting documentation through computational documentation from basic measurement at field.
- iii. Measurement activities in the baseline and assessment year consist of the following:
  - meter installation, calibration and maintenance
  - data gathering and screening,
  - development of a computation method and acceptable estimates from the basic measurement at field,
  - computation with measured data, and
  - reporting, quality assurance

A measurement boundary is a notional border drawn around equipment and/or systems that are relevant for determining the savings achieved through implementation of energy saving projects.

- ▶ **Traceability:** The reduction in specific energy consumption or savings from an energy conservation measure (ECM) should be verifiable and visible. Documents need to be presented to substantiate the reduction in energy consumption.
- ▶ **Verifiability:** The validation of filled in data in the Pro-forma and savings from energy conservation measures through proper authentic documentation are to be carried out by the EmAEA.

### **Empanelled Accredited Energy Auditor or Verifier:**

The accredited energy auditor firm empanelled with BEE will be the verifier of PAT. Given below are key exercises the verifier will carry out and their meaning.

**Verification:** A thorough and independent evaluation by the accredited energy auditor of the activities undertaken by the designated consumer for compliance with the energy consumption norms and standards in the target year compared to the energy consumption norms and standards in the baseline year and consequent entitlement to energy saving certificates.

**Certification:** It is the process of certifying the verification report or check-verification report by the accredited energy auditor to the effect that the entitlement of energy saving certificate is quantified accurately in relation to compliance of energy consumption norms and standards by the designated consumer during the target year.

**Check-verification:** This is an independent review and ex-post determination by the Bureau through the accredited energy auditor, of the energy consumption norms and standards achieved in any year of the three-year cycle which have resulted from activities undertaken by the designated consumer with regard to compliance of the energy consumption norms and standards.

### Specific Role of AEA(Empanelled Accredited Energy Auditor):

#### **A) Verification of Form A**

- a) Shall assess the **correctness of the information** provided by the designated consumer regarding the compliance with energy consumption norms and standards.
- b) Shall **report the results of assessment** and his opinion along with the supporting documents.

#### **B) Submission of Form B**

In case the AEA records a positive opinion in his report, BEE shall consider that all the requirements with regard to the compliance with energy consumption norms and standards, entitlement about issue or liability to purchase energy savings certificate have been met.

PAT-1 cycle ends on 31<sup>st</sup> March 2015, timeline for M&V will be as follows.

- **By 30<sup>th</sup> June:** Submission of FORM-I with Sector specific Performa, Form A,B to SDA & BEE.
- **Based on Form A&B:** DC shall fill form D
- **30<sup>th</sup> June to 15<sup>th</sup> July:** SDA will scrutiny the form A and B and shall give recommendation to BEE.
- **15<sup>th</sup> July to 10 Working days:** BEE to scrutinize forms A and B.
- **Next 15 working days:** BEE to recommend central Government for Issuance of ESCerts and Trading
- **By 30<sup>th</sup> of Nov:** Issue of ESCerts and Trading

### **PCRA is now an Accredited Energy Auditing Agency (DENA):**

Under the Rule 9 of 269(E) under PAT Rules 2012, Bureau of Energy Efficiency empanelled PCRA as DENA for M&V and Check Verification.

### HOW TO CARRY OUT M&V:

- DC will provide Work Order for M&V.
- PCRA submit the plan to DC for visit for M&V along with its TEAM. Team consists of following.
  1. Team head - Acc. Energy Auditor
  2. Team Expert - Graduate Engineer
  3. Team - Certified Energy Auditor.
  4. Support Staff
- Source of data be checked
- Energy Saving Projects, saving is to be certified.

- Document & Circumstantial proof Pictures may be taken & Verification report according Performa.
- Submit the report as per Form-B and PE Management Proforma to SDA & BEE in Soft Copy.

**Documentation Required for Verification:**

- Documents including Quarterly and Yearly data reports for the performance of the plant as below.
  - a) on the performance of plant and production processes
  - b) on the outcome of internal field audits of plant and production processes
  - c) regarding a year-wise report on production achieved, energy consumed, and specific energy consumption achieved, specific energy consumption reduction achieved, measures adopted for energy conservation and quantity of energy saved.
- The Baseline Reports will be a legal document.
- Energy Audit Report by an external Auditor.
- Certificates from NABL lab for fuel quality and GCV.
- Sector specific Performa, and all form-1 of last three years, Source of data be checked.
- Normalization document (Equation & Calculations) issued by BEE, for any normalization is claimed than it should be supported with the proper justification and documents support.

**Different Sector Specific Pro-forma is as follows:**

- Aluminium, 2 Pro-forma, Sa1, Sa2 for Smelter & Cold Sheet respectively.
- Cement, 1 Pro-forma, Sb for cement sector
- Chlor- Alkali, 1 Pro-forma, Sc for Chlor- Alkali sector.
- Fertilizer, 1 Pro-forma, Sd, for Fertilize sector.
- Iron & Steel, 2 Pro-forma, Se1, Se2 for Integrated steel & Sponge Iron respectively
- Paper & Pulp, 1 Pro-forma, Sf for Pulp & paper sector
- Textile, 4 Profarma,, Sg1,Sg2, Sg3,Sg4 for Composite, Fiber, Spinning & Processing respectively.
- Thermal Power Plant, 1 Pro-forma, Shedule for Thermal Power Plant.

So there are total 13 sector specific profarma.