

Frequently Asked Questions on the Energy Performance Monitoring (EPM) Requirements under the Energy Conservation Act (ECA)

General Questions on EPM

- 1. What is the difference between the Energy Management System (EnMS) and Energy Performance Monitoring (EPM) requirements? Are there any overlap in the report submissions for EnMS and EPM?**

Both requirements are complementary but there are distinctions in what the report submissions require.

EnMS report focuses on the implementation of a structured management system to ensure continual improvement in energy performance. On the other hand, EPM report focuses on in-depth evaluation of energy performances and identifying opportunities to help achieve the objectives and targets set in the EnMS policy.

- 2. What is the minimum retention period for the data used to prepare the EPM reports?**

The minimum retention period for the data is 5 years.

- 3. Can gencos implement offline EPM solutions to meet the EPM requirements?**

Yes, gencos may choose to either implement an online or offline EPM solution to meet the EPM requirements.

- 4. Can the implementation of EPM be outsourced to external vendors or consultants?**

Gencos may engage external consultants to implement EPM (e.g. develop the thermodynamic model and conduct energy performance reviews). However, gencos need to ensure that such arrangements can fulfil all the EPM requirements (e.g. quarterly performance reviews, monthly trending of EnPIs etc.). In addition, the validation report for each thermodynamic model developed and annual EPM report must be submitted by the genco.

Thermodynamic Model Development

- 1. Does the model require use of an engineering software to perform iterations, or are other software tools (e.g. MS Excel) also accepted?**

The EPM requirements provide flexibility on the choice of the tool as long as the requirements can be met, i.e. use of a thermodynamic model to perform heat and mass balance calculations to allow comparisons of energy performance between actual and desired states (e.g. new & clean basis) across different operating conditions and 15min data logging interval.

- 2. Can the new & clean (N&C) benchmark be based on the latest inspection data instead of Engineering, Procurement, and Construction (EPC) design values?**

Yes, the latest inspection/performance tests data after major maintenance/overhaul can also be used as benchmarks. The intent of the N&C benchmark is to establish a reference benchmark so that gencos can better evaluate the energy performance and its cost impact to facilitate decision making.

3. What does data logging interval of no longer than 15 minutes refer to?

This refers to the frequency of the data output from the EPM thermodynamic model and should not be longer than 15 minutes. This is to ensure sufficient granularity of the data points to provide insights on the trends.

4. Will gencos be required to install new instrumentations?

It is not a requirement to replace or install new instrumentations and gencos are encouraged to follow the industry's best practice to ensure proper calibration to maintain accuracy levels.

The EPM requirements provide flexibility in the choice of monitoring parameters in order to leverage existing monitoring systems. For EnPIs selected outside the prescribed list, gencos will be required to provide reasons why the EnPIs in the prescribed list are not suitable and provide justifications on the proposed alternatives in monitoring component level performances. This will be subjected to NEA's approval.

5. Are there any penalties if EPM fails to generate any data due to failure in system / instruments?

There is no penalty. However, gencos should provide countermeasures / action plans to rectify these issues at the soonest opportunity.

Some EPM solution providers are able to provide alternatives to such scenarios (e.g. replacement of faulty data with plausible data obtained from thermodynamic models, offline replacement of data, etc.) to ensure continuity of its functions. Gencos are encouraged to discuss such alternatives with the solution providers for new EPM implementation.

Energy Performance Indicators (EnPIs) and Monitoring Parameters

1. What is the difference between EnPIs and monitoring parameters?

EnPI is a metric which helps quantify energy performance or to demonstrate energy performance improvement. On the other hand, monitoring parameter is a variable that can affect the EnPI and may require routine or non-routine adjustment (e.g. temperature, flow rates, pressure, power output).

2. Can gencos identify their choice of EnPIs and monitoring parameters?

There is a prescribed list of key components and component level EnPIs that the gencos should monitor. Gencos will be required to identify at least 1 component level EnPIs from the prescribed list.

For EnPIs selected outside the prescribed list, gencos shall provide reasons why the EnPIs in the prescribed list are not suitable for the gencos and provide justifications on their proposed alternatives in monitoring component level performances. This will be subjected to NEA's approval.

Flexibility will be provided to gencos to identify the appropriate monitoring parameters for in-depth evaluation and root cause analysis. This allows for gencos to leverage their existing instruments / monitoring system and EnPIs.

3. Can EnPIs for EPM requirements be based on engineering estimates instead of measured data?
The EnPIs should be direct measured values of monitoring parameters or derived from measured values of monitoring parameters.

4. If measured monitoring parameters are used to calculate and monitor EnPIs for performance review of each generating unit and prescribed components, does this meet the EPM requirements?

In addition to calculating EnPIs based on monitoring parameters to track current energy performance of each generating unit or its components, it is also required to calculate/establish a reference (or N&C) benchmark at similar operating conditions, so that like-for-like comparisons can be made to identify significant deviations.

EPM Model Validation Report

1. What is the intent of the model validation report, and does it require EPM vendor endorsement?

The intent of the report is to validate the accuracy of the thermodynamic model for performance evaluation. The report should show that the EPM model is validated and the model outputs are representative for evaluation. Vendor endorsement is not necessary.

2. Can Site Acceptance Test (SAT) documents for previously installed thermodynamic modelling tool be used as a model validation report?

Yes, the SAT documents for thermodynamic model tool that was previously installed can be used as an EPM model validation report, if there are no changes to the thermodynamic model installed, and the thermodynamic model is still representative of the eligible generating unit that falls under EPM requirements, at the time of submission. In addition, there may be a need to furnish the report with further information, if not present in the documents, to fulfil the model validation report requirements.

3. If gencos have previously submitted a model validation report and there are subsequent changes made to the existing EPM thermodynamic model, do gencos need to resubmit the model validation report?

Re-submission of model validation report after changes are made to the thermodynamic model is not required, gencos may share an updated validation report or documents related to the changes to the thermodynamic model with NEA for information. However, if a genco commences commercial operation of a new or repowered generating unit that is covered under the EPM requirements, a new validation report will need to be submitted.

Performance Review and EPM Annual Report

1. Are gencos required to implement the energy efficiency opportunities identified through EPM?

Implementation of the energy efficiency opportunities is not mandated. However, gencos should implement the opportunities identified as soon as possible where the technical, operational and business considerations are favourable.

2. Is it acceptable if the root cause analysis (RCA) carried out is inconclusive?

The outcome of RCA is not prescribed. However, gencos should ensure best endeavours to develop the EPM model based on an appropriate number of monitoring parameters which can also aid in the RCA.

3. Can the performance review be conducted at a consistent part load point that is usually operated by the plant, instead of the entire load range for comparison?

EPM requirements allow for gencos to identify and determine appropriate load range, instead of a single load point, for analysis. For instance, if a plant loading of 300 MW and above is deemed representative of the generation unit, only data logged under these conditions should be used for performance review / analysis.

4. Are the opportunities identified required to be implemented within a specified time period? The interval between maintenance shutdown may extend based on OEM's recommendation due to technological advances.

EPM helps pinpoint areas of deviations and quantify gaps in terms of energy and cost savings. This supports decision making and prioritises corrective actions on conducting maintenance activities during scheduled maintenance, to recover efficiency losses.

Subject to technical, operational and business considerations, gencos should implement the opportunities identified as soon as possible.

5. The submission deadline for the model validation report overlaps with the first assessment period for the annual EPM report. If reworks to the thermodynamic models are required during the first assessment period after the validation report is submitted to NEA and there is no data for evaluation, are there any implications or penalties?

There is no penalty. If there is no data during a period within the first assessment period for the performance review due to re-works to the thermodynamic model, gencos may indicate so in the annual EPM report as a form of justification.

For further clarification on the EPM requirements, please contact your NEA ECA account manager via email.

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