

SentientMonitor

Accurate, Auditable Greenhouse Gas Monitoring

Technical Fact Sheet for Power Industry

Introduction

SentientMonitor is Synengco's leading technology solution for Greenhouse Gas Emissions in the Power industry.

Key features

The key features of SentientMonitor are:

- ☑ Full compliance with Greenhouse Gas Benchmark Rule (Generation) No.2 of 2003 Method 2 Performance Improvement Testing Regime Guidance Document.
- ☑ Full compliance with Generator Efficiency Standards and American Society of Mechanical Engineers Performance Test Codes (ASME PTC).
- ☑ Can post correct for ambient conditions, fuel quality, carbon in ash and instrument calibrations.
- ☑ Provides both greenhouse intensity measures (reference, lower and lower implied) as well as the plant performance improvement measures on a 30-minute basis with a 1.5% uncertainty requiring nil adjustment of the plant performance improvement.
- ☑ These measures can be provided as an average hourly, daily, weekly or monthly report for submission for NSW Greenhouse Abatement Certificates.
- ☑ Independently assessed against Performance Improvement Testing Regime to provide an uncertainty to <1.5% ($\pm 0.50\%$ to $\pm 1.00\%$).
- ☑ Real time 1 minute monitoring and reporting of positive weighted averages at 30-minute intervals compliant to Performance Improvement Testing Regime.
- ☑ Reporting tailored to suit your needs.
- ☑ Uses existing plant instrumentation.
- ☑ Fully validated against standard performance testing.

- ☑ Integrates with existing data and reporting systems or provides New South Wales Greenhouse Abatement Certificate's reporting using Web based system.
- ☑ Able to analyse historical data for selection of pre improvement reference conditions for Performance Improvement Testing Regime.

SentientMonitor Data Collection

SentientMonitor collects real time plant data via the DCS, SCADA, PLC, historian or a combination of these. Periodic information such as coal quality, carbon in ash can be manually entered or obtained from other databases.

Plant data inputs are validated using comparison to standard (expected) values and the use of mass and energy balances to reconcile accurate data. Bad data is flagged for attention to plant operators or technicians and replaced by default values using averaging techniques. If insufficient valid data is available the system will cease, alert the authorised person and cease calculation.

Before we install SentientMonitor, we undertake an engineering study to assess critical instruments is undertaken. It is our experience that most Power Stations have sufficient existing instrumentation to enable SentientMonitor to provide Greenhouse intensity and plant performance to a <1.5% uncertainty.

The methodology used by SentientMonitor reduces or eliminates your dependence upon otherwise inherently inaccurate instrumentation to measure greenhouse gas emissions.

The station's gross electrical output, excitation and unit power consumption (+ transformer losses etc) can be reconciled

against the NEMMCO precision revenue meters for net sent out power.

This methodology reduces or eliminates the dependence on inherently inaccurate instrumentation such as flow measures and fuel properties, thus improving uncertainty and the need for accurate coal properties for real-time performance analysis.

Calculations

SentientMonitor models all components within the power generation process such as turbine stages, feed water heaters, condenser, cooling systems, boiler feed pumps, boiler elements, forced draft & induced draft fans, air heaters and ancillary power consumption.

A full mass and thermal balance is completed of the system to provide the key performance information of each plant component in accordance with the ASME PTC.

The output calculations include Greenhouse Intensity (reference, lower and lower improved) and plant performance improvement and are in accordance with the Greenhouse Gas Benchmark Rule (Generation) No.2 of 2003 Method 2 PITR Guidance Document.

Where the real time input allows, data is provided in 1-minute intervals and totalled to 30 minutes, hourly or daily averages as required.

SentientMonitor also provides for the turbine generator gross heat rate to be an "as run" value as required by The Greenhouse Gas Abatement Scheme. It can be corrected for all of the primary

corrections as per original equipment manufacturer.

The system also automatically corrects for a range of different operating configurations such as heaters out of service.

SentientMonitor operates in either a monitoring or a simulation mode. If historical data is available, the monitoring mode can be operated over the historical data for the analysis and development of the pre-improvement reference performance curves.

The simulation mode provides learning functions supported by complex mass and energy balances, to provide guidance on optimising plant performance through the analysis of possible operation changes.

Uncertainty

The absolute uncertainty of SentientMonitor has been independently assessed as providing a relative uncertainty between Plant Performance Improvement measurement periods of between $\pm 0.50\%$ to $\pm 1.00\%$.

Data Outputs

SentientMonitor uses an open architecture philosophy so we can integrate with and use your existing data and reporting systems to give you more efficiency.

The Greenhouse intensity and plant performance improvement information is displayed in the SentientMonitor web based reporting system and/or published out to other databases, SQL, Oracle or MS Excel for reporting from these databases with existing reporting tools.

Reports are tailored to meet your needs at intervals specified by you.

Sentient Comprehensive Performance and Abnormal Operations system

SentientMonitor is designed to integrate with other Sentient System™ products including:

- Sentient Real Time Performance Monitoring;
- Sentient Cause (our root cause analysis technology); and
- SentientAlert (our early warning system).

This allows the user to leverage the investment in SentientMonitor to provide a comprehensive, high precision, real time performance and abnormal operation management system that is compliant with both generating efficiency standards and American society of Mechanical Engineer Performance Test Codes.

Our expertise

Synengco's people and technologies operate at the coalface in various power generation sites across the globe. We are world specialists in information critical systems and our SentientMonitor technology leads the way in Greenhouse Gas Emission accountability.

The Payback Period

The benefits of using Synengco's technology are quantifiable and immediate. Our clients experience payback periods ranging between 6 months and 18 months.

To Contact us

For more information please contact:

Don Sands
Director

[P]: +617 3229 3333

[F]: +617 3229 8011

[E]: info@synengco.com

[W]: www.synengco.com