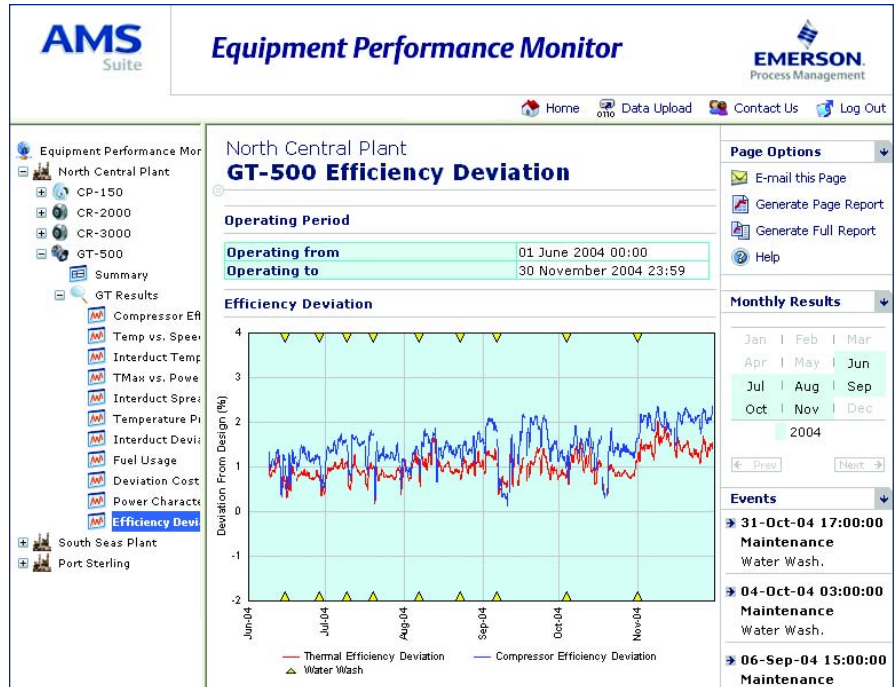


# Performance Monitoring - Gas Turbines

- Reduce operating costs and maximize production
- Increase availability and reliability
- Avoid unplanned downtime and costly shutdowns
- Maintain power demand to plant or to grid
- Determine optimum load across variable ambient conditions
- Reduce fuel costs and energy losses
- Optimize gas turbine and plant heat rate
- Reduce unplanned maintenance expenditures



Difference between actual and design GT thermal efficiency and compressor efficiency.

## Enable Predictive Maintenance

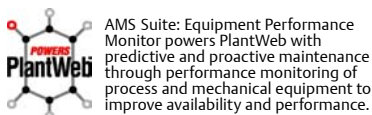
AMS Performance Monitor provides the tool to achieve peak performance of **Gas Turbines**. It facilitates the move to predictive and proactive maintenance programs, thereby maximizing equipment performance.

## Equipment Categories

- Aeroderivative
- Industrial (Heavy Duty)
- Mechanical Drive Application
- Power Generation
- Single and Twin Spool
- Twin Shaft

## Success Stories

- Change water wash maintenance strategy reducing downtime from weekly to six weekly saving \$150K/year.
- Eliminate unplanned equipment shutdown (\$2.6M/year potential lost capacity), ensuring power demand is met.
- Determine relative performance of parallel operating margins to assist in optimizing load sharing and scheduling.
- Adopt a proactive maintenance strategy, increasing availability by 5%.



AMS Suite: Equipment Performance Monitor powers PlantWeb with predictive and proactive maintenance through performance monitoring of process and mechanical equipment to improve availability and performance.

## Capabilities

- Continual assessment of performance relative to design or baseline.
- Alerts for performance degradation beyond defined limits.
- Data validation and reconciliation using rigorous mathematical models.
- Parameters corrected to non-dimensional and ISO / ambient conditions.
- Performance tracking and associated heat rate degradation.
- Performance attributed to individual component sections and stages.

and allows users to:

- Optimize the operation of GT's to meet production targets.
- Track the effects of water washes and maintenance activities on GT performance.
- Benchmark and compare performance between similar units and / or multiple sites.

## Key Performance Indicators (KPIs)

The following are typically presented using ASME PTC 22 thermodynamic custom-built modeling techniques:

- **Polytropic Compressor Efficiency** - Use to determine performance trends and effects of maintenance events.
- **Power Characteristics** - ISO power production and corresponding thermal efficiency overlaid on design / baseline performance.
- **Efficiency Deviation** - Load independent comparison of performance relative to design. Presented separately for both compressor and thermal efficiency.
- **Turbine Inlet Temperature (TIT) vs. Power** - Scatter plot identifying GTG degradation and optimum control regions.

- **Temperature Profiles** - Together with performance KPIs, identify operational conditions to recognize machine performance.
- **Fuel Usage** - Current fuel usage and corresponding fuel requirement at design performance. Shows the effect of degradation and fuel consumption rates.
- **Exhaust / Interduct Spread** - Radial profile of temperature probes relative to position.
- **Temperature Ratio (vs. Speed)** - Scatter plot indicates any deviation from expected performance.
- **KPI Synopsis** - Comprehensive user-defined statistical KPI values with reference to occurrence.
- **Operating Loss Cost** - Track current and historical 'lost opportunity' - both instantaneous and cumulative.

**Gas Turbine Demonstration** available at [www.AMSPerformanceMonitor.com/Demo](http://www.AMSPerformanceMonitor.com/Demo)

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