



11 YEARS OF AUTOMATED COMBUSTION OPTIMIZATION

How Hermiston Generating Plant Used ECOMAX® to Reduce Emissions and Protect Critical Gas Turbine Hardware

**CUSTOMER:**

Perennial Power / Hermiston Generating Plant

LOCATION:

Hermiston, Oregon

ASSETS:

Two GE 7FA Gas Turbines

SOLUTION:

ECOMAX® Automated Combustion Optimization

ECOMAX EXPERIENCE:

Approximately 11 Years

THE CHALLENGE

Hermiston Generating Plant operates two GE 7FA gas turbines in eastern Oregon, where operating conditions range from triple-digit summer temperatures to winter temperatures that can fall well below freezing.

Before ECOMAX®, the plant relied on periodic tuning following outages and, eventually, additional winter tuning to address seasonal operating changes.

The problem was that a turbine tuned at one operating point could not automatically adjust as conditions changed.

The plant's primary concern was the impact on combustion hardware.

According to key maintenance staff, the condition of components coming out of the machines made the issue visible. Fuel nozzles, liners, coatings, and other combustion hardware showed significant signs of thermal and dynamic stress.

The Key Business Risks

- High combustion hardware refurbishment costs
- Combustion dynamics affecting hardware condition
- Seasonal manual tuning requirements
- Emissions performance
- Conservative operation as conditions changed

For a plant where turbine inspection schedules and maintenance costs are heavily influenced by combustion hardware condition, the issue had direct operational and financial consequences.

THE PRESSURE

Combustion Hardware Costs Millions to Maintain

Hardware refurbishment is a major expense for a large-frame gas turbine facility.

Refurbishing turbine hardware can involve several million dollars in cost. The condition of the hardware coming out of the machine directly affects repair scope, refurbishment requirements, and the ability to achieve additional repair cycles.

The plant also faced a fundamental limitation with periodic tuning:

“You tuned it in one spot. You’re not tuning it as conditions change.”

As the plant moved between summer and winter conditions, static tuning could not continuously respond to changing operating conditions.

The result was a clear need for a system that could respond to actual turbine conditions while managing both emissions and combustion dynamics.

THE SOLUTION

ECOMAX® Continuously Adjusts to Actual Operating Conditions

Hermiston began evaluating ECOMAX® in 2014 and installed the system on its units beginning in 2015. Unlike periodic tuning, ECOMAX® continuously monitors and responds to actual turbine operating conditions.

For Hermiston, the value came from two primary areas:

LOWER EMISSIONS

Unit 1 continues to operate with ECOMAX® and DLN 2.0 combustion hardware.

Operating with ECOMAX®
on DLN 2.0 hardware

15 PPM NO_x

BEFORE CATALYST

VS

Original guaranteed level
for DLN 2.0 combustion

25 PPM NO_x

GE DLN 2.0 GUARANTEED

Maintenance staff credited ECOMAX® with helping the unit operate below the original DLN 2.0 guaranteed emissions level.

BETTER HARDWARE CONDITION

“The Hardware Looks Way Better Than It Used To.”

The most important evidence is visible during outages.

After decades of experience at the plant and direct responsibility for inspecting, quoting, repairing, and managing turbine hardware, key maintenance personnel have seen a clear difference in the condition of components removed from the machines.

Since implementing ECOMAX®, they’ve observed:

- Better liner condition
- Less visible thermal damage
- Improved condition of thermal barrier coatings
- Reduced evidence of dynamics-related stress
- Better overall combustion hardware condition

This matters because combustion dynamics can create significant mechanical stress on turbine hardware. By continuously tuning for both emissions and dynamics, ECOMAX® helps the plant maintain more stable combustion conditions.

THE LONG-TERM VALUE

More Repair Cycles Can Create Significant Lifecycle Value

Hermiston has achieved more repair cycles from some of its hardware than considered typical. The assessment was straightforward:

“If you can run another set of hardware an additional 12,000 hours, or another cycle on the hot gas path hardware, that’s worth its weight in gold.”

The value extends beyond a single maintenance event.

For a facility managing:

- 12,000-hour combustion hardware
- 24,000-hour hot gas path hardware
- 48,000-hour major inspection intervals

Extending useful hardware life or achieving additional repair cycles can materially affect lifecycle maintenance economics.



THE RESULT

11 Years of Proven Operational Value

After approximately 11 years of operation with ECOMAX®, Hermiston's experience can be summarized in two primary outcomes:

BETTER HARDWARE CONDITION

The plant has observed visibly improved combustion hardware condition and has achieved additional repair cycles on some components. For management and maintenance staff, the decision is fundamentally economic.

LOWER EMISSIONS

ECOMAX has helped the plant maintain strong emissions performance across changing operating conditions.

"The big thing is your repair cost on your hardware is going to be reduced. Your emissions will be less. Those are both two huge factors."

Tim Key

Maintenance and Projects Manager
Employed at Hermiston for 29 years

He also offered a clear assessment of the investment:

"It pays for itself relatively quick."

ECOMAX® BY NAES

Automated Combustion Optimization Backed by Plant Operations Expertise

ECOMAX helps gas turbine operators manage:

- Combustion dynamics
- NOx and CO emissions
- Flame stability
- Changing ambient conditions
- Operational flexibility
- Combustion hardware exposure

Learn how NAES can support your gas turbine performance strategy.

NAES Corporation

www.naes.com

+1 (425) 961-4700

info@naes.com

