Saving energy with smart e-boiler monitoring

Boosting sustainability with real-time energy insights

Benefits at a glance

- Improved energy efficiency through accurate steam and-power measurement
- Reduced energy losses thanks to real-time monitoring and diagnostics
- Lower CO_2 emissions by optimizing e-boiler operation
- Compliance with the stringent requirements of the Dutch Emissions Authority

Process conditions

Medium 1: Saturated Steam

- Pressure: 11.5 bar
- Temperature: 189.9 °C (373,82 °F)
- Flow rate: 3000 m³/h
- Pipeline size: DN150

Medium 2: Boiler Feed Water

- Pressure: 14 bar
- Temperature: 108 °C (226,4 °F)
- Flow rate: 0–20 m³/h
- Pipeline size: DN40

A global independent infrastructure provider partnered with Endress+Hauser to gain better insight into the energy performance of its e-boiler system. By implementing advanced measurement solutions and data-driven analysis, the Dutch company was able to optimize steam generation and reduce unnecessary energy consumption. The result: improved energy efficiency, reduced emissions, and a more sustainable terminal operation.

The challenge Endress+Hauser supports the tank storage company in sustainability and energy savings. Together, they are taking significant steps toward sustainability and have decided to use a 10 MW electric boiler. This e-boiler is connected in parallel to the existing gas-fired boiler and is activated when electricity prices are low or when there is a need to support the national power grid, for example, to help maintain grid stability.

For this energy solution, accurate and reliable measurements are crucial, not only for operational efficiency, but also for communication with authorities due to strict regulatory requirements. Endress+Hauser was asked to provide input on a suitable measurement solution and to advise on compliance with the Dutch Emissions Authority (NEa) and the conditions of the SDE++ subsidy scheme (Incentive for Sustainable Energy Production and Climate Transition).

Together, we ensure that the infrastructure provider meets legal requirements while fully benefiting from available subsidies, with the ultimate goal of achieving a sustainable and future-proof energy transition.

Endress+Hauser

People for Process Automation

Our solution Endress+Hauser supplied a fully equipped cabinet in which all energy computers and relevant components are installed.

For steam measurement, a vortex flowmeter was used in combination with an external pressure and temperature sensor. These signals are transmitted to the EngyCal RS33 steam calculator, which performs energy calculation.

Vortex Flowmeter Proline Prowirl F200 for measurement of steam flow

To measure the boiler feedwater, an ultrasonic flowmeter was applied, also in combination with an external temperature sensor. The corresponding signals are processed by the EngyCal RH33 BTU meter.

Endress+Hauser Service Engineer commissioning Energy Calculator EngyCal RS33 for steam and EngyCal RH33 for liquids together with Data Manager Memograph M RSG45

Both EngyCal energy computers forward their data via Modbus to the telemetry system of Kenter, a certified and officially recognized metering company. Kenter handles the reporting to the Dutch government.

At the customer's request, the measurement data is also made locally available. For this purpose, signal splitters are used. The split signals are logged via a Memograph M RSG45 data manager from Endress+Hauser and also transmitted via PROFIBUS® DP to the control system.

For this project, multiple services were applied, including project management, FAT (Factory Acceptance Testing), SAT (Site Acceptance Testing), engineering and commissioning.

Components

1x Cabinet
1x Proline Prowirl F 200 vortex flowmeter
1x Cerabar PMP71B - pressure transmitter
2x iTHERM ModuLine TM131 Industrial modular thermometer
1x EngyCal RH33 BTU meter
1x EngyCal RS33 steam calculator
1x Memograph M RSG45 data manager
1x RNB22 system power supply unit
2x RNF22 power feed-in/error message module
5x RN22 active barrier

EngyCal RH33

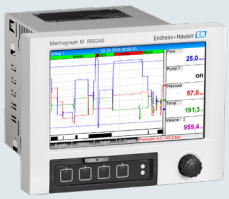
Cerabar PMP71B

RNB22

EngyCal RS33

Proline Prowirl F 200

RNF22



Memograph M RSG45

iTHERM ModuLine TM131

RN22

Result By integrating Endress+Hauser's advanced measurement solutions, the global independent infrastructure provider has achieved significant improvements in the management of their 10 MW electric boiler. Real-time, accurate data on steam pressure, temperature, and flow rates have allowed the customer to optimize energy usage, reduce operational costs, and contribute to a lower carbon footprint.

Additionally, the solution ensures compliance with the stringent requirements set by the Dutch Emissions Authority and aligns with the conditions of the SDE++ subsidy scheme. This partnership enables to maximize subsidies, while supporting their ongoing efforts to transition to a more sustainable energy model.

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