

Optimizing operating expenditure and reducing emissions - no contradiction!

Opportunities through SAACKE Cloud Analytics

Introduction

Operators of combustion plants are faced with constantly increasing requirements. On the one hand, they must produce more efficiently and flexibly than ever before, act quickly in the market and achieve maximum profitability. On the other hand, society is becoming increasingly aware of environmental aspects, which is increasingly reflected in legislation. The need to reduce emissions and increase efficiency is no longer just a matter of conscience, but a necessity that has a direct impact on process costs.

Plants and processes are therefore becoming more and more complex, while at the same time highly qualified personnel who deal with the processes and plants in the long term and identify with them are becoming increasingly scarce.

In order to meet these requirements, systems and information sources for monitoring and analyzing processes are required that are easy to handle, guarantee reliable operation and transparently demonstrate optimization potential without requiring expert knowledge on the part of the operators - because this is the only way to operate systems in a highly efficient, highly available and extremely low-maintenance manner. The risk of investment decisions being made as a result of stricter future environmental regulations can also be limited in this way.



This document outlines the possibilities that SAACKE Cloud Analytics offers you to increase the efficiency of your processes and the availability of your plant.

Why monitoring and analysis?

The complexity of today's industrial plants for thermal energy generation has increased many times over. At the same time, environmental regulations are being tightened, making the requirements for visualization and optimization much more important for investment projects.

In order to ensure optimum operation, various control processes are required in addition to a large number of different sensors and devices for monitoring safety. It is becoming increasingly difficult for on-site personnel to maintain an overview of the entire plant, from fuel supply to energy consumption and operating conditions, and to ensure that deviations are detected before they become a real problem - before they lead to costly downtimes or exceed legal limits, for example. Not only are there many individual components that need to be considered - the distances to the individual measuring points are often very long, and it is simply not possible to view all the necessary information at the same time in order to draw correct conclusions.

At the same time, the number of experienced employees in the company is being reduced, either due to demographic change or for economic reasons. This fact has a big influence on the operation of the plant: the previously readily available expert, who has known the plant for years, is closely familiar with every manometer and recognizes every deviation from the click of a relay, is unfortunately very difficult to find in times of a lack of skilled workers.

Therefore, larger correlations in the amount of individual information are often not recognized - and this can be expensive.

If there were a central source of information for monitoring the entire plant, which could be called up at any time and which would allow correct conclusions to be drawn about the condition of the plant using effective algorithms, it would be possible, for example, to identify and plan upcoming service work. Increased maintenance, labor and overhead costs due to downtime or wear would be reduced. Changes with regard to process engineering (e.g. pressures, temperatures, steam removal), which, for example, lead to increased emissions, could also be detected and processed in good time. In short, many problems could be identified and resolved before they cost money.

This is where data analysis systems come in.

Intelligent data analysis systems use networked sensors to transmit all important process values of the plant to a central data pool. There the data is checked and evaluated on the basis of algorithms for anomalies and correlations.

In this way, depending on the quality of the sensor technology and the algorithms, impending faults can be reliably predicted or process optimization potential uncovered.

The following applies: The more expertise the creator of the data analysis system has about relationships in the overall process, the variables to be considered and the control processes, and the better he is able to abstract relationships from these, the better the analysis system is.

Why SAACKE?

SAACKE is the only supplier in the market that develops and manufactures **all** core components of combustion plants (burners and their supply systems, electronic controls, boilers, exhaust gas heat exchangers and exhaust gas cleaning systems).

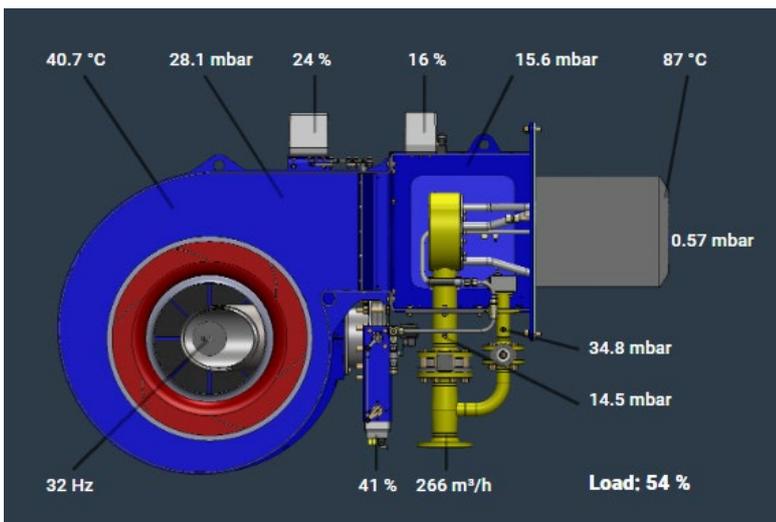
Therefore SAACKE as a complete system provider understands every single aspect of an energy supply system and is able to evaluate all relevant information and draw correct conclusions from the evaluation.

The step into the world of intelligent data analysis systems was therefore more than logical, and SAACKE has therefore declared the company's digital capabilities to be a central component of the technology roadmap.

The goal was to create a solution that meets **all the** requirements for monitoring and analyzing a modern combustion plant and, in addition, to create a possibility that makes the results of the evaluations easily accessible at any time and anywhere - naturally only for appropriately authorized persons, because the security of your data is also of great concern to us.

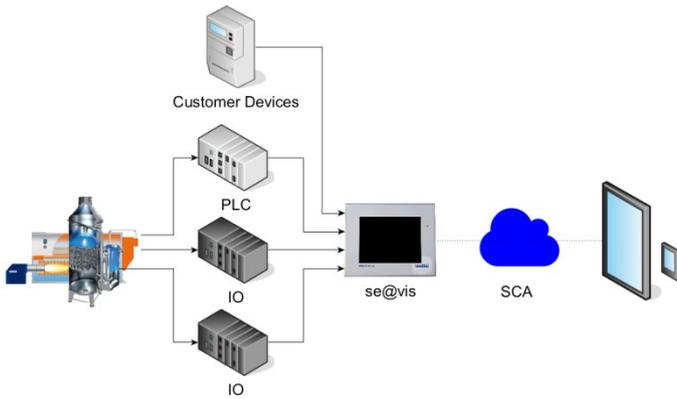
What does the SAACKE solution look like?

The SAACKE solution starts with the *SAACKE Smart Burner* - a system consisting of burner, supply system and measurement and control technology that is equipped with a large number of sensors that allow the SAACKE se@vis control system to find the optimum operating point for your system and to operate the burner constantly in it.

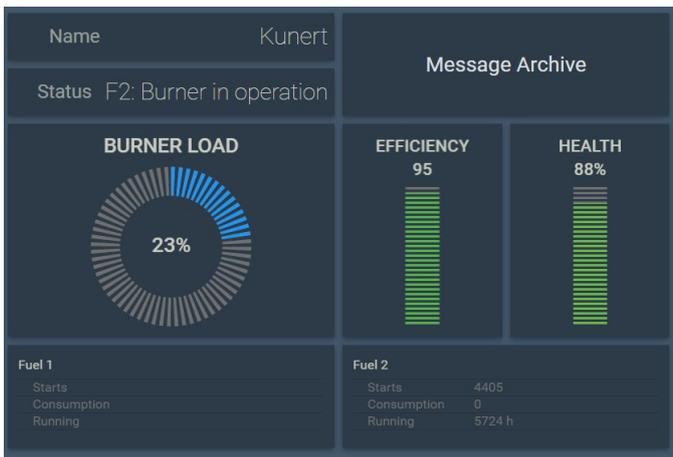


All data required for monitoring and analyzing the Smart Burner and all other system components is centrally recorded by an "IoT Edge Device" (part of the se@vis V3.00 product range). This device evaluates the data on site in such a way that system alarms are generated and issued.

The data is then transferred to the *SAACKE cloud* where it is analyzed by *SAACKE Cloud Analytics* (SCA). SAACKE Cloud Analytics compares the current analysis data of your plant on the basis of KPIs (e.g. efficiency) with previous analysis data and can therefore reliably detect deviations. In addition, the analysis data is compared with comparable systems, so that you can also benefit from the findings of other analyses. The analysis models are constantly being further developed so that your system remains state-of-the-art at all times - without having to adapt the sensors or the control system on site.



SAACKE Cloud Analytics offers the possibility to monitor and analyze the thermal process worldwide from any location in real time. The large amount of information is prepared in such a way that the decisive key figures are presented at a glance.



In case of problematic deviations, the responsible authorities named by you will be informed directly (e.g. via push message on the mobile phone) and can, if required, find the optimal solution in cooperation with the SAACKE experts - because if required, the data of each individual sensor can be analyzed by our experienced experts.

All this ensures that the customer has full insight into all data and always sees what "his" system is doing. If required, SAACKE can also make the data available online to the customer's own IT systems, for example to cost-effectively expand the monitoring of the entire plant.

References in use at SAACKE customers

On the water - SAACKE Marine Systems

In order to comply with stricter emission standards in international shipping, the new IMO standards require shipowners either to switch to significantly more expensive, low-sulfur fuels or to treat the exhaust gases through an exhaust gas cleaning system in such a way that the pollutant emissions correspond to those that would result from the use of a low-sulfur fuel. The operator must be able to prove to the local authorities that the ship has been operated in

accordance with the rules for an interval of 18 months at any time. The penalties for breaches of the rules are severe.

In many cases ship operators opt for an exhaust gas cleaning system such as the EGCS system from SAACKE. The "EGCS Management" control system developed for this purpose is also part of the se@vis product family and provides the necessary logging functionalities and the connection to SAACKE Cloud Analytics. In this way, SAACKE Cloud Reports can be generated at any time, both locally and worldwide, which prove the rule-compliant operation. If compliance with the limit values is at risk due to a malfunction or incorrect operation of the system, the shipowner responsible is informed and can initiate countermeasures before he has to fear consequences. The SAACKE experts at the headquarters in Bremen can analyze the data and deliver analyses very quickly.



Thanks to the SAACKE EGC system installed on the chimney, the MT Levana can sail unhindered through the North and Baltic Seas.

Plants equipped with this system have been running continuously since 2013, the strict limit values are adhered to and securely logged. SAACKE Cloud Analytics was able to detect individual limit violations resulting from operating errors in good time, and countermeasures could be taken to prevent penalties.

As an additional benefit, ship owners are presented with proposals for optimizing the operating profile of the boilers and drives connected to the flue gas cleaning system, based on data from long-term monitoring. Lay times in harbors are minimized, as the maintenance teams can read out the condition of the plant and in particular the fault memories before arrival and are thus optimally prepared for a known condition.

On land - SAACKE Industrial Systems

The heart of the production of many SAACKE customers is the boiler, which often has to be made fit for the future, especially with regard to emissions and consumption values.

SAACKE aroused great interest from the Federal Ministries for the Environment, the Economy and Energy, above all through the installation of our customer Kunert Corrugated Board. SAACKE installed a Smart Burner and the current se@vis Burner Management System and connected the system to SAACKE Cloud Analytics in order to optimize it step by step on the basis of the SCA analyses in cooperation with Kunert.



Delegation consisting of representatives of the Federal Ministry of Economics and Energy (BMWi), the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), the Federal Environment Agency, the Darmstadt Regional Council and TÜV Hessen, as well as SAACKE, which met to demonstrate the state of the art at our customer "Kunert Corrugated Board".

In the end, SAACKE was able to achieve an enormous reduction in NOx emissions through retrofitting - to be more precise: a reduction of 80% to less than 30 mg/m³! As part of the long-term recording of the plant data, SCA was used to determine that recurring peaks in consumption behavior generated high consumption peaks in fuel demand. Since the fuel costs are determined not only by the base load, but also by the peak consumption, the fuel costs could be additionally reduced by appropriate measures in the plant operation, without one euro investment. The plant is thus also equipped for future emission requirements - and saves fuel costs every week.

When defining the digital SAACKE portfolio, it was important that the possibility of optimization was not limited to new buildings, but that old systems could also be retrofitted with this technology. And regardless of whether SAACKE burners, controls or boilers are in use. In case of doubt, the SAACKE experts switch to existing data or offer retrofitting with inexpensive sensors. This also makes it easy to speed up troubleshooting and increase the efficiency of customer service. As in the example of the marine sector (see above), service employees arrive at the customer already informed and, if necessary, with special spare parts.

What is SAACKE planning for the future?

SAACKE is already working on the solutions of tomorrow, because the possibilities offered by digital technologies are far from exhausted. Through close cooperation with various scientific research institutes and the expansion of the database, we will further improve the analysis models in order to increase the efficiency and availability of combustion plants and put our vision of an emission-neutral future into practice. Whether these are methods from the field of Big Data or AI Artificial Intelligence... you will be surprised.

Our Vision

We believe that energy generation from fossil fuel combustion can be as efficient and clean as from sun, wind and water.