

Hack&Match Event #3

"Advanced Technologies for Energy Savings"

CHALLENGES

Challenge #1 description:

Company: SÜDSTÄRKE GMBH (Germany)

Südstärke GmbH is a major German producer of potato starch and processes starch potatoes into potato starch and starch derivatives. Starch is one of the most important renewable raw materials, and it offers a wide range of applications in food production, as well as in the chemical and paper industries. For example, native potato starch is used as a base ingredient for glass noodles, in the production of snacks, dumpling dough, and ketchup.

Challenge:

The Südstärke GmbH processes around 250,000 tons of potatoes annually at its Schrobenhausen site to produce native potato starch and starch derivatives. Energy in the form of steam is required for these processes, which is provided by two gas boilers (Boiler 1 capacity: 8,400 kW, Boiler 2 capacity: 3,500 kW, energy source: natural gas). Annually, we require approximately 25,000,000 kWh of natural gas for steam generation in our boiler house, with about 70% of this amount consumed from September to December. During this period, both boilers operate, consuming approximately 17,000,000 kWh of natural gas to generate steam at a pressure of 12 bar and a temperature of 188 °C. In the other months, only the smaller boiler operates, generating steam at a pressure of 7 bar and a temperature of 165 °C, which is sometimes reduced to 0.5 bar with a temperature of about 100 °C for drying and roasting processes. The gas consumption from January to August averages around 800,000 kWh of natural gas per month. Our goal is to generate the required steam, which is produced by our boilers, using renewable energies, thereby reducing our carbon footprint and overall natural gas consumption. The aim is to make use of as many components of the existing technology as possible (naturally, only where feasible) to keep investment costs as low as possible. Additionally, steam generation with renewable energies must be economically viable, meaning payback times should not exceed 10 years.



Challenge #2 description:

Company: CELULOSA FABRIL SA (CEFA) - (Spain)

We are CEFA, a leading company in the automotive industry specialized in the design and manufacture of innovative plastic injection components. With production plants in Zaragoza (Spain) and Żagań (Poland), we combine international presence with agility and excellence. Our portfolio covers interior and exterior solutions — from dashboards and door panels to decorative trims and functional parts — always developed with a strong focus on innovation, quality, and competitiveness. At CEFA, we are committed to collaborating with partners to co-create advanced, sustainable, and value-driven solutions for the mobility of the future.

Challenge:

At CEFA, we are committed to innovation, sustainability, and efficiency in the automotive industry. With production plants in Zaragoza (Spain) and Żagań (Poland), we design and manufacture plastic injection components such as dashboards, door panels, trims, and functional parts. As our production grows, our machines – ENGEL CC100, CC200, and especially the larger ENGEL CC300 – consume increasing amounts of energy. This makes the optimization of every step in our processes critical, particularly when it comes to energy-intensive operations like heating injection molding machines.

Today, the heating process is managed manually. Operators must decide when to switch on the heaters, often erring on the side of caution and starting them too early. The result is excessive heating time, unnecessary energy consumption, and higher CO₂ emissions. In other cases, if heating is started too late, machines are not ready when production should begin, causing downtime and delays. In both scenarios, the process is inefficient and unsustainable. As the size and power of our machines increase, these inefficiencies lead to even greater energy losses and environmental impact.

Our challenge is to create a smart system that optimizes heating times. The idea is simple: each machine should be heated precisely so that it is ready at the exact moment production starts – not earlier, not later. Achieving this requires combining knowledge of heating times, the type of raw material used, and the production plan.

We already have three valuable data sources that can serve as the foundation for such a system. The first is a reference table showing the heating time required for each machine model depending on the type of raw material. The second is a mapping table that links each finished product with the specific material used in its production. The third is the daily planning email sent by our production planner, which specifies what each machine will produce and when it needs to start. By bringing these sources together, we can calculate the precise moment when each machine's heater should be activated.

However, we do not want to stop at a simple scheduling tool. We are looking for innovative solutions that combine hardware and software. Sensors, IoT devices, and predictive algorithms could be used to monitor the heating process in real time, adjust to variations, and ensure that the machine reaches the exact required temperature at the right moment. Automation modules could switch heaters on and off without operator intervention, while dashboards could give supervisors a clear overview of energy use and efficiency improvements.



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The challenge is deliberately open and flexible. We invite all types of participants – startups, research centers, universities, technology providers, and independent experts – to bring forward their ideas. We are especially interested in disruptive solutions that may rethink the way heating is planned and managed, rather than limiting the scope to incremental improvements. Any proposal should ideally be adaptable to our existing ENGEL machines, but also scalable to future equipment as we continue to expand.

The potential impact of this project is substantial. By ensuring that machines are heated only when necessary, we can significantly reduce energy consumption, cut CO₂ emissions, and lower operating costs. At the same time, we improve production efficiency by eliminating delays caused by heating mismatches. This challenge is a crucial step in CEFA's broader strategy to strengthen our competitiveness while embracing sustainability and innovation.

In short, our goal is clear: we want to transform the heating process of injection molding machines from a manual, inefficient task into an intelligent, automated system that saves energy, protects the environment, and supports the competitiveness of the automotive supply chain. We are ready to collaborate with creative minds who share our vision and can help us turn this challenge into a breakthrough solution.

Challenge #3 description:

Company: CELULOSA FABRIL SA (CEFA) - (Spain)

We are CEFA, a leading company in the automotive industry specialized in the design and manufacture of innovative plastic injection components. With production plants in Zaragoza (Spain) and Żagań (Poland), we combine international presence with agility and excellence. Our portfolio covers interior and exterior solutions — from dashboards and door panels to decorative trims and functional parts — always developed with a strong focus on innovation, quality, and competitiveness. At CEFA, we are committed to collaborating with partners to co-create advanced, sustainable, and value-driven solutions for the mobility of the future.

Challenge:

At CEFA, innovation and continuous improvement are central to how we design and manufacture plastic injection components for the automotive industry. One of the key steps in our production process is laser marking a QR code on every injected part. This QR code is essential for our Traceability System: it is read at each subsequent stage of production to confirm whether the part has successfully passed earlier processes. In other words, the QR code is the backbone of quality assurance and traceability throughout the entire manufacturing chain.

Currently, the laser marking process presents a significant challenge. The laser machines require a long adaptation and setup period every time a new piece or configuration is introduced. Operators must perform numerous tests to find the right combination of parameters – such as positioning of the piece, laser power, duration, and other settings – before achieving a stable and acceptable marking quality.



This results in wasted time, excess trial pieces that must be discarded, and delays in production start-up.

Our challenge is to develop an adaptive solution that shortens setup time and reduces waste. Instead of treating each setup as if it were new, the solution should learn from experience: from the historical data of previous setups as well as from the tests being carried out in the current setup. By recognizing patterns and building knowledge over time, the system would be able to quickly suggest or automatically apply the most promising parameters, accelerating the path to a successful result.

We envision a solution that combines elements of machine learning, adaptive control, and process optimization. For example, the system could store detailed records of past setups – including parameters, test results, and final validated configurations – and use this data to predict the optimal starting point for similar future setups. During a new setup, the system could adjust parameters dynamically based on feedback, continuously narrowing down the options until the ideal configuration is reached. Over time, as the system learns from more and more cases, the number of trials required would shrink dramatically.

The potential benefits of such a solution are clear. First, it would save valuable time in production changeovers, making our operations more agile and efficient. Second, it would reduce scrap, since fewer parts would need to be discarded during setup trials. Third, it would support sustainability goals, as reducing waste and energy use directly contributes to lowering the environmental footprint of our production. Finally, it would empower operators, giving them intelligent support tools that help achieve consistent results faster and with less effort.

This challenge is open to all types of participants: startups with innovative AI solutions, research centers working on adaptive manufacturing systems, universities with expertise in machine learning or laser processes, as well as technology providers with proven experience in industrial automation. We are not looking only for incremental improvements – we are open to disruptive approaches that could fundamentally change the way laser marking is set up and optimized.

In short, **our goal is to transform laser QR code marking from a slow, manual trial-and-error process into a smart, adaptive system that learns from experience and continuously improves.** By collaborating with creative and forward-thinking partners, we aim to develop a solution that enhances traceability, efficiency, and sustainability, while reinforcing CEFA's position as an innovative and competitive supplier in the automotive sector.

Challenge #4 description:

Company: BLEND PLANTS (Italy)

Blend Plants is an Italian-based company specialized in the production of automated mobile mixing plants distributed all over the world. Blend plants can be also mounted on rail wagons so becoming a concrete batching train, and used in the construction and maintenance of ordinary and high-speed railway networks. Blend Plants is also specialized in customized projects, developed to meet the



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specific needs of its clients. Thanks to this flexible and client-focused approach, the company has created tailor-made solutions for special applications on railways and in tunnels.

Challenge:

We are looking for innovative solution to reduce the electric consumption in our plants and also to reduce the dimensions of the inverter to make it works.

Challenge #5 description:

Company: COFFEE CULTURE s.r.o. (Czech Republic)

Our company is a speciality coffee roastery based in Ostrava focusing on the highest quality product possible, combined with an environmentally responsible business strategy.

The main goal (challenge) is to lower the overall energy intensity of the roasting process with or possibly reusing the excess heat for purposes other than the roasting itself. This can be implemented and tested on an already functional low scale experimental roasting bed.
