

Bosch supports global player with Net Zero vision: PepsiCo operates hybrid boiler system with green electricity

Since mid-2023, PepsiCo has been producing tortilla chips and potato crisps for the Doritos and Lay's brands on three production lines in Środa Śląska. What makes the plant in Poland so special is that it is one of PepsiCo's most environmentally friendly production facilities in Europe. With its own energy infrastructure and the continuous expansion of this, the company is pursuing a Net Zero vision for carbon emissions. An important component in achieving this is a hybrid boiler system from Bosch, which also generates process heat using green electricity.



PepsiCo's greenfield factory was built within 20 months, covering an area of 55,000 square metres. At the heart of this new production landscape is sustainable, innovative technology, which utilises environmentally friendly energy sources such as waste heat, biogas and solar energy. Another important factor for PepsiCo is the extremely high standards of safety and reliability needed to achieve a production volume of up to 130 tonnes per day. The supply of process heat plays a particular role in this regard, too. As a technological solution, they are using a hybrid Bosch steam boiler system for various energy sources. "With our multivalent approach, we have succeeded in finding a flexible solution for PepsiCo that meets the company's current and future sustainability goals," says Łukasz Sarbiewski, Sales Manager for Bosch's exclusive partner, Loos Centrum Sp. z o.o. in Poland.

Climate-neutral steam generation

The Bosch system primarily utilises surplus green electricity via the ELSB electric steam boiler. With an electrical output of 3.6 megawatts, the ELSB generates five tonnes of steam per hour at 184 °C and 10 bar.



This produces no carbon emissions at all – a significant milestone, both for the Net Zero vision and for environmental protection. There are further advantages from an economic point of view: The electric boiler achieves an outstanding efficiency rating of over 99% and, by utilising surplus electricity, makes steam generation profitable. There is no need to purchase other energy sources, which reduces energy costs.

PepsiCo generates this green electricity using its on-site photovoltaic system. There are plans for further expansion in the future, and a wind turbine will also support electric power generation at a later date. If there are fluctuations in the amount of electricity produced due to the weather, or when there are peak loads, a reliable back-up is needed. The solution to this is a highly efficient UL-S gas-fired steam boiler, which supplements the Bosch system by producing another five tonnes of steam per hour. The convertibility of such boiler systems will offer flexibility if, in the future, other renewable energy sources become available in the infrastructure.



Customer

PepsiCo
Środa Śląska, Poland
Net Zero vision



Production

Greenfield factory
55,000 qm
130 t/d snacks



Environment

Energy infrastructure with photovoltaic systems, biogas, waste heat

The ELSB electric boiler from Bosch uses 3.6 megawatts of green electricity to generate up to five tonnes of steam per hour – without producing any carbon emissions.



Steam for 15,000 tonnes of corn

The generated steam is used in the corn cooking process, heating huge containers. Yellow corn is the main ingredient in Doritos tortilla chips: The production line processes up to 15,000 tonnes of corn each year – and up to 30,000 Doritos packs pass along the conveyor belt every hour. This makes the reliable supply of process heat all the more important. The different systems and types of energy need to be combined in a way that works holistically. The control system, which was produced and configured by Bosch for this project, has been set up accordingly. The incorporated software not only controls the complex steam processes, but also ensures intelligent communication between the systems. This is made possible by the smart multi-boiler control. "This means that the two steam generators can be operated in parallel or individually in a cascade, which ensures an uninterrupted supply of steam," adds Łukasz Sarbiewski. This entire process is automated, including communication with the central control room.

Another highlight is the electric steam boiler's rapid heat-up capability as well as its dynamic response behaviour. Steam is available for the cooking process within a short period of time. If there are massive load fluctuations, the electric boiler responds immediately – without any negative impact on energy efficiency or steam quality. This is made possible thanks to the modulation range of the thyristor switching, which is practically unlimited from 0 to 100%. In addition, optimised grid compatibility avoids negative effects on the stability of the power grid, which can occur when switching large loads.

Boiler technology from a single source

For a steam system to work perfectly, it requires components for thermal water treatment and condensate management. The two processes are identical for both electric and gas-fired boilers, so there is no need for different solutions. The boiler house is complemented by corresponding system components from Bosch. Integrated efficiency components on the conventional steam boiler – such as flue gas heat exchangers – boost its energy efficiency by up to 7%, contributing to further savings in terms of fuel and emissions.

In addition to the hybrid steam boiler system, Bosch also supplied the system for supplying heat to buildings and production halls, comprising two UT-L gas-fired boilers with control systems and waste heat recovery. The total heat output is around six megawatts. The technology boasts an efficiency level of 98%, achieving energy-saving and low-emission operation. The UT-L heating boilers from Bosch can also be converted to run on biofuels or up to 100% hydrogen.



The UL-S steam boiler generates up to five tonnes of steam per hour and serves as a reliable back-up for the supply of steam.



PepsiCo uses process heat in the form of steam in the manufacture of Doritos tortilla chips.



The new boiler house is fully equipped by Bosch technology.



Bosch components, such as the thermal feed-water treatment system, complement the boiler system.



The Bosch UT-L boilers support the supply of heat to the buildings and are highly efficient in generating up to six megawatts of heat.

Experts on site

Different technologies for energy generation, different types of energy and a complex production environment – all of these call for the right expertise, which the Bosch and Loos Centrum team have been able to provide. "From the initial concept right through to the commissioning of the boiler system, we worked side by side with PepsiCo as a project partner. Our direct contact on site will

continue to be beneficial when it comes to boiler servicing and technical support requirements," says Łukasz Sarbiewski. He adds, "We are delighted that we can use our technology to support PepsiCo as it strives to achieve climate neutrality." And Bosch is creating the ideal conditions to achieve this, with heating and process heat solutions for utilising renewable energy, scalability and the potential for conversion.

ELSB electric steam boiler at PepsiCo



5 t/h steam from 3.6 MW green electricity



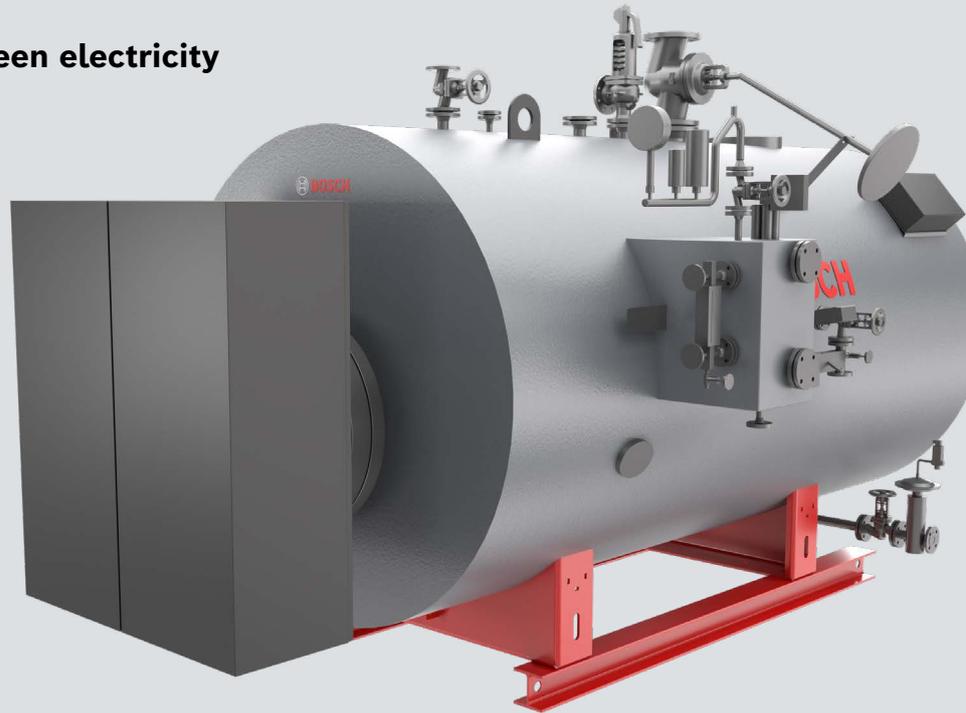
Rapid steam availability



Carbon-neutral, no flue gas



Over 99% efficiency



The project partners

Investor: PepsiCo Polska
www.pepsicopoland.com

General contractor: Budimex SA
www.budimex.pl

Plant construction: Electra M&E Polska
www.electra.co.pl

Certified Bosch exclusive partner:
Loos Centrum Sp. z o.o.
www.bosch-industrial.pl

We are: Bosch Industriekessel GmbH
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