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A Bavarian brewery tests beer as cold storage for smarter power use

The AI pilot shifts refrigeration across nine fermentation tanks toward strong solar output and cheaper electricity without changing brewing standards.

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A Bavarian brewery is testing whether beer can help act as a form of cold storage as part of a pilot project that uses artificial intelligence to shift refrigeration demand toward periods of stronger solar output and lower power prices.

Brauerei zum Kuchlbauer, a family-owned brewery in Abensberg, is working with Bayernwerk Netz GmbH and technology company encentive to digitally manage cooling processes tied to beer production, according to a statement released Tuesday by Bayernwerk. The project focuses on the brewery's cooling system and nine fermentation tanks, where temperature must stay within fixed limits during brewing and fermentation.

The basic idea is to use that permitted temperature range more strategically. When electricity from the brewery's own photovoltaic system is abundant, or when grid power is cheaper, the system could cool the beer somewhat more. At other times, the cooling load could be reduced and the beer would warm slightly, but still remain within the strict boundaries required for production. In that sense, the product itself would function as a thermal buffer.

The companies described the effort as a digital energy management pilot rather than a finished commercial solution. They said the first goal is to gather reliable operating data and create a clearer picture of when the brewery uses the most energy, where demand peaks occur and how much flexibility the production process allows. No figures for expected savings were released, and the partners did not present measured results from the trial.

Cooling is one of the most energy-sensitive parts of brewing. Freshly brewed beer must remain in a controlled temperature window during fermentation, and changes that affect product quality are not acceptable. The partners say the project is designed around those limits, with the brewing process and product standards remaining unchanged.

Jacob Horsch, managing director of Kuchlbauer, said in the statement that digitally connecting the brewery's equipment makes it possible to see when energy demand is highest, where consumption spikes occur and what room for maneuver exists inside the production schedule. Based on that information, he said, the brewery and its partners want to determine whether meaningful flexibility can be used and to what extent.

Bayernwerk said the pilot combines several data streams in one system. The company’s Energy Portal Business platform serves as the central tool for energy management, while encentive’s flexOn software is being integrated to collect data from the cooling installation and fermentation tanks. The system also pulls in historical consumption information, weather data and electricity price forecasts. According to the companies, AI is then used to identify patterns and calculate operating schedules for the equipment.

One reason the project matters is that generation and consumption do not always happen at the same time, even at sites with significant on-site renewable power. Bayernwerk said Kuchlbauer already produces more electricity overall than it consumes, but still has to draw power from the public grid at certain times because brewing demand does not always line up with sunshine or with the availability of stored energy.

That timing problem is common across food and beverage manufacturing, where refrigeration, heating and pumping loads often have to follow production needs rather than the power market. In brewing in particular, flexible cooling could become a practical way to lower exposure to volatile electricity costs and make better use of self-generated renewable energy, if the process can be managed without affecting quality. Similar approaches could eventually draw interest from other beverage producers that rely on temperature-controlled operations, including wineries and distilleries.

Bayernwerk presented the project as an example of how smaller and midsize industrial companies might use digital tools to support the energy transition. Maximilian Weinzierl, head of digital customer solutions at Bayernwerk Netz, said in the statement that companies that capture their energy use digitally and apply available flexibility more intelligently can create a basis for better business decisions and a more sustainable use of energy. He added that the broader energy transition will require not only more generation capacity and stronger grids, but also new ways of using electricity.

The pilot also points to a growing interest in “demand-side flexibility,” or the ability of businesses to move certain loads in time to match renewable supply, market prices or grid conditions. Industrial refrigeration is often seen as one of the clearest candidates because cooling systems do not always need to run at full power continuously, provided the product and the process remain within tight limits.

Bayernwerk, which operates electricity infrastructure across large parts of Bavaria and also runs a gas network in northern and eastern parts of the state, said its digital platform is intended to help customers reduce both costs and CO2 emissions. The company did not say when the Kuchlbauer trial would end or whether the model would be expanded to other industrial sites.

For the brewery, the project is centered on a simple question with broader implications: not just how much energy is needed to make beer, but exactly when that energy is needed and what it costs at that moment. The answer could help determine whether a process as traditional as brewing can become more flexible in a power system increasingly shaped by solar generation, price swings and the need to use electricity when it is most available.