

A photograph of a complex industrial facility, likely a cold storage or food processing plant. The scene is filled with a dense network of silver-colored metal pipes, some of which are insulated with reflective foil. In the foreground, there are large, vertical red cylindrical tanks and blue industrial pumps. To the right, a stainless steel vertical tank is labeled 'Isolcell' and '2'. The background shows more industrial equipment and structural elements of the building.

Cooling, heating, power and solar

Integrated control melts energy costs

By coupling its power, heating and cooling systems, the wholesale fruit market in Mittelbaden, Germany, managed to reduce the energy costs associated with operating its cold storage facilities by 50%. At the heart of the network is a central controller based on a B&R Power Panel, which ensures that the individual systems interact with optimal efficiency.

The energy control center of the wholesale fruit market in Mittelbaden, Germany. With active support from B&R, aeteba developed a modular and scalable control solution that couples all of their energy supply systems.

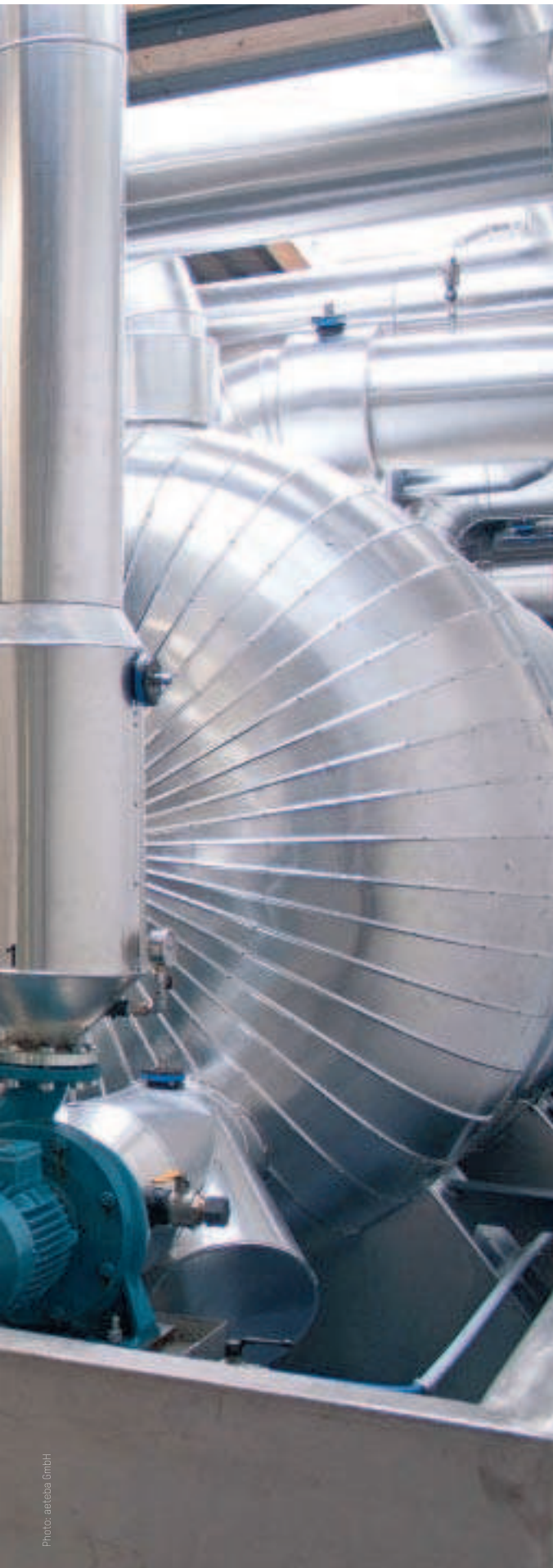


Photo: aareba GmbH



Over the course of a year, the local-grown apples on your supermarket shelves actually leave a larger ecological footprint than their imported cousins. This has been confirmed by studies comparing the carbon dioxide emissions associated with growing, transporting and storing fresh produce. Surprisingly, the environmental cost of energy-intensive cold storage significantly outweighs that of transporting freshly harvested fruits from large plantations half-way around the globe.

Yet the scales may soon tip in favor of your friendly local orchard. By creating intelligent links between their various supply systems and incorporating renewable energy, producers of pharmaceuticals, foods and beverages as well as plastics processors, hotels and, of course, cold storage facilities can minimize the impact of their energy-intensive enterprises on both the environment and their bottom line.

High energy consumption

Case in point: the wholesale fruit market in Mittelbaden. At its headquarters in Oberkirch, between the Rhine and the Black Forest in

one of Germany's largest fruit-growing regions, the 3,100-member producer group operates more than 50 cold storage facilities home to a total of 550 cold rooms, 45 freezer rooms and 12,100 controlled atmosphere rooms for 11,000 metric tons of pome fruits.

Until late 2014, the 4,987 megawatt hours of refrigeration these facilities require each year were generated using conventional chillers. This alone accounted for an estimated 65% of the market's total power consumption of 2,557 megawatt hours, with the rest going to operation of the cleaning, sorting and packaging lines. To provide the necessary electricity – at a total cost of €409,100 per year – the utility company consumed a calculated 6,649 megawatt hours of primary energy. This doesn't even account for the €58,000 of gas – another 1,284 megawatt hours of primary energy – needed to heat the buildings.

Custom-tailored intelligent energy supply

"In the past, the heating and cooling systems operated completely independently of one another," explains Elmar Sporer, the R&D manager at aeteba who was responsible for planning and implementing the new energy generation and distribution solution for the wholesale warehouse. "While this kept the design relatively simple, it didn't make efficient use of the available energy."

A solution that is both ecologically and economically optimized must account for every process involved in generation and distribution of heating, cooling and power. Most importantly, it must be custom-de-

signed in a way that allows for intelligent interaction between these systems. "Since the circumstances vary from location to location," explains Sporer, "the supervisory controller responsible for networking the energy systems needs to be easily adaptable. Off-the-shelf controllers we found only covered a portion of our needs or were simply too rigid, so we chose to develop our own solution based on standard B&R components."

Scalable and adaptable control

For aeteba, the decisive arguments in favor of B&R technology were the scalability and modularity that make it particularly cost-effective. At the heart of the new control solution is a Power Panel that serves double duty as both HMI and control platform. For the wholesale market in Mittelbaden, aeteba selected a fanless Power Panel 520 with an Intel Atom processor and a 15" touch screen display. If necessary, the HMI and



At the heart of the new energy supply system designed and implemented by aeteba is a combined heat and power unit with electrical and thermal capacities of 200 and 256 kilowatts, respectively. Power and waste heat are used primarily to generate energy for refrigeration.



Elmar Sporer
R&D Manager, aeteba GmbH

"The advantages of B&R's solution are its scalability, modularity and ease of use. On top of giving us remote maintenance possibilities that grant us access down to the field level, B&R's technology allowed us to create a control solution that quickly and easily adapts to each location's customized energy supply system to guarantee high availability."

