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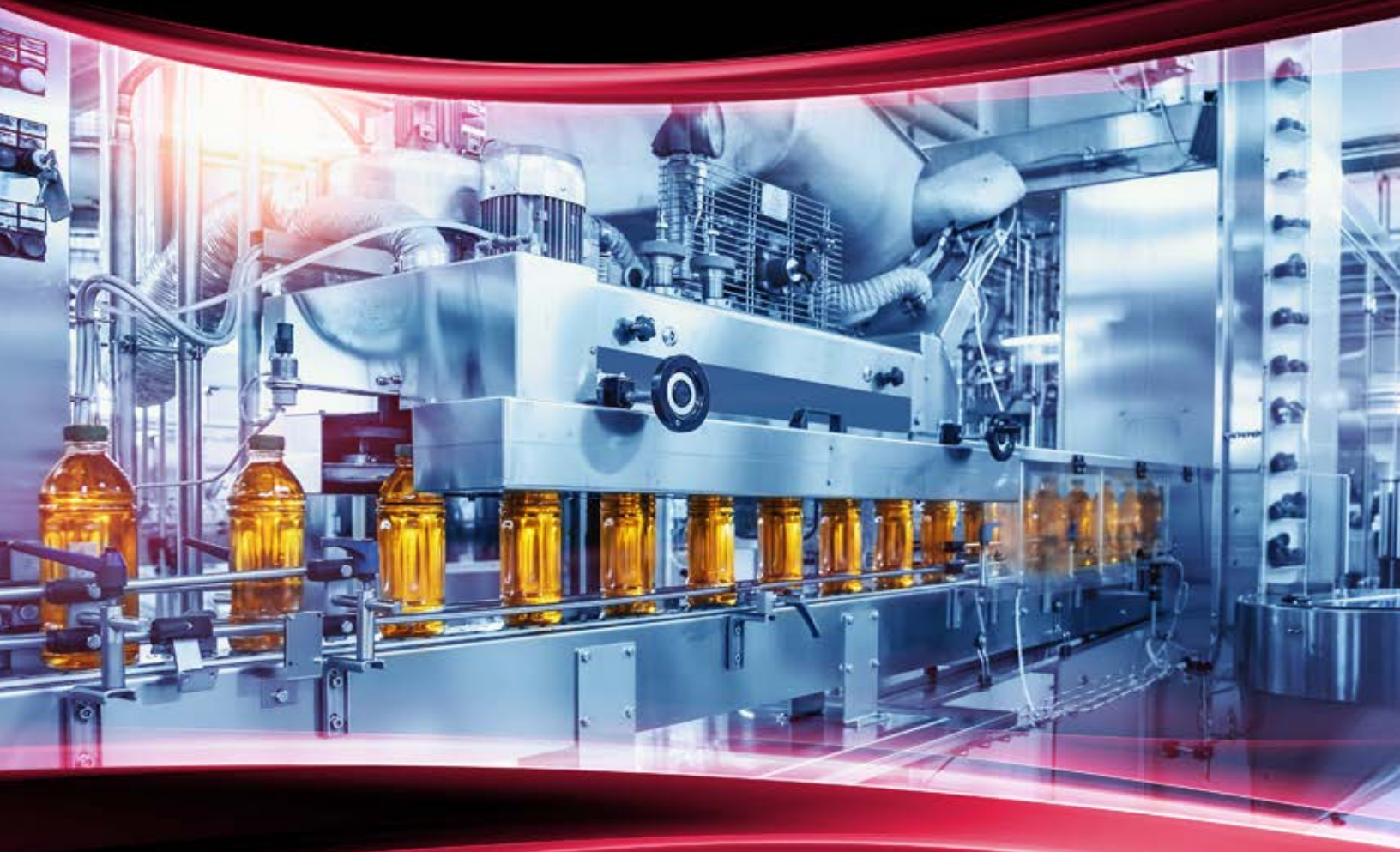
THE ULTIMATE EFFICIENCY PLAYBOOK:

HOW FOOD & BEVERAGE PRODUCERS CAN OPTIMIZE PRODUCTION PROCESSES



ENCLOSURES | POWER DISTRIBUTION | CLIMATE CONTROL | IT INFRASTRUCTURE | SOFTWARE & SERVICES

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UNDERSTANDING THE IMPORTANCE OF EFFICIENCY

In today's fast moving, global marketplace, the game that is food and beverage production has changed. Adapting to constantly evolving production parameters, bringing new, innovative products to market to meet today's consumer demands, behaviors, and agility to respond to supply chain instability or disruption have all become the new normal. The one unifying element that pulls them together is the strive for efficiency in each.

Yes, efficiency is the play that, when called, can result in growing your footprint and market share in an increasingly competitive space; on the flip side, when not taken into account, the lack of process efficiency can not only put undue pressure on your production infrastructure but also leave you struggling to keep pace with your competitors.

For context, the annual growth rate of U.S.-based food and beverage production is projected to increase by more than 9% year-over-year through 2028.[1] In addition, it's estimated that more than 4,000 early-stage technology companies are making their entry into the market via the food and beverage industry. For food and beverage producers, this signals an opportunity to adopt new technologies that help optimize production processes, reduce waste, and increase profitability.

[1] U.S. Packaged Food Market Size, Share & Trends Analysis Report By Product (Beverages, Ready-to-Eat Meals), By Distribution Channel (Supermarkets & Hypermarkets, Online), And Segment Forecasts, 2021 - 2028

WHAT'S DRIVING THIS RETHINKING OF FOOD AND BEVERAGE PRODUCTION EFFICIENCY IS FIVE-FOLD

- **COVID-19** and its impact on the global supply chain has pushed producers to do more with less, seek innovative alternatives or enhancements to legacy processes or solutions, and refocus on high degrees of hygienic production processes to curb consumer concern about the potential spread of the COVID-19 virus.
- **Industry 4.0** has not only revolutionized how producers incorporate industrial automation, Big Data, and detailed analytics into production processes, but it's also helped reimagine how the panels, enclosures, climate control, and Edge data systems that help power production are engineered, produced, and modified to reduce downtime, decrease energy consumption and costs, and enhance overall productivity.
- **Governmental Regulations** such as the Food Safety Modernization Act have pushed food and beverage producers to think more critically and microscopically about how their industrial panels and enclosures fit into an overall architecture that is designed to combat the intrusion of foreign particles of substances, particularly in areas adjacent to the production floor that may have been overlooked in recent years.
- **Sustainability Initiatives** are no longer a fringe or niche movement. In fact, more than 71% of North American manufacturers have a sustainability policy in place, according to a recent survey by the National Association of Manufacturing.[2] In addition, consumer expectation for sustainable production has reached an apex with 49% of all purchasing decisions by consumers being influenced by the effectiveness of the manufacturer's sustainability efforts.[3]
- **IIoT** has taken the advancements in automated food and beverage production and connected each step of the process to create a unified, intelligent value chain that begins with panel and enclosure design and ends with a finished, packaged food or beverage product. Communication and data silos have come down, barriers to actionable analytics are gone, and plant managers have more power and control than ever before to influence enclosure specification, climate control systems, and data center creation and integration.

[2] https://www.nam.org/wp-content/uploads/2019/07/NAM-Sustainability-Survey-Report-2019.pdf
[3 https://www.nam.org/wp-content/uploads/2019/07/NAM-Sustainability-Survey-Report-2019.pdf

ACHIEVE THE ULTIMATE IN END-TO-END EFFICIENCY

With the playing field for efficiency in food and beverage production in full view, the question becomes: How do you create a strategic, actionable plan to introduce game-changing efficiency into your production facility, and what are the initiatives and solutions necessary to get you there?

The good news is this playbook will not only outline key steps you can take to be a true change agent for your organization in building an efficient production framework, but you'll also experience how Rittal's innovation, thought-leadership, and state-of-the-art solutions can provide an open running lane for you to achieve the ultimate in end-to-end efficiency.

6 KEY STEPS TO BE A TRUE CHANGE AGENT FOR YOUR ORGANIZATION

1

DEVELOP A SUPPLY CHAIN YOU CAN TRUST

Any mention of supply chain logistics in today's global manufacturing landscape can't ignore the elephant in the room that is the COVID-19 pandemic. And hard on the heels of that part of the conversation is the topic of reshoring to help reduce production disruption, increase flexibility, and boost competitiveness in an already crowded and growing consumer space.

While North American producers were making some strides before COVID-19 in bringing advanced manufacturing processes back from overseas and increasing their automation infrastructure, the instability of the global supply chain, labor and material shortages, and shifts in consumer demand have emerged as massive incentives for producers to move faster and more deliberately in both of these arenas.

These initiatives are part and parcel in creating a more stable supply chain where the component parts necessary for optimized automation processes are closer at hand, less susceptible to unforeseen changes in availability, and produced under U.S. government regulations and guidelines for faster, simpler integration with existing systems. Developing a localized supply chain for panel, enclosure, climate control, and Edge data systems simplifies the complexity of the manufacturing process, but also extends outward toward helping you provide a better product for your customer, thus enhancing your entire value chain.

While this may sound like an easier said than done situation, Rittal's U.S.-based production and modification facilities — along with our growing network of regional warehouses and distribution centers — helps bring your supply chain closer to home for both increased efficiency and peace of mind. With production centers and modification centers in Sparks, Nevada; Houston, Texas; and Urbana, Ohio, Rittal provides coast-to-coast inventory and delivery to help you increase your speed to market and scale your manufacturing footprint.

But developing a more stable supply chain goes beyond geography; it also requires powerful, predictive design and engineering capabilities to increase visibility and transparency at each stage of the solution production sequence. In a partnership that reimagines the industrial automation process from design to deployment and all points in between, Rittal and EPLAN bring together a modular engineering philosophy, precise and automated Rittal Automation Systems machines, and powerful, database-driven electrical engineering to provide maximum efficiency and visibility to mission-critical manufacturing and automation control processes.

EPLAN's comprehensive design suite provides superior insight into the pre-planning, planning, and procurement stages for a more proactive approach to avoid material or resource shortages, which in turn reduces production gaps. Programs such as EPLAN ProPortal provide up-to-date device data from leading component manufacturers for total visibility of component part availability, while EPLAN Preplanning uses computer-aided engineering (CAE) to capture engineering data from the very beginning of the design phase.

2

REDUCE ENERGY CONSUMPTION AND WASTE

The epicenter of energy and resource use is the actual food and beverage production floor, which means it's also more often than not ground zero for inefficiencies, redundancies, and waste. The layout of common production room floors can be divided into three main zones, each with their own unique and distinct challenges in reducing energy consumption, eliminating inefficiencies, and creating an environment built on long-term, sustainable efficiency.

Basic Hygiene Zone has no open production processes where food or beverage products can come in contact with contaminants, airborne or otherwise. In addition, there are no wash down requirements. Typical applications in this zone include building systems, packaging, and storage and/or conveyors.

Medium Hygiene Zone contains food and beverage processing with equipment like tanks, vats, vessels, piping, and other storage or transferring apparatus. While there are no open processes in the medium zone, all equipment is flushed, washed, drained, and sanitized. This means industrial panels, enclosures, and accessories must be engineered for easy water runoff or drainage to prevent pooling, as well as interaction with chemicals and cleaning agents without corrosion.

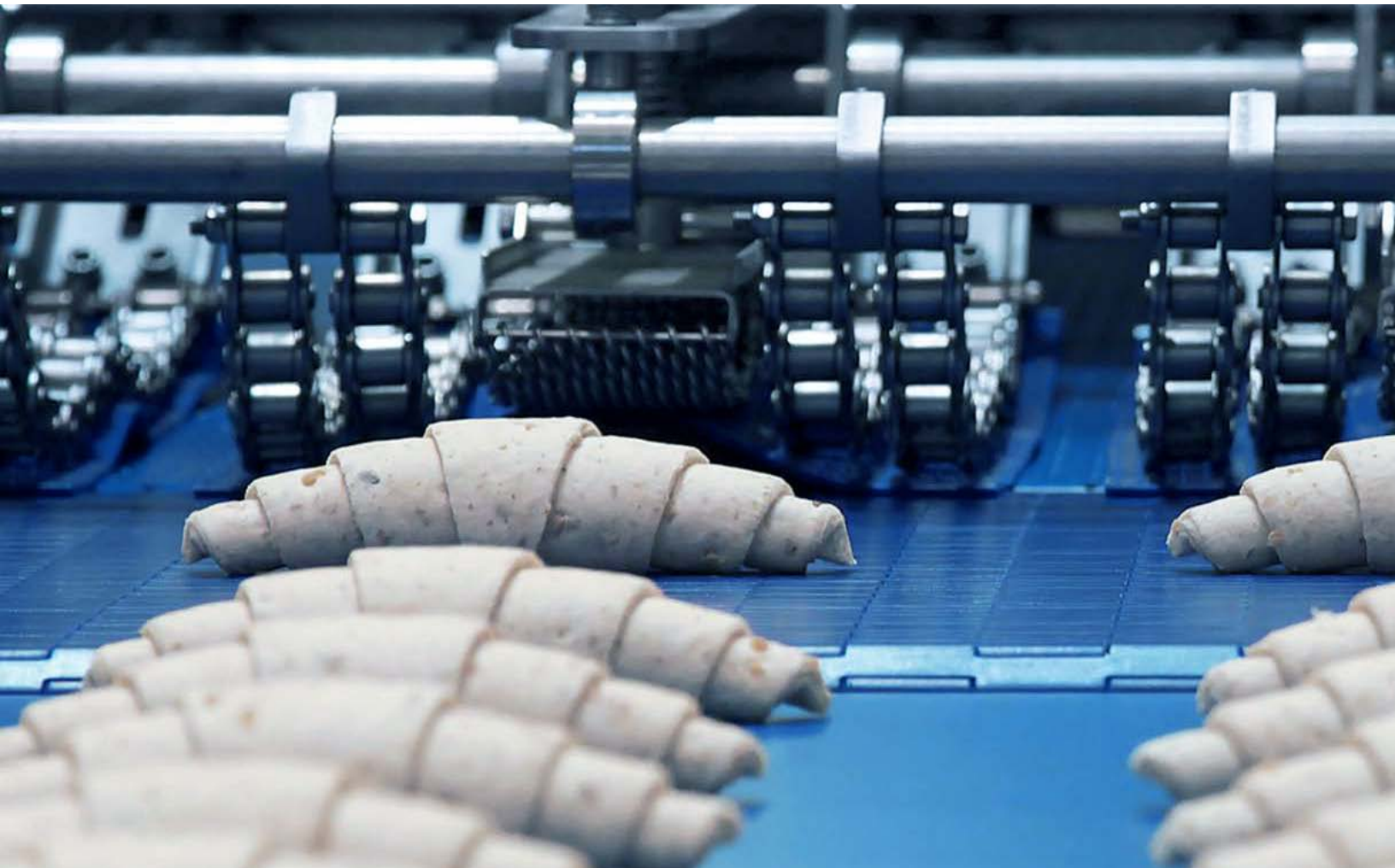
High Hygiene Zone contains a variety of open processes exposed to a variety of surfaces and thus requires the highest degree of sanitation. Industrial panels and enclosures must have the greatest degree of protection against corrosion from cleaning agents and must facilitate runoff to prevent pooling from frequent wash downs. In addition, equipment in the high hygiene zone must be able to withstand elevated degrees of water pressure and water temperature.

To help reduce energy and resource consumption, Rittal's Hygienic Design solutions specifically for the food and beverage space encompass all aspects of the industrial automation ecosystem. For example, in the medium hygiene zone, Rittal's TS 8 modular enclosure combines the strength of unibody freestanding enclosures with the flexibility of modular design. Stainless steel construction provides NEMA 4X and IP 66 durability and protection, while zinc-plated mounting plates and detachable rear panels allow for application flexibility.

With an eye toward energy conservation and waste reduction, Rittal's Blue e+ cooling units reduce energy costs by up to 75% due to a hybrid technology that allows for demand-based cooling. Network alerts, remote monitoring, a touchscreen interface, and mobile connectivity make Blue e+ the most dynamic climate control system on the market today.

For the high hygiene zone, our HD wallmount enclosures are engineered with 30° forward slope-top design and an IP69K rating for the maximum in durability and protection for electrical components. Hygienic design terminal boxes and junction boxes have easy-to-clean lock systems and replaceable silicone gaskets designed to withstand aggressive detergents, hot water, and high degrees of water pressure during repeated washdowns.

From a climate perspective in the high hygiene zone, our air-to-water heat exchangers provide a 30° angled roof design, water-resistant and joint-free seals, water connection flexibility, and smooth external surfaces to reduce dirt and foreign contaminant buildup.



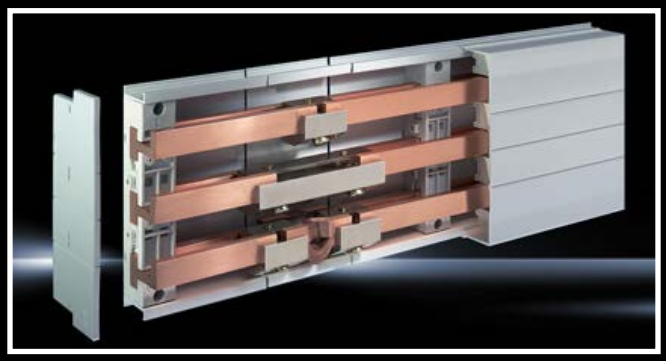
3

OPTIMIZE POWER DISTRIBUTION

How you power the equipment and solutions that help drive your production can fall through the cracks when evaluating a holistic industrial automation system. However, the ability to direct, regulate, alter, and monitor power where it's needed and when it's needed is a critical aspect of optimizing the efficiency of your production room floor. This is where busbar power distribution has emerged as a true innovative force in helping plant and facilities managers reconfigure how power gets from point A to point B.

New guidelines issued in a May 2020 report by the International Electrical Commission cemented specific regulatory compliance and standards for power distribution and control for industrial panels and enclosures. Traditional wiring relying on cable connections and connectors that require loads of space to manipulate is a thing of the past and busbar power distribution is now the industry standard for all industrial enclosures.

For some time prior to the update, global companies were deploying busbar to power their modular enclosures, and European countries have been requiring busbar over traditional wiring in enclosures since the middle part of the last decade. The primary driver behind the movement toward busbar was safety. Busbar is better equipped to prevent shocks and accidental arcing, and busbar also allows for electronically safe installation and maintenance up to 60 IP inside the industrial enclosure.



However, from an efficiency standpoint, the value proposition of integrating a busbar power system from a trusted partner like Rittal combines safety and compliance with a forward-thinking engineering philosophy built on the complete optimization of your power distribution strategy.

Rittal's busbar power distribution solutions provide:

- Reductions in the use of space relative to the panel and enclosure
- Easy troubleshooting in the event of automation control interruption or failure
- Time savings during both installation, maintenance, or upgrades
- Increased operational efficiency
- Integration of supplemental panel or enclosure elements to enhance or augment performance

Rittal busbar supports fit dimensions from 40 × 10 mm to 120 × 10 mm. The support may be top-mounted with components using the pitch pattern of the cover system.
In addition, Rittal meets and exceeds power demands to withstand current ICW up to 50kA, with rated currents up to 1600 A. All are UL and ETL Listed. Rittal is also the world's first manufacturer to offer an approved busbar system with standard components optimized for both AC and DC applications for international use.

The flexibility of Rittal's busbar power distribution comes in the form of customizable plug-ins and component adapters to allow for safe use of compact air-circuit breakers from a variety of manufacturers. Circuit breakers and adapters can range from 100 A to 630 A, and connector kits, adapters, and transformers make contact without drilling. NH Slimline fuse-switch disconnectors range from sizes 00 to 3, fitting single pole and 3-pole switchable variants, and all components are modular for complete customized configuration.

4

PRIORITIZE PREVENTATIVE MAINTENANCE

If there's one specific thematic arc or throughline in creating an efficient industrial automation framework, it might be the shift toward working proactively as opposed to reactively. In today's variant-rich manufacturing sphere, what makes true production efficiency is the ability to get ahead and game plan for changes in production parameters as opposed to responding to them as they arise.

This is where Industry 4.0 and IIoT help manufacturers predict or anticipate variables in food and beverage production to create solutions or workarounds in order to avoid downtime or stoppages.

Preventative maintenance of enclosure, climate, power, or Edge systems via Industry 4.0-based engineering and IIoT connectivity helps plant managers reduce undue stress on equipment and redirect maintenance and troubleshooting resources to parts of the automation ecosystem that most need it. Remote monitoring capabilities allow for real-time adjustments based on production parameters and the environment of the production room floor, and real-time reporting also helps avoid machine downtime by gathering and communicating data nearest to the data source.

But the most critical aspect of prioritizing preventive maintenance comes from a comprehensive evaluation and audit of your existing automation infrastructure to understand its weaknesses, liabilities, and opportunities for optimization. In other words, you can't discover a cure without an accurate diagnosis, and a Rittal Climate Control Efficiency Analysis is a powerful tool in helping you realize how efficient your climate system truly is.

Through a comprehensive exploration of your climate control system, Rittal's climate control experts will identify redundancies and inefficiencies in your existing infrastructure and demonstrate how solutions like Rittal's Blue e+ cooling units, Blue e TopTherm air conditioners, chillers, and IoT accessories optimize cooling strategies for reduced energy consumption and costs, along with a long service life of equipment.

A recent climate control analysis of a Wisconsin-based food and beverage production facility uncovered massive inefficiencies in the facility's cooling units. Rittal's expert climate technicians identified cooling units throughout the facility were experiencing as much as a 50% reduction in useful life, resulting in regular unit failures, downtime, and costly repairs and maintenance. Rittal's climate team charted a course for overhauling the facility's cooling units via a service contract and routine maintenance schedule that resulted in zero cooling unit failures over a one year span which both significantly reduced downtime and overall cost.

This climate analysis helped reduce the producer's overall cooling costs by 76% and provided a more detailed understanding of where cooling processes could be optimized to help ensure long-term cost reduction and increased efficiency.

5

EMBRACE A DATA-DRIVEN DECISION MODEL

The food and beverage industry is at something of a crossroads. While today's producers may not view themselves as being at the forefront of the IT infrastructure conversation, food and beverage companies in a modern production landscape are also tech companies. The ability to gather, sort, retrieve, and act on data as quickly as possible is a necessity for producers to be proactive to consumer demands and behavior, compliant with safety regulations and guidelines, and competitive via optimized processes and workflows.

Edge computing is rapidly increasing the ways in which companies leverage their IT infrastructure. By bringing networks closer to the points where actual data is located, companies around the globe are deploying IoT products and solutions to integrate sensors, optimize IT systems, analyze data, and make decisions in real time to reduce latency, energy consumption, and operational costs.

Common uses of Edge computing can put sensitive IT equipment in harsh operating conditions that require durable, reliable, and turnkey solutions to protect critical data, reduce the possibility of disruption or breakdown, and simplify installation. Rittal's Edge computing and modular data center solutions help drive productivity and data-driven efficiency through:

- Decreasing production latency
- Reducing bandwidth strain
- Providing real-time data analysis
- Improving monitoring of production and equipment
- System alerts and notifications for predictive maintenance
- Creating more reliable security systems

Because no two data-driven decision models are the same — just as no two food and beverage production environments are the same — Rittal's Edge computing and data solutions can be customized and scaled based on any application or production environment to help you harness the power and opportunity data-driven production strategies afford.

6

UNDERSTAND THE RELATIONSHIP BETWEEN EFFICIENCY AND SUSTAINABILITY

As we discussed earlier, the relationship between production efficiency and sustainability is now inextricably linked as consumers beat an increasingly loud drum for eco-friendly and green production processes from their food and beverage manufacturers. In fact, a recent study by the National Institute of Standards and Technology[3] outlined the top concerns consumers have about their food and beverage producers and found the top concerns to be:

- Ease of recycling/reusability of materials
- Green or eco-friendly power sources
- Water and waste management
- Overall reduction of a producer's carbon footprint

For producers, this list of concerns (all of which center on sustainability) has two important takeaways.

First, as we've discussed thus far, these concerns focus on challenges that Rittal solutions can help food and beverage producers overcome, making Rittal a valuable partner in creating an automation framework driven by the connection between efficiency and sustainability.

Secondly, sustainability initiatives are not only tied to consumer behavior. In fact, sustainability programs can enable producers to gain a strategic advantage over competitors and seizing opportunities for increases in market share. For the last few years now, food and beverage producers have relied on Industry 4.0 and the Industrial Internet of Things (IIoT) to help them reduce energy usage, mitigate manufacturing costs via optimized production programs, and increase profitability by reaching new consumer bases.

[3] https://www.nist.gov/mep/manufacturing-infographics/food-and-beverage-manufacturing-industry

THE PLAYBOOK CHECKLIST: ASSESSING YOUR PROGRESS

If the end game is an optimized framework of industrial automation solutions that provide end-to-end visibility of the entire production sequence, then it's time to assess your understanding of these plays to help you win the game that is an efficient food and beverage production process.

1. Develop a supply chain you can trust by partnering with Rittal's U.S.-based manufacturing and modification centers, along with our regional network of distribution warehouses to ensure you have the right solutions at the right time for the right application.
2. Reduce energy consumption and waste in each of the three hygienic zones with Rittal's line of hygienic design enclosures and climate control solutions specifically for use in the food and beverage space.
3. Optimize power distribution with Rittal's busbar power distribution solutions that help you direct and distribute power to where it's needed most with the greatest efficiency while keeping you compliant with global standards.
4. Prioritize preventative maintenance through Industry 4.0 and IIoT principles to create a proactive strategy for avoiding shutdowns and preventing undue stress on enclosure or climate control solutions.
5. Embrace a data-driven decision model via a Rittal Edge computing and data center solution to, store, communicate, and act on real-time data gathered nearest the source.
6. Understand the relationship between efficiency and sustainability and how customer expectations and industry trends impact the importance of sustainability.

Whether it's a holistic climate control efficiency analysis, a proactive approach in providing solutions that adhere to the regulations of tomorrow, or an energy-conscious mindset toward the design and engineering of industrial enclosures and climate systems, Rittal's partnership with food and beverage producers like yourself is built upon a simple premise: Helping you provide a better product to your customer faster.

With Rittal, the path toward ultimate food and beverage efficiency is simplified so you can consider the job done.

Explore our entire line of industrial automation products and solutions for the food and beverage market with our new Food and Beverage Solution Suite.

Rittal – The System.

Faster – better – everywhere.

- **Enclosures**
- **Power Distribution**
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