

## DEAR DAIRY PROFESSIONAL,

As a dairy or juice processor, you must balance dynamic market demands that require speed, responsiveness and agility with perennial business demands of efficiency, profitability and growth. The ever-increasing requirements of regulatory compliance, cleanliness, quality and traceability coupled with the need for cost-cutting and sustainability are driving many dairy and juice processors to search for new ways to optimize their business.

The answer to these challenges is based on Totally Integrated Automation (TIA) – an integrated software and hardware platform for both primary processing and secondary packaging applications. In addition to the inherent advantages of TIA, Siemens also provides a number of pre-engineered “tool sets” that are specifically focused on the dairy and juice industries. Combining the automation layer with our Manufacturing Execution System (MES) can create a seamless integration of discrete control and process automation that can lay the needed foundation for meeting the marketing challenges, regulatory compliance, track/trace/genealogy and sustainability issues that dairy processors face.

Dairy and juice product profits can leak from almost anywhere across complex production plants. Some plant costs, like milk and energy, are at the market’s mercy, while others need tight controls to keep them in predictable limits. Other factors demand production flexibility. Our “Intelligent Dairy Plant” approach is a technology-enabled business model that can provide operators with real-time visibility to maximize efficiency, gain flexibility and conserve limited resources while providing a range of decision support tools to assist management as they optimize their business.

In the balancing act of market demands versus business demands, synergies gained via integrated MES, primary process control and automated packaging lines can lay the needed foundation for meeting the marketing challenges that dairy and juice processors face.

I invite you to take a few moments to investigate our Answers for the Dairy Industry overview and to understand how your vision and our technology can work together. To view the entire Dairy/Juice Whitepaper, please visit [www.usa.siemens.com/dairy](http://www.usa.siemens.com/dairy).

Regards,

A handwritten signature in black ink, reading "Rich Sammarco", is positioned below the "Regards," text.

Rich Sammarco  
Industry Manager, Dairy & Juice

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The Siemens logo is displayed in a bold, teal, sans-serif font at the bottom left of the page.



# BLUEPRINT FOR BUILDING MORE PROFITABLE DAIRY & JUICE PRODUCTION

**A Practical Guide to Meeting Key Challenges of Today and Tomorrow**

## WELCOME

“Rocket science” is a term used to describe anything complex and is one that applies to the dairy and juice processing business.

I know that few other industries have the kinds of process and market variables, interdependencies and public health regulations that ours does, all in spite of unforgiving profit margins.

When we set out to develop this information to share with you, we wanted to offer our insights into the key challenges that we believe our industry faces today and in the future. Our views reflect conversations not only with U.S. producers but also with others from around the world.

Of course, as a supplier of processing automation solutions, we have a vested interest in selling these solutions. But our approach to any application of technology is fundamentally pragmatic. We aim to first understand the business context of the specific opportunity or challenge, then the process or processes that can support a successful outcome. Only at that point will our engineering teams begin to develop a solution with the right combination of technology and services.

We hope you find this content insightful and useful, letting you read it as quickly or as thoroughly as your limited time allows. I invite you to contact me directly for further information or a no-obligation consultation. Thank you.



Rich Sammarco  
Industry Manager, Dairy & Juice  
Siemens Industry, Inc.  
July, 2009

**PLEASE VIEW THE FOLLOWING BRIEF ABSTRACT OF THE CHALLENGES THAT THE DAIRY AND JUICE INDUSTRY FACE IN TODAY'S MARKET AND THE PARTIAL ANSWERS FOR THE INDUSTRY.**

**TO VIEW THE COMPLETE DAIRY/JUICE WHITEPAPER PLEASE VISIT US AT [WWW.USA.SIEMENS.COM/DAIRYWP](http://WWW.USA.SIEMENS.COM/DAIRYWP)**

## ABOUT SIEMENS

Siemens has developed a wealth of best-practice knowledge and applied expertise, plus an engineering staff with hundreds of years of combined experience. We also offer a portfolio of proven, advanced solutions to optimize your dairy plant operations so you can maximize your company's profitability and market share. With a deep understanding of the dynamic and highly competitive markets dairy producers address, Siemens stands ready to help you achieve your highest production goals and increase the value of your enterprise for all of your stakeholders. [www.usa.siemens.com/foodbev](http://www.usa.siemens.com/foodbev).

**SIEMENS**

TO MEET EVOLVING CONSUMER  
TASTES, DAIRY AND JUICE  
PRODUCERS NEED WAYS TO BE  
MORE RESPONSIVE TO SHIFTING  
MARKET DEMANDS.

## THE CHALLENGE

### MARKET POSITION AND IMAGE

With 45,000 SKUs in the average size supermarket, consumers today are accustomed to a wider variety of choices when they shop there than ever before. Dairy products, almost 10 percent of grocery sales, are no exception. The same applies to juice products, which account for as much as a quarter of many dairy food plants' output.

Certainly the dairy and juice industries have kept pace with other food producers over the years to meet these market expectations. From fresh milk variations

to flavored yogurts, artisan cheeses and chilled treats, the numbers and kinds of dairy and juice products have exploded. That doesn't count demand from other channels outside the dairy and juice aisles for semi-finished products like powdered milk and whey or for finished cheeses and other dairy and juice products as inputs to processed foods.

Changing tastes. More and more, consumers are conscious of health and safety, too. Media bombard them with warnings about fat and sugar consumption, cholesterol, lipids and the like. All this heightens their awareness about the effects foods and beverages can have on their health, for better or worse. Ultimately this knowledge can change their eating habits as they seek healthier choices. Still they will continue savoring the richer flavors and textures of more traditional fare, challenging dairy producers to deliver rich-tasting but low and no-fat alternatives. They also look for juices and juice blends with little or no added sugars.

To meet evolving consumer tastes, dairy and juice producers need ways to be more responsive to shifting market demands, spurring such questions as:

- How can research and development cycles be accelerated?
- How can the risk of shortened product life cycles be managed better?
- Which production methods best meet the demands of dynamic consumption trends?

At any one time, thousands of SKUs in the average supermarket are new products vying for consumer attention and sales to keep their shelf position and sustain their existence. The ultimate question: How do you ensure your new dairy and juice products prevail against the competition – and improve their odds for success?

Health consciousness becomes even more acute when reports surface of foods gone bad causing sickness even death. Perishable dairy products can become suspect, undermining the valuable brands of dairy producers. And liability protection costs can soar.

Of course, keeping unsafe foods out of distribution in the first place is preferred. But if existing controls slip, then executing a fast recall -- thanks to detailed tracking and tracing -- can help contain the safety dangers as well as liability and brand damages.







## MEETING THE CHALLENGE

### SPEED WITH CONFIDENCE

Today's large-scale dairy production facilities can process hundreds of thousands of gallons of milk each day through miles of plumbing, thousands of sensors and hundreds of valves and vessels, turning out a wide range of packaged and bulk dairy products. Juice production can share these facilities or have similarly complex ones. Such systems have almost infinite operating variables and innumerable points of contamination or failure.

Standard operating procedures are needed to contain all this potential variability. The more these procedures are automated, the less chance for human error to undermine predictable and consistent outputs.

In the face of such complexity, **Totally Integrated Automation (TIA)** can help optimize the overall performance of dairy and juice production facilities while ensuring uniform yields from each production stage. TIA is a comprehensive process control system (PCS) that includes not only the necessary process line controller (PLC) and human-machine interface (HMI) but also much more: an extensive library of pre-built and pre-configured generic and dairy/juice-specific functions. These come in the form of discrete software modules based on best practices from around the world, from across automated industries and from within the dairy and juice production industries – the best of the best, if you will.

TIA can provide precise, centralized control and operation of all plant processes, including receiving, storage, pasteurization, homogenization, filling, batching and clean-in-place (CIP) procedures. It can minimize the risk of process, component and sub-system failures by monitoring each one's performance for anomalies presaging such events.

**Dynamic flexibility.** Not only does TIA offer much greater operating efficiencies but also tremendous flexibility to try new recipes and re-plan production batches, small or large. Doing so is easy and quick without taking down a production line and incurring costly, time-consuming conversions. Control recipes can be modified in-process so operators can fine-tune a recipe dynamically.

Because TIA's process and automation systems use similar data sets, a recipe change instantly adjusts the entire automation environment. This helps dairy and juice producers reproduce recipes consistently without guesswork.

These capabilities give producers the means to tailor production recipes and capacities to the needs of channel customers like private labels or other food

### BUILDING THE BUSINESS CASE

#### ROI of a Manufacturing Execution System (MES)

AMR Research interviewed more than 20 companies that had implemented MES. It found that companies saw three tiers of benefits from their projects:

- **Cost reductions** (1x savings in the first year) – Inventory, people and cycle time
- **Process improvements** (3x savings in the second year) – Faster New Product Introduction (NPI), new customer compliance, and data services from better tracking and genealogy
- **Market improvements** (10x savings in the third year) – Tuning the manufacturing operation to be extremely responsive to actual demand allows companies to capture market share without increasing costs.

*AMR Research Alert – Bill Swanton, Alison Smith*

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# SIEMENS

**BRIDGING THE GAP BETWEEN PLANT  
AUTOMATION AND PRODUCTION WITH  
PRECISELY TIMED PACKAGING RUNS WILL  
REDUCE WORK-IN-PROGRESS INVENTORY AND  
BOOST MACHINE UTILIZATION.**

processors. It also lets them process shorter runs for targeted market trials, which can help minimize the risk of larger, more costly production runs.

Complementing TIA for production is a **Manufacturing Execution System (MES)** that links dairy and juice plant processes with Enterprise Resource Planning (ERP) systems like SAP, Oracle and others. An MES captures hundreds of data points every minute and displays key indicators in full-color graphs, charts and dashboards.



In its role as an interface between real-world automation systems and upper level planning and financial systems, the MES layer provides production monitoring and modeling. It also can provide a view into Overall Equipment Effectiveness (OEE) as well as downtime monitoring and inventory control

With both historical and real-time data available, complete product lifecycle support is possible. Combined with built-in statistical functions, strategic decisions can be made faster, to respond to new and emerging market trends before the competition.

If dairy and juice production facilities are located in different geographies with ingredient variations, an MES can provide “brand specification management.” That is, the MES can enable central recipe management and help determine the precise adjustments needed to ensure a consistent taste and overall product result across the dairy producer’s market footprint, regardless of geography.

**Packaging on demand.** Effective packaging can make a huge difference in how well dairy and juice products sell, but the real effect of packaging begins long before they reach the shelf. The longer a production output sits before packaging, the greater the chance variations in the plant environment will affect product quality, even leading to contamination or spoilage.

Bridging the gap between plant automation and production with precisely timed packaging runs will reduce work-in-progress inventory and boost machine utilization. The “Optimized Packaging Plant” (OPP) combines an Optimized Packaging Line (OPL) with a plant’s TIA and MES as well as its ERP systems to facilitate these packaging runs, while providing real-time views across the dairy and juice corporate enterprise. With that comes flexibility to adapt packaging for new and existing products alike as well as for any private label channel customers you may have. Products get to market faster, helping retailers avoid out-of-stocks, and dairy and juice producers can turn inventories into cash much more quickly.

Today’s large-scale dairy and juice producers must balance dynamic market demands that require speed, responsiveness and agility with perennial business demands of efficiency, profitability and growth as well as regulatory compliance for cleanliness, quality and traceability. Synergies gained via integrated MES, primary process control and automated packaging lines can lay the needed foundation for meeting the marketing challenges that dairy and juice producers face.

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