

## A DIFFERENT OIL BUSINESS

### Their World Runs on Oil - vegetable, sunflower, corn, soybean

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*It's been said the business world runs on oil.*

*At a global snack food manufacturer, that's certainly true of ...cooking oil. On bags of its product (along with "no preservatives") you will see oils used – vegetable, sunflower, corn, soybean -- and in most cases, a mix of those oils. By mixing those oils in the just the right ways, the company can keep product integrity and select certain commodities based on their price – a huge potential money saver.*

*It's a significant challenge to manage fluctuating commodities costs, maintain recipe quality control, and install a new blending system – especially while minimizing downtime at near 24x7 facilities.*



## INTRODUCTION

Our client's philosophy is to make, move and sell its products "from seed to shelf". That means they contract with farmers to produce patented varieties of corn and potatoes to ensure the highest-quality ingredients. And their products come from 20-plus plants and disperse them to 200 distribution centers across the United States and Canada.

The manufacturer's "Direct Store Delivery" system is the largest in North America. The net result: when you go into your local grocery store and pick a bag of its product from the shelf, typically the only people who touched that bag were our client and you.

Due to fluctuating commodity prices for cooking oils, our client was experiencing high costs for selected oils used in the manufacture of its products. Fortunately, the ingredient profile allowed them to use multiple oils - or blended oils - in the manufacturing of their products.

Not all suppliers process all oils, so pre-blending required a double handling of at least one oil; shipping it from one processing site to another for blending; then shipment to manufacturing sites. While this model was possible, it increased the cost of the oil and extended the delivery timing of the blended oil to the targeted manufacturing plant. The company sought a better way and a better system to accurately blend oils at its manufacturing sites.

Each of the three blending options available to our client had pros and cons.

1. Ratio Blending
2. Batch Blending
3. In-Line Blending

## REQUIREMENTS

The customer approached Rockwell Automation and Polytron, a Rockwell Automation Solution Partner, with its challenge, presenting five major requirements:

1. **Blend Ratio** – The solution must provide precise controls to meet nutritional statements on each bag. Also, the product's taste must be right – under no circumstances could this trust be violated -- and the solution had to provide flexibility to leverage variability of supply and cost of oils.
2. **Minimize effect to production efficiency** – The solution must be transparent to the existing oil supply system controls and process controls. And, any installation downtime window must fit within current production schedules. Note: all of its plants are structured for near continuous operation thus limiting downtime.
3. **Cost** - Capital requirements must be minimized to maximize the Internal Rate of Return.
4. **Timing** – The blend system must be in full operation within 15 months.
5. **Maintain Oil Quality** – There could be no degradation of the oil through the new blending system.

*Low capital investment, high accuracy and short lead-time – while maintaining the highest level of product quality*

## CONTROL ALGORITHMS AND IN-LINE BLENDING

The Rockwell team conceived control algorithms for accurately blending oils and offered this system to the customer to solve the problem.

The initial phase of the project called for implementation of an in-line blending system for all potato chip lines, which consisted of 18 facilities across the United States. Rockwell had the capability to deliver the blending control system, and called on Polytron to assist them in managing the implementation at each site, including equipment supply, mechanical and electrical support, and construction management. Polytron worked with the project team to take information gathered from each site and develop construction and implementation plans.

A second phase of the project called for implementation of a skid mounted in-line blending system for implementation at 17 additional facilities for other product lines.

When installed the system would allow the manufacturer to blend oils from its existing oil storage systems at highly accurate ratios to send directly to the fryers. In addition, due to the flexible nature of the system, our customer could adjust the blends to take advantage of changes in commodity pricing for oils.

## FROM WHITEBOARD TO REAL WORLD

A member of the Polytron project team traveled to the site to conduct a site audit where a preliminary installation plan was created and reviewed with our client's plant personnel. In addition, local contractors were contacted to discuss the project. Upon returning from the audits the field notes were formalized into an implementation plan to be reviewed with the manufacturer's corporate engineering, plant personnel and Rockwell.

The implementation plan consisted of piping isometric drawings illustrating how the existing oil tank farms would be modified to incorporate the blending system, layout drawings/photographs illustrating where new equipment is to be located, and controls diagrams indicating key control modifications that would need to be implemented. In some cases, the customer's site did not have adequate oil storage for new oils being introduced so the Polytron team also developed an implementation plan for construction of a new silo at that site.

Once the plan was approved by the project team, mechanical and electrical bid packages were developed and issued to local contractors for pricing. Upon review and evaluation of the bids, Purchase Orders were then delivered to the contractors and work began at the manufacturing site.

Polytron's engineer/construction manager traveled to the site to oversee the construction of the system. The construction of the system generally occurred during off hours or during planned downtime to minimize the impact to the client's production. Management of contractors to ensure tie-ins were made and construction was completed within the downtime windows was critical to the success of the project.

Upon completion of the construction, the Polytron controls engineer and a Rockwell technician along with their construction manager/engineer started up the system and began sending blended oil to the fryers. Key startup activities included testing the Rockwell supplied control panels, incorporating the new blend system into existing plant PLC and HMI programs, calibration of flowmeters, and tuning of the oil supply pumps.



## LEAPFROG

Adding to the complexity of the project was that the systems needed to be rolled out to ultimately 27 sites all over the U.S. often occurring on successive weekends.

Due to the schedule needs, Polytron used three implementation teams to ensure the schedule risks would be minimized. This allowed the teams to “leapfrog” each other giving each team time to start up a system and deal with any issues that may have arisen during startup, as well as get prepared for the next implementation to follow.

The final challenge was the training of maintenance and operations personnel at 27 sites on the use and care of the new blend systems. Polytron worked with Rockwell and the customer to develop a training program, training documentation, and rollout plan to deliver training at all of the sites.

## SUMMARY: LET THE OIL FLOW

Polytron’s multifunctional team of process engineering, controls, construction management, and training team, along with our customer, their partners and Rockwell resources, a successful project was delivered. The client was now able to take advantage of fluctuations in oil commodity pricing and accurately shift oil ratios and blend oil as it was being sent to the fryer.

The systems were rolled out to all production sites in approximately 14 months. Production sites were started up on time, and interruptions to planned production were minimized.

The system as designed and deployed was a cost effective solution for our leading food manufacturer. It met their needs for low capital cost, high accuracy and short lead-time – while maintaining the highest level of product quality.



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