

Capacity Increase and Capital Avoidance via Simulation in the Alternative Energy Industry

Global Supplier of Renewable Energy Tiles

Success Story

Logistics

ProModel Optimization Suite



SITUATION

With a rapidly escalating demand for green energy, our client was already in a customer-delivery backlog situation and was expecting things to get worse due to their capacity limitations. They were planning on building several new manufacturing facilities to meet this increasing demand for their products. They also knew that they were not maximizing the throughput capability of their existing facility, but were not sure which of several very costly process improvements would yield the best result in the shortest amount of time.

In order to improve their current delivery dilemma and also minimize the number of new plants, they needed to optimize the throughput capability of the current facility. The management team realized that with the severe levels of risk involving both short and long-term customer delivery, as well as the millions of dollars at stake based on which choices they made, that simulation analysis would be the best method for determining the fastest and most effective course(s) of action.

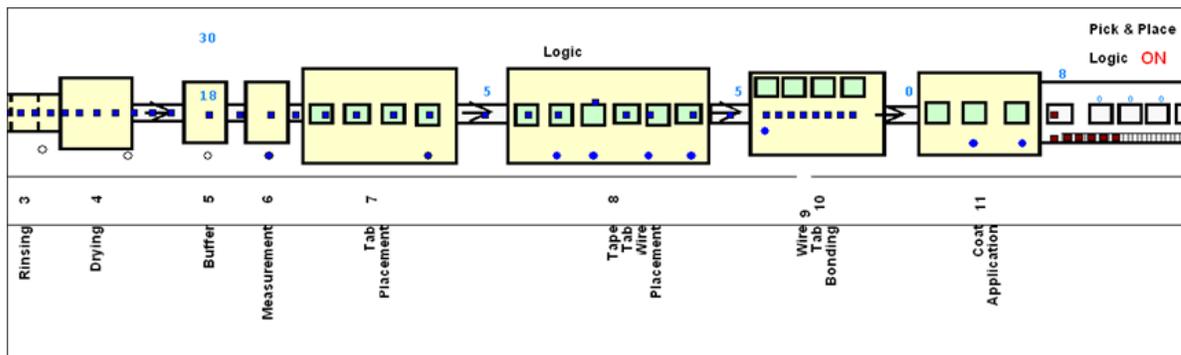
OBJECTIVES

The client's primary business objectives for this initiative were as follows:

- Increase throughput in a single existing facility
- Understand what improvements from this project could be replicated across other existing plants to minimize future capital investment in building new plants
- Improve their ability to meet increasing demand now and in the future

RESULTS

The client team working in conjunction with the ProModel team developed the appropriate simulation model to help determine that adding uniquely sized buffers, in critical areas of a line would result in an immediate throughput increase. However, with each buffer costing hundreds of thousands of dollars, every single piece of equipment was a critical decision.



Sample Image from "Green" Tile Production Line Model

It was determined that a scenario involving multiple, uniquely sized buffers was the most cost effective and fastest change they could make to improve the throughput of the plant. This improvement will be replicated throughout the other similar lines in this plant and is expected to reduce cycle time between 10 to 25 percent. After incorporating the recommended changes to this facility with the resulting increase in capacity, the client will be able to more confidently improve other existing facilities and also determine how many additional facilities need to be built, and when, in order to meet the increased demand projections while balancing it with sound capital investment timing decisions. If implemented, ROI to the client from this project will be in the thousands of percent, and savings will be in the millions of dollars.

SOLUTION

The project team simulated hundreds of scenarios to identify constraints within the solar tile module production line using a model solution created with the ProModel Optimization Suite. The model allowed our client to chart and view reports of their existing operation as well as the future state reflecting the production line effect of having multiple buffers within their system. They modeled the placement and size of these various buffers and discovered constraints they had in their production line system. A cost benefit analysis revealed that there was more value to be gained, more rapidly, by choosing Scenario 2, which ran multiple buffers along the production line, versus retrofitting or replacing existing machinery.

The model simulated a period of over half a year. This simulation was repeated to reach statistical validity and provided ample data points to confirm and justify answers. ProModel ran as many as five replications for each data point (hundreds of scenarios) to reach the desired confidence interval of 95%.

In addition to this solution, one of our client's production lines incorporated a pick-and-place robot that improved throughput within their system (as seen in the model graphic). There was a desire to achieve similar results along other lines using the same type of robot, so our client modeled the impact of increased capacity on their system with and without the pick-and-place robot assisting in the line.

Due to the enormous cost of purchasing new equipment (hundreds of thousands per machine), a risk-free, cost-effective solution was necessary. With assistance from ProModel, our client's team now has a dynamic solution that reflects the actual production process and potential ways to improve operations before risking an untested decision whether to invest in new equipment, expansion efforts, or other yet to be determined production improvements.

