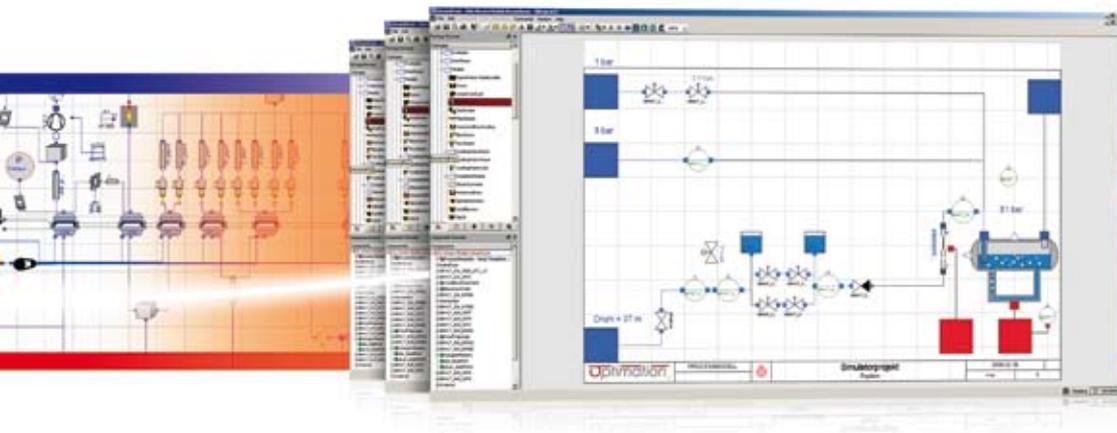


# Optimization

Optimizing process control with Dymola



## Overview

### ■ Challenge

*Optimization needed to provide its customers with solutions that define the optimal process control strategy for their production processes*

### ■ Solution

*Optimization uses Dymola to dynamically simulate the way a controller should function for maximum operating capacity*

### ■ Benefits

*Thanks to Dymola, Optimization's customers have a precise idea of the way a process controller should be programmed before proceeding with physical modifications or installations*



"In addition to the component library, we selected Dymola because it is one of the fastest and most user-friendly programs on the market."

Tomas Eriksson  
Deputy CEO  
Optimization



### Optimizing manufacturing processes

Sweden's Optimization helps companies to optimize their manufacturing processes via its expertise in control technology, dynamic simulation, and production processes.

Optimized process control can contribute to energy savings, better product quality, and increased output. On the contrary, incorrectly structured and insufficiently configured control systems lead to production downtime, idleness or inefficiencies. Customers that turn to Optimization for process control optimization come from a variety of disciplines that include pulp mills, power plants, mining and steel.

### Optimum configuration with Dymola

Optimization uses Dymola, Dassault Systèmes multi-engineering modeling and simulation solutions based on the open Modelica modeling language, to create the process that is most efficient and that generates the best output while consuming the least amount of energy. "Our main expertise is in process control such as programmable logic controllers and control systems," said Tomas Eriksson, Deputy CEO, Optimization. "We

define the strategies to run the mill or the power plant at an optimum level and use simulation to test those strategies before they are implemented in the real world."

With Dymola, Optimization produces simulation results that mimic reality enabling its customers to implement the most optimum configuration from the beginning. "I suppose we can say that we are control architects - we define the optimum strategy and we create a roadmap so that programmers have precise instructions on how to program a control system," said Eriksson.

A plant is an ensemble of hydraulic, mechanical, electrical systems. This is why Optimization adopts a broad approach when asked to optimize an existing plant. It analyzes every system to see how the plant functions as a whole and simulates with Dymola a solution that will make it perform optimally. "Customers usually have an idea of what they want to improve. We normally start with a feasibility study to see if it is possible to do what the client wants," said Eriksson. "We go



on site to analyze the process and see what conditions the physical objects are operating in. We then design the control strategies and verify the control design through simulation of the dynamic process model.”

### Reusable object library saves valuable time

One of the reasons why Optimization chose Dymola is its object-oriented technology, which has enabled it to build a comprehensive library of components that it can reuse in its various projects. “In addition to the component library, we selected Dymola because it is one of the fastest and most user-friendly programs on the market,” said Eriksson. “We can use a top-down approach on our projects, which enables us to quickly begin simulation without requiring us to have all the details right away.”

Simulation speed is another of Dymola’s assets. Optimization uses Dymola to virtually test, at an accelerated pace, processes that are, in reality, slow such as lime kilns in the pulp industry. “Because it can take hours to change the temperature in this process, testing a controller in the physical world can be very time consuming. Simulation with Dymola enables us to obtain answers in record time,” said Eriksson.

### LKAB operator training and controller testing

Optimization provided one of its customers, LKAB, a leading producer of iron ore products for the steel industry, with a complete dynamic

process model to train its operators via simulation. “We supplied them with a platform to do the operator training and LKAB later used that same platform to test changes in the control system,” said Eriksson. This proved particularly useful when upgrades to the control system were sent by the supplier. “Before implementing the upgrade, LKAB first tested the upgraded controller in the simulator, which enabled it to detect problems that would have been costly to correct if the upgrades were installed right away,” said Eriksson.

Of the 19 employees working at Optimization, 10 people use Dymola on a regular basis. Their ramp up time was quick, with them mastering the fundamentals of the solution in a matter of days. Modelon, the Dymola solution provider in Sweden, delivered training and support to Optimization on an on-demand basis to solve specific problems.

### Simulation is a trend on the rise

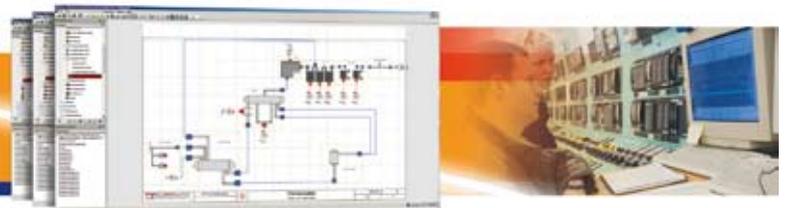
In the future, simulation in controller-based technology will become more widespread. “When we started, our customers were not too keen on simulation; they were under the impression that it would be expensive and unnecessary,” said Eriksson. “Nowadays, it is more the rule than the exception to precede real-world changes with simulation testing. You can probably make things function, even if it’s not in an optimum way, but it sure is an expensive way to run a plant. It’s more cost effective to have everything work right the first time.”

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**Tomas Eriksson**  
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