

## GE Manufacturing Plant Uses AnyLogic for Real Time Decision Support

### OVERVIEW:

In 2012, GE opened a new battery manufacturing plant in conjunction with the launch of an innovative energy storage business. The new Durathon battery products, which are half the size of conventional lead acid batteries, but last ten times longer, are the result of GE's \$100 million initial investment in battery technology developed at GE's Global Research Center (geenergystorage.com, 2014). Expanding the facility doubled production, added 100 new jobs, and brought the total factory workforce to 450 when at full capacity (geenergystorage.com, 2014).

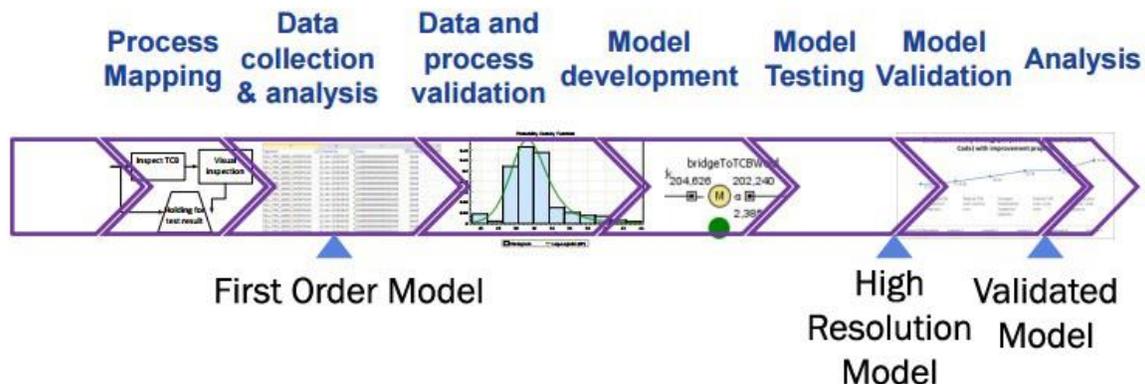
### PROBLEM:

GE's exciting opportunity brought on many new challenges, such as increasing production throughput and yield under evolving processes and uncertainties, and reducing manufacturing costs in order to gain market share. With over 27,000 variables tracked daily, GE was equipped with a lot of data, but they lacked the means to answer questions, analyze the data properly, or test and evaluate options.

The GE Global Research Center sought out a powerful and flexible tool to analyze, not just the specific process, but the manufacturing system as a whole.

### SOLUTION:

GE chose simulation modeling because it offered a dramatic return on investment, and simulation enabled the visualization of their system over time. The long term impacts could be evaluated with increased accuracy compared to using traditional computational, mathematical methods.



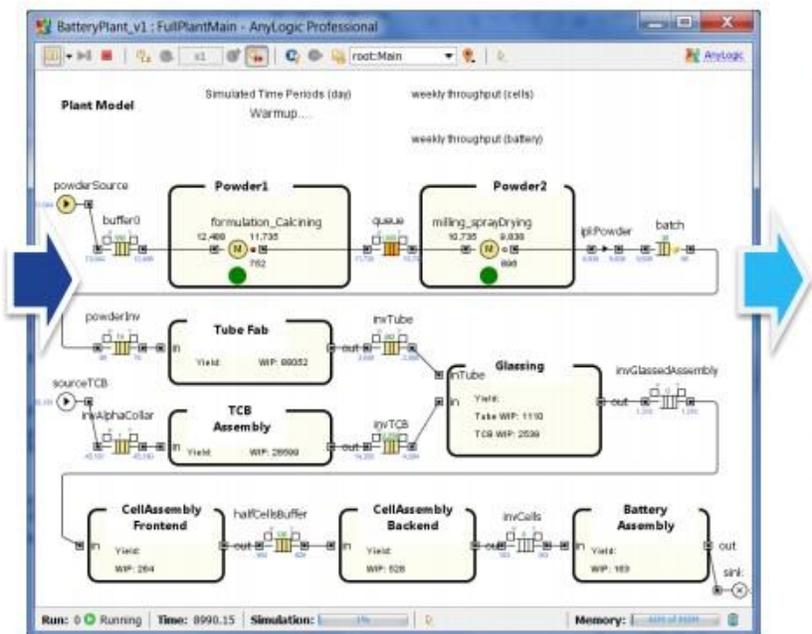
Full plant simulation development process

AnyLogic modeling and simulation software was chosen for its agent-based and multimethod modeling capabilities. It allowed GE to solve problems in any area, combine models, input multiple data sources, and run models anywhere for complete collaboration and real time decision making.

GE's simulation models, built in AnyLogic, focused on determining baseline capacity with variability, simulating system dynamics, identifying bottlenecks, planning production ramp-up, guiding expansion, facilitating continuous improvement, evaluating P/E investment, and achieving real time production optimization.

Input Data:

- Process flow
- Type of machine (continuous, batch, single machine, and special machines including tube press and kiln)
- Machine cycle time
- Yield
- Machine MTBF/MTTR
- Staffing plan
- Setups, cleaning or special non-std work
- IPK's



### OUTCOME:

GE's full plant simulation modeled manufacturing flow, and it was used for capacity planning (identify, evaluate, and prioritize projects), quantitatively analyzing bottlenecks, and evaluating improvement options. Real time operational decision support allowed GE to answer questions such as, "Do I need an additional operator in the next eight hours?", quickly, simply, and accurately, by running what-if scenarios and optimizing results.

AnyLogic software gave GE the tools to make the right probabilistic and multi-scenario informed decision, which resulted in clear visibility of day-to-day operations, increased production throughput, and decreased manufacturing costs.