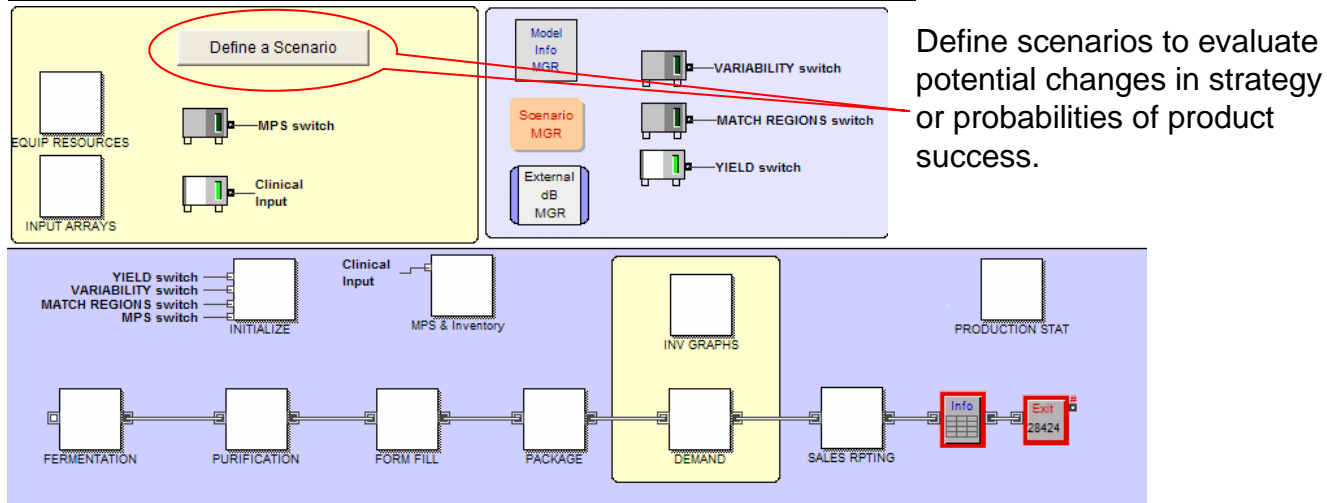


# Strategic Planning Model

## Optimizes Network Capacity for BioPharma Products Worldwide

Planning capacity for a mix of commercial and developmental products with varied probabilities of success has been a challenge due to the number of parameters involved. OpStat's strategic model uses Monte Carlo simulation and integer programming technology to develop how much capacity is required, and where products should be manufactured. It computes the optimum profit based on lot sizes, lead times, forecasts, tax structures, royalties, operating costs and contractual commitments.

### Worldwide Supply Chain Flows: Fermentation to Packaging

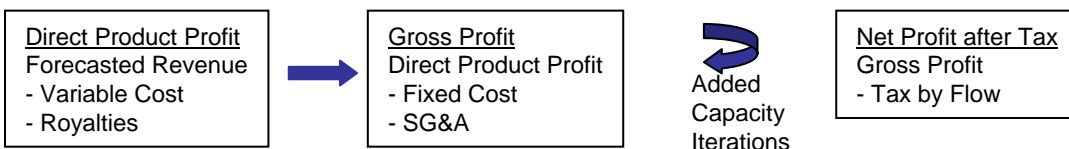


The model can address a virtually unlimited number of “what-if” scenarios for fermentation, purification and formulation/filling sites over a 10-20 year horizon, to determine capital investment and probable utilization of plant resources and inventory. Model capability covers protein or chemical based products, with all manufacturing processes including GMP release included in the lead times.

### Monte Carlo Simulation

Probabilities of success and forecasted volumes by product drive the predicted results. In Monte Carlo mode, 1000 runs provide a statistical range of results. For each run, the OpStat integer programming solver optimizes the network, using current capacity and future build options.

### Optimization Algorithms Incorporate Capital Build Options



## Spreadsheets for All Inputs & Outputs

Spreadsheet capability simplifies the training and maintenance required, while minimizing dependency on corporate IT resources.

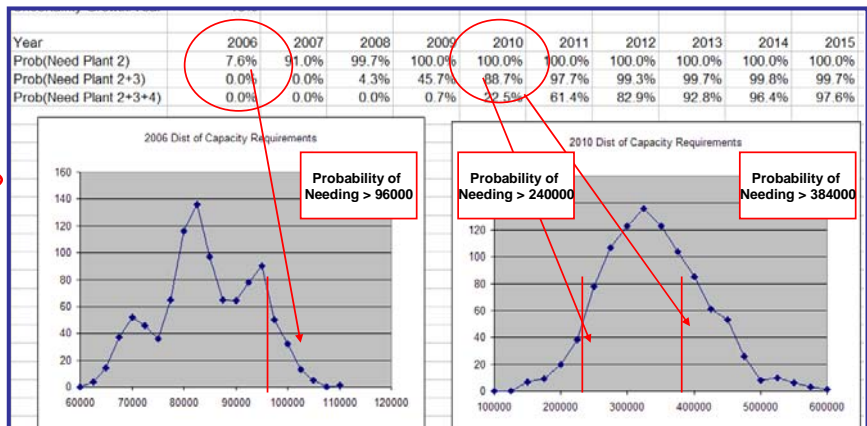
Product	Form: 1=Liq or 2=Lyo	Pkg: 1=Vial or 2=Syringe	Strength	Upstream	Res ID	Downstream	Res ID	Fill/Finish	Res ID	Package	Res ID	Region	Region ID	Start	Stop
Product 1	2	1	2	US Plt 1	4	US Plt 2	8	3rd Party	31	3rd Party	41	US	1	2009	2011
												Europe	2	2009	2011
												Japan	3	2009	2011
												ROW	4	2009	2011
												Canada	5	2009	2011
	2	1	2	Ireland Plt1	4	Ireland Plt2	52	3rd Party	31	3rd Party	41	US	1	2012	
												Europe	2	2012	
												Japan	3	2012	
												ROW	4	2012	
												Canada	5	2012	

## Flexible Graphical Summaries for all sites

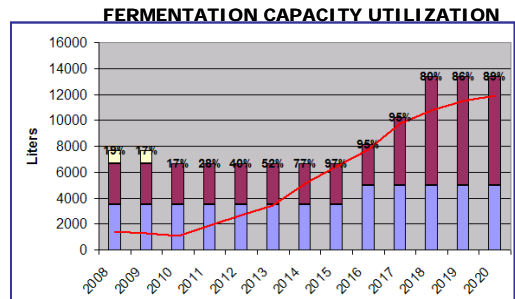
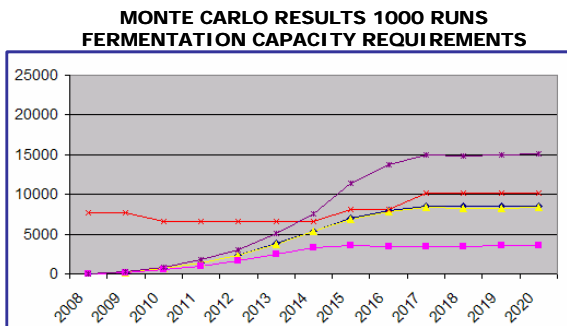
A detailed database of results is available for standard and ad hoc formats.

Current Plant 1 Capacity	96000
Plant 1+2 Capacity	240000
Plant 1+2+3 Capacity	384000
Yield(g/L)	0.75
Scrap (%)	20%
Pr(Pass Clinical Trial)	60%
Uncertainty Growth/Year	10%

Probability of success by product is a key driver.



Statistical ranges of capacity requirements for each operational stage are calculated, as well as projected utilization of lines and of individual sets of equipment .



OpStat Group Inc. has a proven track record with pharmaceutical and biological companies. Founded in 1986, our staff is expert in operational improvement, and uses modeling tools for analysis of operations. We have adapted our models to be licensed to biopharmaceutical companies.



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