

Excerpt from MMTTC research paper “Energy Project Financial Analysis: What Have We Been Missing?” submitted to the ACEEE, April 2009.

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Process Cooling Closed-Loop System - Energy, Operations & Other Resources

This case is a plastics manufacturer operating 22 injection molding machines. Support equipment: 150 ton cooling tower with 1 chiller rated at 60 tons. The energy saving is due to Ecody and decentralize system which saves on pumping kW and also the ability to operate at the proper chilled water temperatures (50F to 80F) to multiple processes in lieu of lowest temperature (48F) at central location. The ability to automatically provide ambient cooling utilizing the Ecody in lieu of chiller for cooling molds when dry bulb is below 71F also was factor in savings. The following table outlines the energy savings from the project. The total project cost was \$497,600.

Annual Total Energy Savings \$146,389. Tower Operating Savings \$16,004/yr.

Current	UF	kW	kW hrs/year	\$/Year	Upgrade	UF	kW	kW hrs/year	\$/Year	Savings
TCU Pumps	85%	122	734,400	\$ 51,408	TCU/RC Pumps	85%	96	577,575	\$ 40,430	21%
Chiller Pumps	100%	44	385,440	\$ 26,981	Chiller Pumps	-	0	0	\$ -	100%
Compressor	100%	74	648,122	\$ 45,369	RC Compressor	100%	20	121,626	\$ 8,514	81%
Tower Pumps	100%	116	1,016,160	\$ 71,131	Ecody Pumps	100%	15	90,000	\$ 6,300	91%
Tower Fan	100%	15	134,583	\$ 9,421	Ecody Fans	100%	6	38,226	\$ 2,676	72%

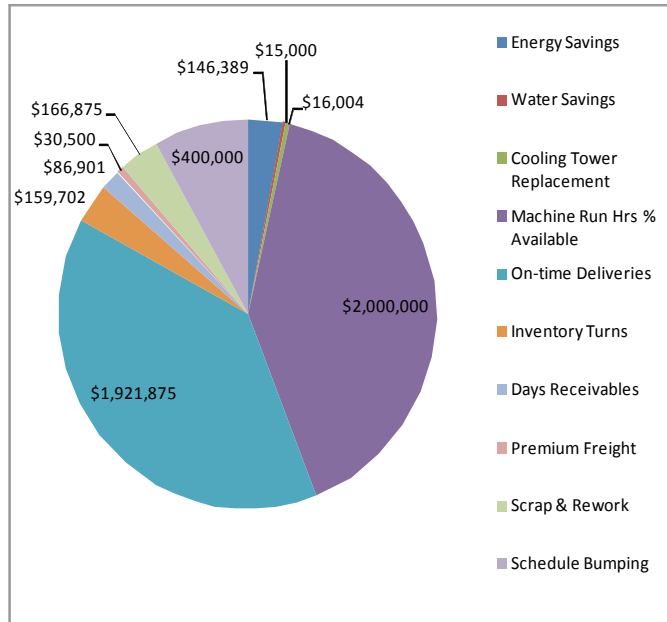
But what about the improvements obtained from cycle time improvements utilizing smaller point-of-use chiller systems with 20% reduction in mold cooling times, reduced mold changeovers, and improved product quality? To measure the financial benefits from operations we used the financial benchmarking tool, Transformation Planner. Restating, the process is two steps. First, input the current manufacturing performance. Second, model the expected or desired changes in percentages or dollars. Calculating the improved state, we held the improvements to 5% although productivity improvements from cycle times based on customer interviews achieves 20%; reduction in scrap and rework by better control over mold temperatures can be reduced by 10% or more over the current state.

The following charts show the relative savings in dollars accruing from a broader range of savings that are not customarily computed but all generated by the project. The project moved from good to great as additional savings from the project were calculated.

Water savings are estimated at 1,847,814 gallons (Existing tower 1,981,076 versus Ecody 137,262) and annual savings of \$1201.00 (0.00065/gallon) with a reduction in water treatment from \$15,000 annually (1250/mo) to \$1200 annually (300/qtr) or total savings of \$15,001.

Energy and Operations Savings from Process Cooling Closed Loop System

Closed Loop Process Cooling: Energy and Operations Savings	Annual Savings	Monthly Savings
Energy Savings	\$146,389	\$12,199
Water Savings	\$15,000	\$1,250
Cooling Tower Replacement	\$16,004	\$1,334
Machine Run Hrs % Available	\$2,000,000	\$166,667
On-time Deliveries	\$1,921,875	\$160,156
Inventory Turns	\$159,702	\$13,309
Days Receivables	\$86,901	\$7,242
Premium Freight	\$30,500	\$2,542
Scrap & Rework	\$166,875	\$13,906
Schedule Bumping	\$400,000	\$33,333



Improvements in Cash Flow and Profit and Loss from process cooling energy project

	Initial Evaluation	%	Target Objectives	%	Opportunity
Income Statement:					
Annual Revenue	\$ 243,750,000		\$ 243,750,000		
Cost of Goods Sold	\$ 166,875,000		\$ 161,962,758		
Operating Margin	\$ 76,875,000	31.5%	\$ 81,787,242	33.6%	\$ 4,912,242 Annual Benefit
Balance Sheet:					
Average Inventory	\$ 20,468,750		\$ 19,404,070		
Receivables	\$ 33,125,000		\$ 31,386,986		\$ 2,802,694 One-Time Benefit