CHATSWORTH PRODUCTS, INC.

KyotoCooling Case Study

1.5 megawatts IT load @ 2.0 PUE and $0.075 per kW/h = $886,950 for cooling

100% return air containment with water side economization

52.4% (4588 hours) @ 1.3 PUE

47.6% @ 2.0 PUE

Total annual PUE = 1.63

Annual cooling cost savings = $363,650 (41%)

$300,000 premium for F-Series TeraFrame™ Cabinet with Vertical Exhaust Duct System

$100,000 water-side economization system

Payback = 13 months and one week

ROI = $1,418,247 (5 year capital depreciation)

100% return air containment with KyotoCooling economization cells

78.9% (6909 hours) @ 1.15 PUE

21.1% @ 2.0 PUE

Total annual PUE = 1.33

Annual cooling cost savings = $638,604 (72%)

$150,000 premium for F-Series TeraFrame Cabinet with Vertical Exhaust Duct System versus containment rooms

-$6,600,000 construction cost savings (Tier 4 assumption)

Payback = Day 1

ROI = $9,643,020 (5 year capital depreciation)

100% return air containment with evaporative air economization

99.8% (8745 hours) @ 1.3 PUE

0.2% @ 2.0 PUE

Total annual PUE = 1.30

Annual cooling cost savings = $691,821 (78%)

$300,000 premium for F-Series TeraFrame Cabinet with Vertical Exhaust Duct System

$50,000 for additional humidity control

$50,000 premium for water-cooled central air handlers (versus CRAH)

Payback = 7 months

ROI = $3,059,105.00 (5 year capital depreciation)

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Estimated Annual Economizer Hours For New York, New York USA											
				Scenario*							
				A		B		C		D	
		Available	Available	Number of Hours Temperature** Is Under							
Month	Year	Days	Hours	37	°F DB	60	°F DB	72	°F DB	77	°F WB
January	2007	31	744	385		734		744		744	
February	2007	28	672	550		672		672		672	
March	2007	31	744	245		712		736		744	
April	2007	30	720	0		313		619		720	
May	2007	31	744	0		313		635		744	
June	2007	30	720	0		26		438		720	
July	2007	31	744	0		2		211		744	
August	2007	31	744	0		40		274		735	
September	2007	30	720	0		71		448		720	
October	2007	31	744	0		254		669		739	
November	2007	30	720	62		707		719		719	
December	2007	31	744	345		744		744		744	
Total Hours			**8760**	**1587**		**4588**		**6909**		**8745**	
Total Days (Total Hours/24)* **			**365**	**66**		**191**		**287**		**364**	
Percentage of Total Hours			**100.0%**	**18.1%**		**52.4%**		**78.9%**		**99.8%**	

Notes

1. 1.5 megawatts given per 10,000 square feet. Calculations assume that is the IT load for 5kW per cabinet and with a 2.0 PUE, the total power demand of the base design would be 3 megawatts
2. Water-side economizer capital expenditures would decrease per 10,000 square feet in a larger space. If the client has a particular budget for water-side economization capital expenditure, this report could be re-calculated accordingly.
3. Tier 4 base construction costs are assumed at $22,000 per kW, per tier classification tables published by the Uptime Institute.
4. ROI will continue to improve for evaporative air-side economization as 10,000 square foot “pods” are added to capture economies of large, water-cooled central air handlers.
5. ROI calculations do not include reduced generator capacity due to reduction in over-provisioning of air flow volume.
6. Because of thermal performance of VED cabinets, power density per cabinet could be increased with a resultant reduction in payback period and further increase in ROI.