

8 Coolerado M50 vs. 30 ton SEER 13 A/C

Facility	Location	Los Angeles, CA	Load	Medium
	Type	Commercial	Utility	SCE
	Square Feet	22,000	Cost \$/kWh	\$ 0.14
	Number of People	85	Cost \$/100 cf.	\$ 3.50

Performance: C60 vs. Seer 13 Vapor Compression Air Conditioner

Air Conditioner Comparison	Air Conditioner Type		Coolerado	DX (Direct Exp)
	Vapor Compression/Direct Expansion		M50	30 ton SEER 13
	Coolerado M50	#####		
	Percentage of Make Up Air (Fresh Air)		100%	Minimal
	Air Delivery Rate (Cubic Feet/Minute)		11,200	11,250
	Design Maximum Humidity (Dew Point)		70° F	63° F
	Hours Cooling Required		2891	4144
	Hours of Condensing		0	850
	Hours Above Design Humidity		297	3030
	Design Set Point Temperature		75° F	75° F
	Total Hours Above Set Point Temperature		162	0
	Hours 3 Degrees Above Set Point		17	0
	Hours 4 Degrees Above Set Point		12	0
	Hours 5 Degrees Above Set Point		27	0
Bonus!	Fresh Air - Better Indoor Air Quality		✓	
	No Chemical Refrigerants		✓	
	Simple System - Few Moving Parts		✓	
	No Return Air Ducting		✓	
	No Electrical Service Upgrade		✓	
	Tons of CO2 Avoidance		56.08	tons (1)

Cost: Coolerado M50 vs. SEER 13 vapor compression A/C

	Estimated Installed Cost	\$ 64,800	\$ 41,440
	SCE Rebate (\$ 0.15/kWh + \$ 100/kW)	\$ (29,940)	None
	Net Cost after SCE Incentive	\$ 34,860	\$ 41,440
	Energy Efficiency Investment tax Credit (\$ 0.60/SF)	\$ (13,200)	None
	Net Cost after ITC	\$ 21,660	\$ 41,440
	Depreciable Basis	\$ 28,260	\$ 41,440
	Annual Operating Costs		
	Peak Power Draw (Kilowatts)	21.8	114.0
	Annual Demand Charge Cost	\$ 785	\$ 4,104
	Total Annual Power (Kilowatt Hours)	20,063	138,132
	Annual Electricity Cost	\$ 2,809	\$ 19,338
	Annual Water Cost	\$ 468	N/A
	Annual Maintenance Cost	\$ 4,000	\$ 5,000
	Total Annual Cost	\$ 7,277	\$ 24,338
	Savings/year: 8 Coolerado M50 vs. 30 tons SEER	\$ 17,062	/year
	Simple Payback	15.2 Months	

10 year payment and costs for 2 options

Does NOT include cost savings from eliminating use of HVAC electric heating coils or cost/benefit of upgraded supply/return ducting to meet CA Title 24 standards

Net Cost after ITC	\$ 21,660	\$ 41,440
1st year depreciation	\$ (2,430)	\$ (3,564)
1st year operating costs	\$ 7,277	\$ 24,338
1st year total	\$ 26,507	\$ 62,215
2nd year depreciation	\$ (2,430)	\$ (3,564)
2nd year operating costs	\$ 7,713	\$ 25,799
2nd year total	\$ 31,790	\$ 84,449
3rd year depreciation	\$ (2,430)	\$ (3,564)
3rd year operating costs	\$ 8,176	\$ 27,347
3rd year total	\$ 37,535	\$ 108,232
4th year depreciation	\$ (2,430)	\$ (3,564)
4th year operating costs	\$ 8,317	\$ 28,987
4th year total	\$ 43,422	\$ 133,656
5th year depreciation	\$ (2,430)	\$ (3,564)
5th year operating costs	\$ 8,816	\$ 30,727
5th year total	\$ 49,807	\$ 160,819
6th year operating costs	\$ 9,345	\$ 32,570
6th year total	\$ 59,151	\$ 193,389
7th year operating costs	\$ 9,905	\$ 34,525
7th year total	\$ 69,057	\$ 227,914
8th year operating costs	\$ 10,500	\$ 36,596
8th year total	\$ 79,556	\$ 264,510
9th year operating costs	\$ 11,129	\$ 38,792
9th year total	\$ 90,685	\$ 303,301
10th year operating costs	\$ 11,797	\$ 41,119
10th year total	\$ 102,483	\$ 344,500

Since all four existing 15 ton RTUs supply a single plenum, replacing two 15-ton RTUs with two clusters of 4 Coolerado M50 A/Cs would allow the two remaining RTUs to perform 2nd stage cooling (Similar to the Coolerado H80) and remove latent heat during the 297 hours/year when humidity is too great to be corrected with 8 Coolerado air conditioners without supplemental cooling.

Notes:

- CO2 avoidance is based upon SCE service area. Possible AB 32 Cap & Trade Offsets
- SCE Energy Efficiency Incentive of \$ 0.15/kWh/year saved + \$ 100/kW of demand savings.
- An Energy Efficiency Investment Tax Credit of \$ 0.60/SF would apply due to the > 50% reduction in HVAC costs.

4 The annual cost savings calculation considers energy and water cost escalations of ~ 6%/year

Life cycle costs of 8 Coolerado M50 air conditioners would be only 30% of that of the two 15 ton DX RTUs that they would replace. Their \$64,800 installed costs would be reduced to \$ 34,860 after the SCE EE incentive is received and would be further reduced to \$ 21,660 after the \$ 0.60/SF Investment Tax Credit is applied. The \$ 17,062 lower annual O&M cost of the 8 Coolerados would result in a simple payback of 15.2 months vs. the cost of replacing 2 of the 4 existing 15 ton RTUs with Title 24 SEER 13 air conditioners. The proposed combination of Coolerado and vapor compression A/Cs could achieve a SEER of ~ 50 in the Santa Ana, CA Climate