

PROJECT DESCRIPTION:

Industrial Lighting Demonstration Center / ILDC
Belleville, MI

SYSTEM NO: 1

Existing 2-lamp T12 System
Luminaire Description: 2-LAMP STRIP
Luminaire Catalog #: C296HOT12

SYSTEM NO: 2

New T8 Fluorescent High Bay System
Luminaire Description: T8 HIGH BAY
Luminaire Catalog #: IB532WDS

SYSTEM NO: 3

New T8 Fluorescent High Bay System with Daylight Integration
Luminaire Description: T8 HIGH BAY WITH DIMMABLE DIGITAL BALLAST & PHOTO SENSORS
Luminaire Catalog #: IB532WDS

Prepared By: RSA

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Input Information

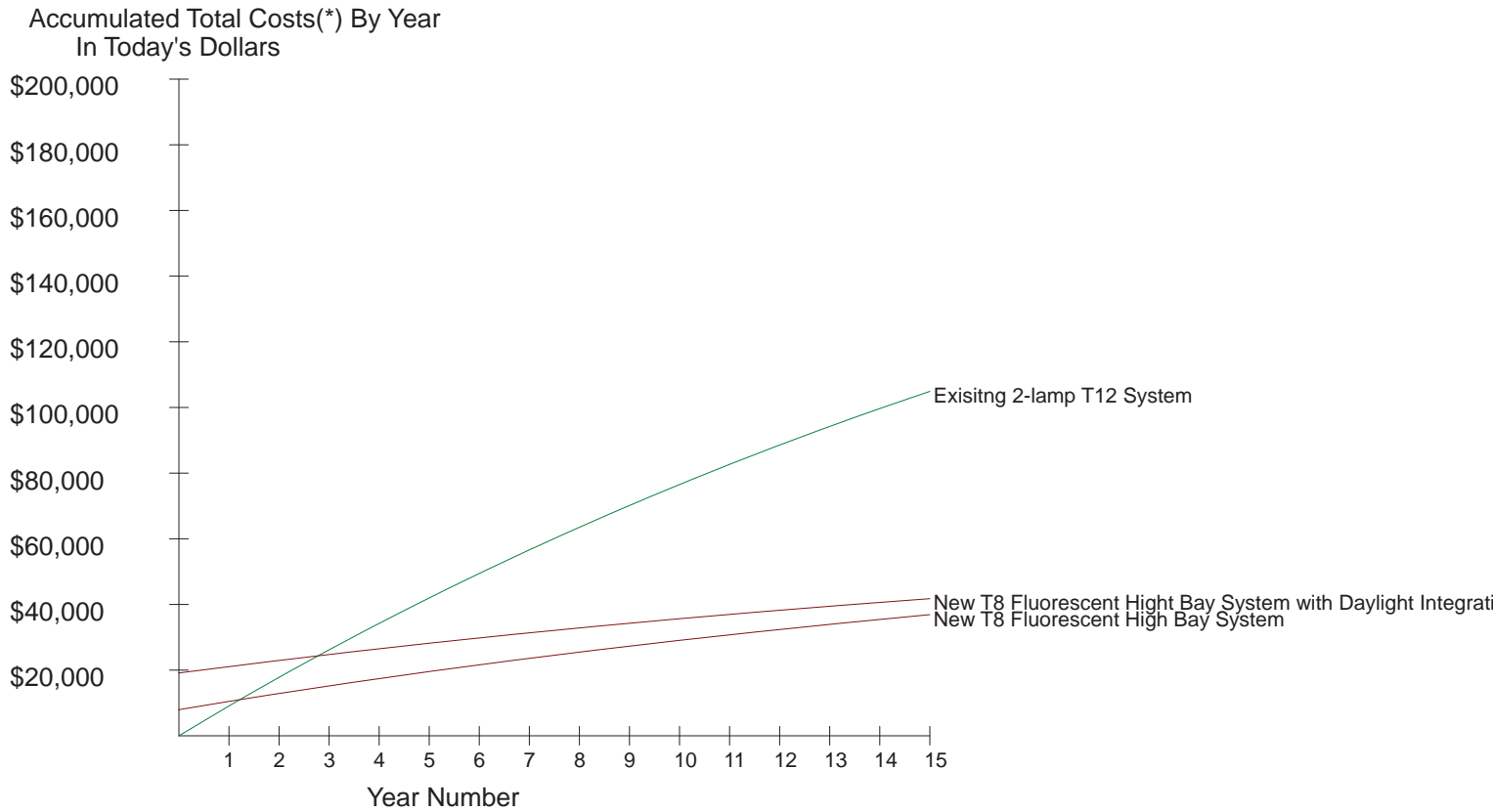
	SYSTEM NO: 1	SYSTEM NO: 2	SYSTEM NO: 3	
Luminaire Information				
Luminaire Catalog Number	C296HOT12	IB532WDS	IB532WDS	
Luminaire Description	2-LAMP STRIP	T8 HIGH BAY	T8 HIGH BAY WITH DIMMABLE	
Initial Cost Per Luminaire	\$0.00	\$155.00	\$483.00	
Number of luminaires	64	32	32	
Input Watts/Luminaire	210.	106.	106.	
Power Factor	0.90	0.90	0.90	
Installation Hours/Luminaire	0.00	1.01	1.01	
Cleaning Hours/Luminaire	0.40	0.40	0.40	
Cleaning Option	RELAMP	RELAMP	RELAMP	
Lamp & Ballast Information				
Lamp Description	F96T12	F32T8	F32T8	
Lamp Life (Hours)	12000	30000	30000	
Cost Per Lamp	\$5.99	\$3.69	\$3.69	
No. of Lamps/Luminaire	2	3	3	
Annual Hours of Operation	3120	3120	1716	
Relamping Hours/Lamp	0.15	0.10	0.10	
Relamping Option	SPOT	GROUP(40)	GROUP(40)	
Replacement Cost Per Ballast	\$52.00	\$17.50	\$17.50	
No. of Ballasts/Luminaire	1.	2.	2.	
Ballast Life (Hours)	38000	50000	50000	
Ballast Replacement Hours/Luminaire	2.01	2.96	2.96	
System & Project Information				
Electrician Labor Rate (\$/hr)	\$56.15	\$56.15	\$56.15	
Maintenance Labor Rate (\$/hr)	\$35.00	\$35.00	\$35.00	
System Life (years)	15	15	15	
Electric Rate (\$/kWh)	\$0.15	\$0.15	\$0.15	
Base Wiring Cost (\$/KVA)	\$0.00	\$202.68	\$202.68	
HVAC Costs have been:	Omitted	Omitted	Omitted	
Interest Rate (%)	4.00	4.00	4.00	
Tax Rate on Initial Costs (%)	6.00	6.00	6.00	
Insurance Rate (%)	1.25	1.25	1.25	
Property Tax Rate (%)	4.00	4.00	4.00	
Income Tax Rate (%)	34.00	34.00	34.00	
Additional Initial Costs	\$0.00	\$0.00	\$0.00	
Additional Annual Costs	\$0.00	\$0.00	\$0.00	
Escalation Rates (%):				
Electricity:	3.00	A/C Maintenance: 3.00	Lamps: 3.00	Electrician Labor: 3.00
Natural Gas:	3.00	Heating Maintenance: 3.00	Ballasts: 3.00	Maintenance Labor: 3.00
Fuel Oil:	3.00			
Coal:	3.00			

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Output Information

	SYSTEM NO: 1	SYSTEM NO: 2	SYSTEM NO: 3
Initial Costs			
Luminaires	\$0.00	\$4960.00	\$15456.00
Luminaire Installation Costs	\$0.00	\$1814.77	\$1814.77
KW Load of the Lighting	13.440	3.392	3.392
Luminaire Wiring Costs	\$0.00	\$763.88	\$763.88
Compensating A/C (tons)			
Cost of A/C Equipment			
Heating From Lighting (kBTUs/hr)			
Savings in Heating Equipment			
Initial Cost of Lamps	\$0.00	\$0.00	\$0.00
Additional Initial Costs	\$0.00	\$0.00	\$0.00
Sub-total	\$0.00	\$7538.65	\$18034.65
Taxes on Initial Costs	\$0.00	\$452.32	\$1082.08
TOTAL INITIAL COSTS	\$0.00	\$7,990.97	\$19,116.73
Relative Initial Costs	0.00	0.00	0.00
Average(*) Annual Costs			
Lighting Energy	\$7861.48	\$1984.09	\$1091.25
KW Load of the A/C			
A/C Energy			
Maintenance of A/C Equipment			
Heating Hours			
Heat From Lighting (MBTUs)			
Heating Savings			
Savings on Maintaining Heating			
Cost of Replacement Lamps	\$215.33	\$117.19	\$117.19
Cost of Labor for Relamping	\$188.72	\$111.16	\$111.16
Cost of Replacing Ballasts	\$918.41	\$0.00	\$0.00
Cost of Cleaning Luminaires	\$251.63	\$148.21	\$148.21
Additional Annual Costs	\$0.00	\$0.00	\$0.00
Sub-total	\$9435.57	\$2360.65	\$1467.80
Insurance	\$0.00	\$99.89	\$238.96
Property Taxes	\$0.00	\$319.64	\$764.67
Reduced Income Tax Liability	\$0.00	-\$181.13	-\$433.31
TOTAL ANNUAL COSTS	\$9,435.57	\$2,599.04	\$2,038.12
Relative Annual Costs	1.00	0.28	0.22
Analysis			
Simple Payoff (years)	Base Case	1.17	2.58
Discounted Payoff (years)	Base Case	1.22	2.78
Internal Rate of Return (%)	Base Case	85.6	38.5
Total Net Present Value of Costs	\$102,362	\$31,581	\$30,265

(*) = All annual costs represent an average over the system life.

Present Value


(*) = All annual costs represent an average over the system life.

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Industrial Lighting Demonstration Center / ILDC

Annual Costs By Year (System # 1)

Year #:	1	2	3	4	5	6	7
Lighting Energy	6289.92	6478.62	6672.98	6873.17	7079.36	7291.74	7510.49
Relamping Lamp Costs	4.22	25.15	134.83	316.26	296.00	183.78	196.82
Relamping Labor Costs	3.70	22.05	118.17	277.19	259.43	161.08	172.51
Ballast Costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ballast Labor Costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cleaning Costs	4.93	29.39	157.57	369.59	345.91	214.77	230.01
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Total Annual Costs:	6302.77	6555.21	7083.55	7836.21	7980.69	7851.37	8109.83
Year #:	8	9	10	11	12	13	14
Lighting Energy	7735.81	7967.88	8206.92	8453.12	8706.72	8967.92	9236.96
Relamping Lamp Costs	281.13	286.23	250.41	253.10	288.43	302.12	295.22
Relamping Labor Costs	246.40	250.87	219.48	221.83	252.80	264.79	258.75
Ballast Costs	0.00	0.00	0.00	0.00	0.00	4887.28	0.00
Ballast Labor Costs	0.00	0.00	0.00	0.00	0.00	12115.10	0.00
Cleaning Costs	328.53	334.50	292.63	295.78	337.06	353.06	345.00
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Total Annual Costs:	8591.87	8839.48	8969.44	9223.83	9585.01	26890.27	10135.93
Year #:	15	16					
Lighting Energy	9514.06						
Relamping Lamp Costs	299.44						
Relamping Labor Costs	262.45						
Ballast Costs	0.00						
Ballast Labor Costs	0.00						
Cleaning Costs	349.93						

Total Annual Costs:	10425.87						

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Annual Costs By Year (System # 2)

Year #:	1	2	3	4	5	6	7
Lighting Energy	1587.46	1635.08	1684.13	1734.66	1786.70	1840.30	1895.51
Relamping Lamp Costs	0.06	0.00	0.00	398.70	0.00	0.00	435.67
Relamping Labor Costs	0.06	0.00	0.00	378.17	0.00	0.00	413.24
Cleaning Costs	0.08	0.00	0.00	504.23	0.00	0.00	550.98
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Total Annual Costs:	1587.66	1635.08	1684.13	3015.76	1786.70	1840.30	3295.40
Year #:	8	9	10	11	12	13	14
Lighting Energy	1952.37	2010.94	2071.27	2133.41	2197.41	2263.33	2331.23
Relamping Lamp Costs	0.00	0.00	476.07	0.00	0.00	0.00	535.82
Relamping Labor Costs	0.00	0.00	451.56	0.00	0.00	0.00	508.23
Cleaning Costs	0.00	0.00	602.07	0.00	0.00	0.00	677.64
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Total Annual Costs:	1952.37	2010.94	3600.97	2133.41	2197.41	2263.33	4052.92
Year #:	15	16					
Lighting Energy	2401.17						
Relamping Lamp Costs	0.00						
Relamping Labor Costs	0.00						
Cleaning Costs	0.00						

Total Annual Costs:	2401.17						

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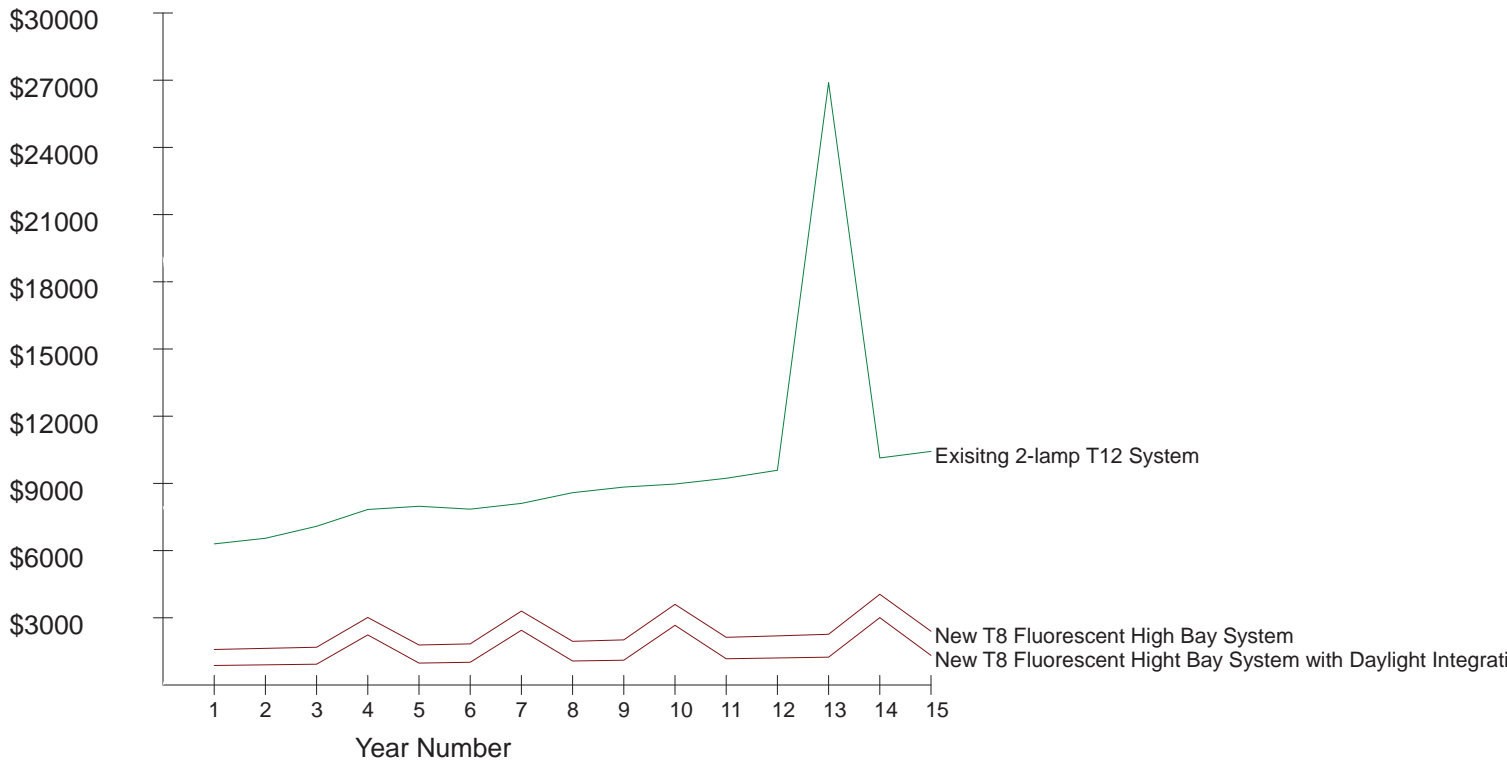
Annual Costs By Year (System # 3)

Year #:	1	2	3	4	5	6	7
Lighting Energy	873.10	899.29	926.27	954.06	982.68	1012.16	1042.53
Relamping Lamp Costs	0.04	0.00	0.00	398.70	0.00	0.00	435.67
Relamping Labor Costs	0.03	0.00	0.00	378.17	0.00	0.00	413.24
Cleaning Costs	0.05	0.00	0.00	504.23	0.00	0.00	550.98
	-----	-----	-----	-----	-----	-----	-----
Total Annual Costs:	873.22	899.29	926.27	2235.16	982.68	1012.16	2442.42
Year #:	8	9	10	11	12	13	14
Lighting Energy	1073.80	1106.02	1139.20	1173.37	1208.58	1244.83	1282.18
Relamping Lamp Costs	0.00	0.00	476.07	0.00	0.00	0.00	535.82
Relamping Labor Costs	0.00	0.00	451.56	0.00	0.00	0.00	508.23
Cleaning Costs	0.00	0.00	602.07	0.00	0.00	0.00	677.64
	-----	-----	-----	-----	-----	-----	-----
Total Annual Costs:	1073.80	1106.02	2668.90	1173.37	1208.58	1244.83	3003.87
Year #:	15	16					
Lighting Energy	1320.64						
Relamping Lamp Costs	0.00						
Relamping Labor Costs	0.00						
Cleaning Costs	0.00						

Total Annual Costs:	1320.64						

Actual Annual Expenses

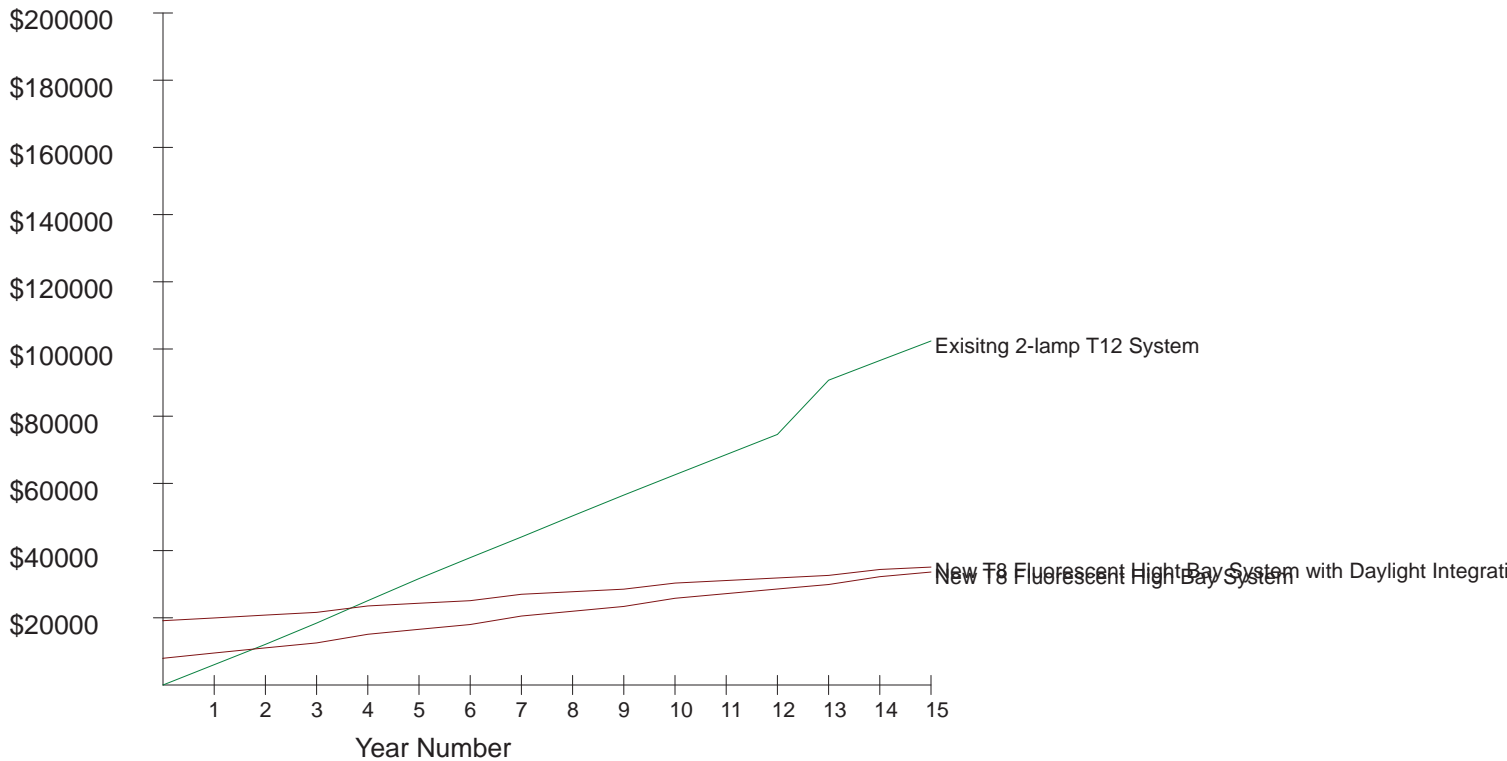
Annual Costs By Year



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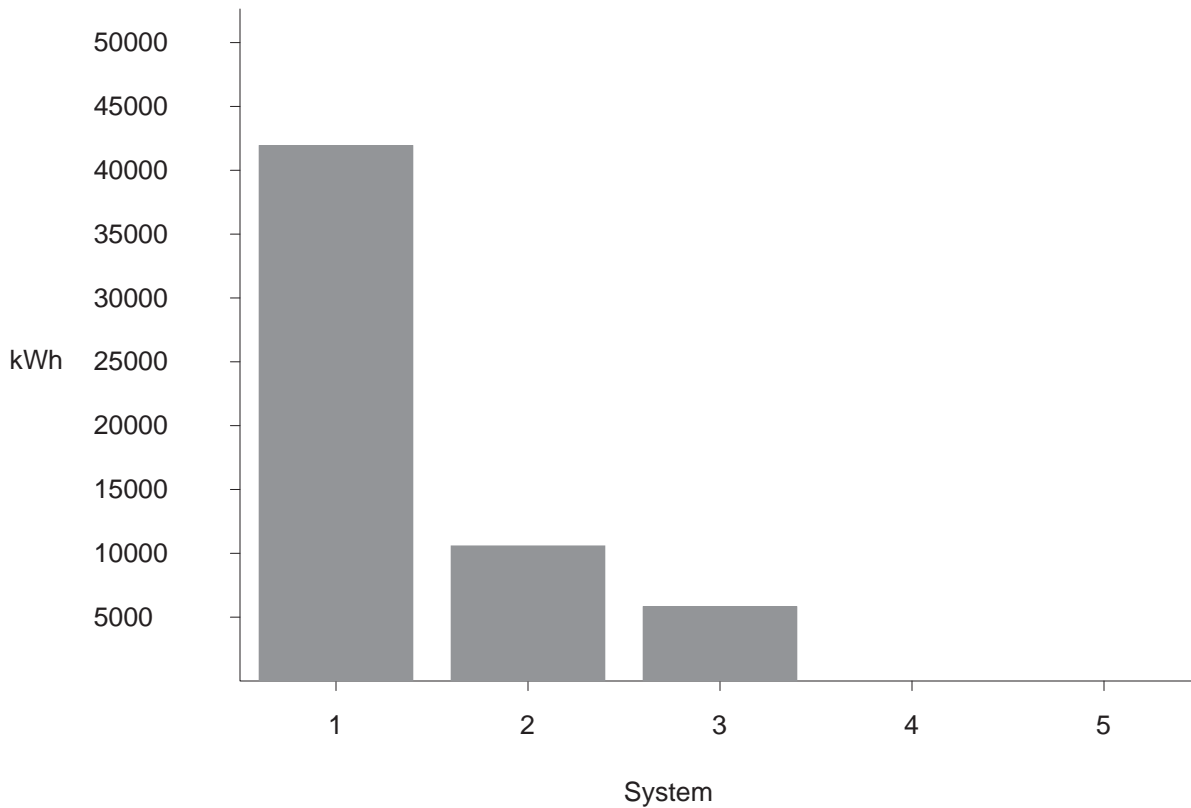
Accumulated Costs Based on Actual Annual Expenses

Accumulated Total Costs(*) By Year
In Today's Dollars



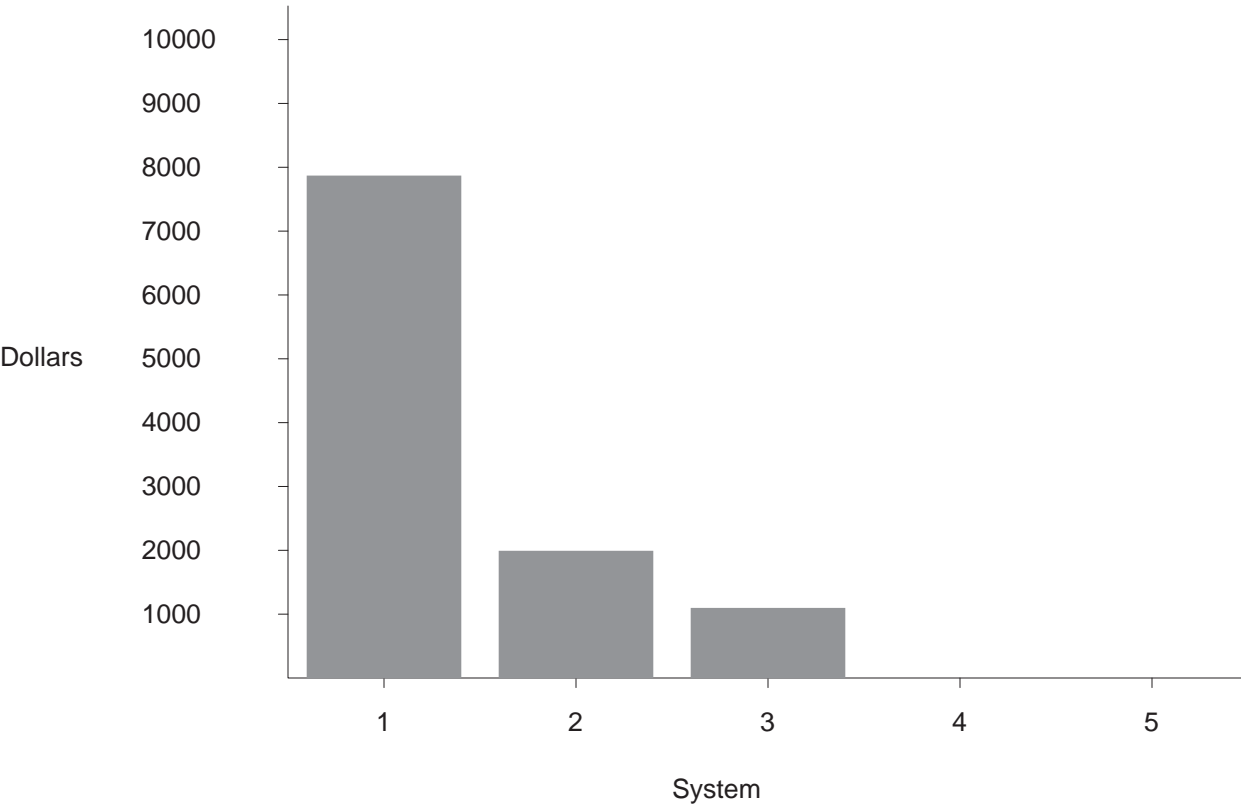
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Annual Energy Use



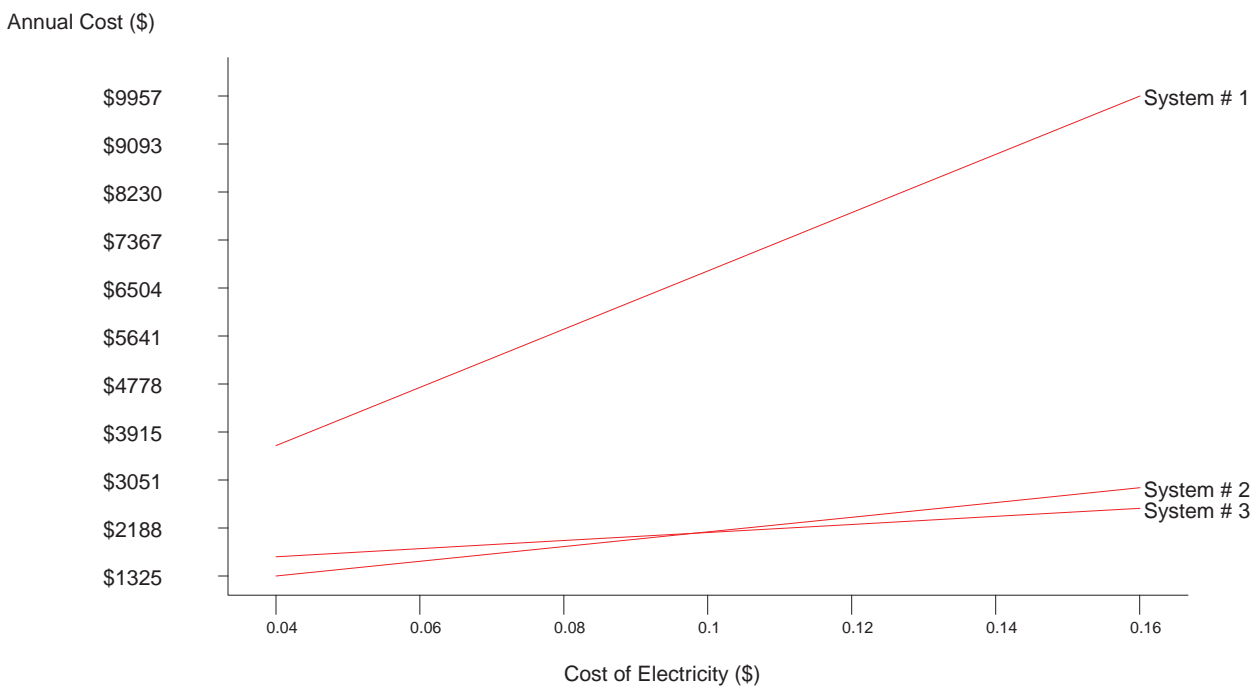
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Annual Energy Costs



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Variance Analysis

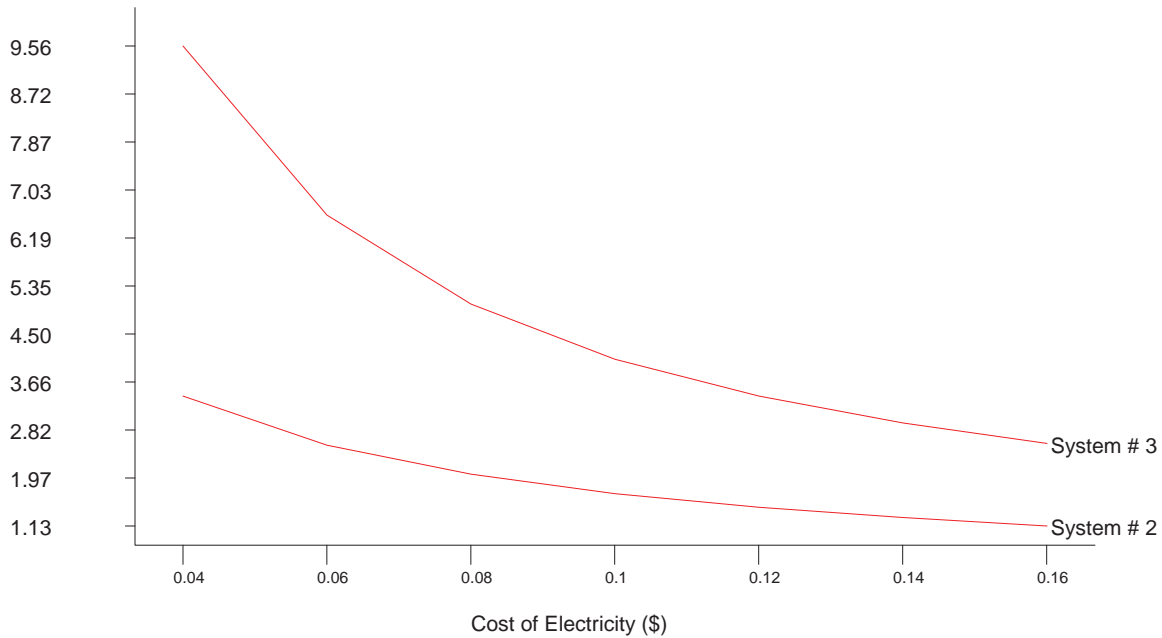


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Variance Analysis

Simple Payback (yrs)

System No. 1 is the base case.

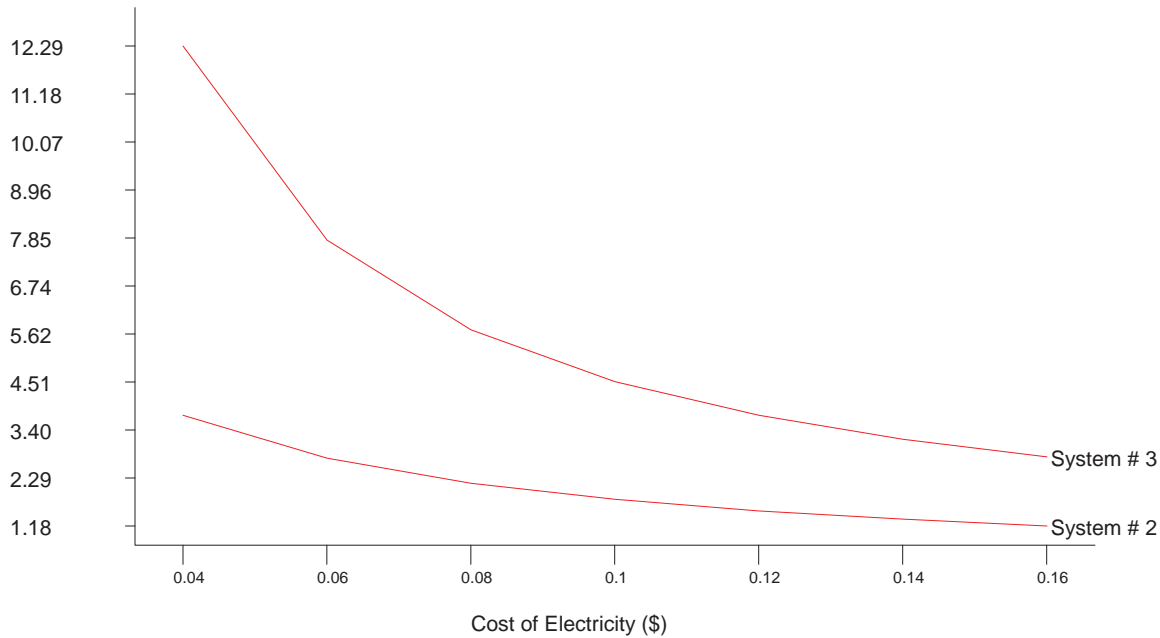


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Variance Analysis

Discounted Payback (yrs)

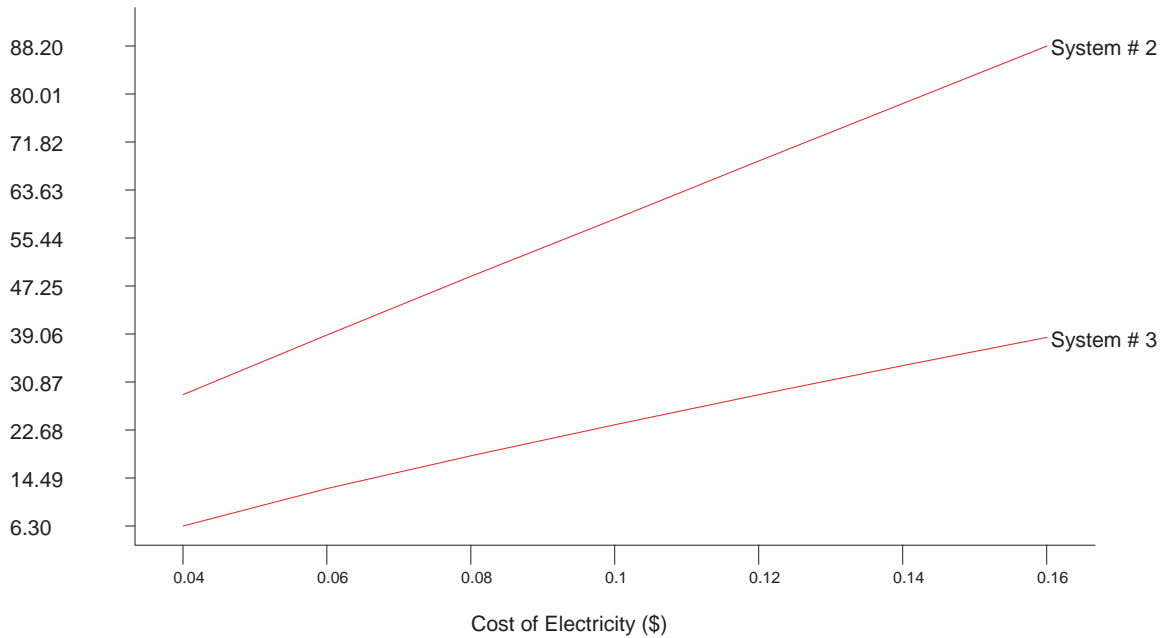
System No. 1 is the base case.



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Variance Analysis

Internal Rate of Return (%) System No. 1 is the base case.



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