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Hawthorn Building  
Altoona, PA



## Construction Management Breadth

### Introduction

For my first breadth study, I wanted to elaborate more on the idea of energy saving lamps and how much could be saved if a construction management cost analysis was done. After designing my lighting systems for the building, I went back and checked different possibilities for lamps that could be used. A detailed spreadsheet with energy savings, kilowatt usage, and rate charges was created to see how much money per year using energy efficient lamps could save.

### Problem Statement

The major challenge of the construction management cost analysis was to go back after the lighting redesign was done and find equivalent lamps to the ones I used in my lighting depth, and then run calculations to see how many kilowatt hours could be saved using the optimal system.

### Design Criteria

Design criteria were chosen at will by me. I looked at different types of lamps from different manufactures to see which ones were “energy efficient.” From here, I compared them all against each other to see which had the best lumen outputs as well as lowest wattage used. I then chose the ones I thought would be the optimal system, and ran a cost analysis on them, strictly for kilowatt hour usage. Relamping was not taking into account in this study.

**Lamp Comparison**

**Note: All lamps from Philips Lighting unless noted otherwise in lamp description**

**Note: All ballasts taken from Advance Transformer**

Space	Fixture	Lamp Description	Design Lumens	Watts (w/o ballast)	Watts (w/ ballast)
Computer Class	Indirect/direct	(1) 54w T5HO	4740	54	62
	Indirect/direct	(2) 28w T5	5500	56	63
Corridor	Wall mount	(1) 28w T5	2750	28	33
	Wall mount	(1) 34w Cold Cathode (by American Cathode)	2836	34	34
Corridor	Downlight	(1) 18w CFT	1100	18	20
	Downlight	(1) 75w Incan.	1030	75	75
Music Room	2x2 indirect	(2) 21w T5	4000	42	48
	2x2 indirect	(1) 39w T5HO	3320	39	40
Music Room	Cloud Pendant	(5) 60w Halogen Quartz	4600	300	300
	Cloud Pendant	(5) 50w Incan.	4125	250	250
Lecture Hall	2x4 Troffer	(2) 32W T8	5420	64	79
	2x4 Troffer	(2) 32w T8 Ultramax (by GE)	5170	56	71
	2x4 Troffer	(2) 32w T8 Alto energy advantage (by Philips)	5500	60	75
Lecture Hall	Wallwasher	(1) 54w T5HO	4740	54	62
	Wallwasher	(2) 42w CFT	5440	84	91
Lecture Hall	Spot	(1) 150w Incan.	2850	150	150
	Spot	(1) 120w Par38	1200	120	120

Space	Fixture	Lamp Type	Watts Saved per lum.	# of Lums.	Total Watts Saved
Computer Class	Indirect/direct	(1) 54w T5HO	1	16	16
	Indirect/direct	(2) 28w T5			
Corridor	Wall mount	(1) 28w T5	1	27	27
	Wall mount	(1) 34w Cold Cathode			
Corridor	Downlight	(1) 18w CFT	55	18	990
	Downlight	(1) 75w Incan.			
Music Room	2x2 indirect	(2) 21w T5			
	2x2 indirect	(1) 39w T5HO	8	16	128
Music Room	Cloud Pendant	(5) 60w Halogen Quartz			
	Cloud Pendant	(5) 50w Incan.	50	3	150
Lecture Hall	2x4 Troffer	(2) 32W T8			
	2x4 Troffer	(2) 32w T8 Ultramax (by GE)	8	16	128
	2x4 Troffer	(2) 32w T8 Alto energy advantage (by Philips)			
Lecture Hall	Wallwasher	(1) 54w T5HO	29	13	377
	Wallwasher	(2) 42w CFT			
Lecture Hall	Spot	(1) 150w Incan.			
	Spot	(1) 120w Par38	30	2	60
			<b>Total Kwatts =</b>		<b>1.876</b>

<b>Building use in hours/year =</b>	<b>2376</b>	<b>(KW*hours)/year =</b>	<b>4457.376</b>
<b>Building rate plan = \$0.06/kwh</b>			
<b>Total savings/year =</b>	<b>267.44256</b>		