Energy Efficiency:
Where is the bang for your buck?

Overview

Building Energy Usage

Building Envelope

LED Lighting

Mechanical Systems

Energy Star

Building Energy Usage

Typical $/sf for buildings

Buildings Energy Data Book: 3.3 Commercial Sector Expenditures *March 2012*

3.3.9 2003 Energy Expenditures per Square Foot of Commercial Floorspace and per Building, by Building Type

	Per Square Foot ($2010)	Per Building ($2010 thousand)		Per Square Foot ($2010)	Per Building ($2010 thousand)
Food Service	4.88	27.2	Mercantile	2.23	38.1
Food Sales	4.68	26.0	Education	1.43	36.6
Health Care	2.76	68.0	Service	1.39	9.1
Public Order and Safety	2.07	32.0	Warehouse and Storage	0.80	13.5
Office	2.01	29.8	Religious Worship	0.76	7.8
Public Assembly	1.73	24.6	Vacant	0.34	4.8
Lodging	1.72	61.5	Other	2.99	65.5

Note(s): Mall buildings are no longer included in most CBECs tables; therefore, some data is not directly comparable to past CBECs.

Source(s): EIA, 2003 Commercial Buildings Energy Consumption and Expenditures: Consumption and Expenditures Tables, Oct. 2006, Table 4; and EIA, Annual Energy Review 2010, Oct. 2011, Appendix D, p. 353 for price deflators.

Typical $/sf for buildings

Buildings Energy Data Book: 3.1 Commercial Sector Energy Consumption *March 2012*

3.1.9 2003 Commercial Delivered Energy Consumption Intensities, by Principal Building Type and Vintage (1)

	Consumption (kBtu/SF)		
Building Type	Pre-1959	1960-1989	1990-2003
Health Care	178.1	216.0	135.7
Inpatient	230.3	255.3	253.8
Outpatient	91.6	110.4	84.4
Food Sales	205.8	197.6	198.3
Lodging	88.2	111.5	88.1
Office	93.6	94.4	88.0
Mercantile	80.4	91.8	94.4
Retail (Non-Malls)	74.1	63.7	86.4
Retail (Malls)	N.A.	103.9	99.5

	Consumption (kBtu/SF)		
Building Type	Pre-1959	1960-1989	1990-2003
Education	77.7	88.3	80.6
Service	62.4	86.0	74.8
Food Service	145.2	290.1	361.2
Religious Worship	46.6	39.9	43.3
Public Order & Safety	N.A.	101.3	110.6
Warehouse & Storage	N.A.	38.9	33.3
Public Assembly	61.9	107.6	119.7
Vacant	21.4	23.1	N.A.
Other	161.3	204.9	125.3

Note(s): 1) See Table 3.1.3 for primary versus delivered energy consumption.

Source(s): EIA, 2003 Commercial Buildings Energy Consumption and Expenditures: Consumption and Expenditures Tables, Oct. 2006, Table C12a.

What is using your energy?

Buildings Energy Data Book: 3.1 Commercial Sector Energy Consumption

3.1.13 2003 Commercial Buildings Delivered Energy End-Use Intensities, by Building Activity (Thousand Btu per SF) (1)

	Health Care			Inpatient			Outpatient		
Space Heating	70.4	37.5%	$1.04	91.8	36.8%	$0.37	38.1	40.3%	$0.81
Cooling	14.1	7.5%	$0.21	18.6	7.5%	$0.07	7.2	7.6%	$0.15
Ventilation	13.3	7.1%	$0.20	20.0	8.0%	$0.08	3.3	3.5%	$0.07
Water Heating	30.2	16.1%	$0.44	48.4	19.4%	$0.19	2.5	2.6%	$0.05
Lighting	33.1	17.6%	$0.49	40.1	16.1%	$0.16	22.6	23.9%	$0.48
Cooking	3.5	1.9%	$0.05	5.6	2.2%	$0.02	0.0	0.0%	$0.00
Refrigeration	2.6	1.4%	$0.04	2.0	0.8%	$0.01	3.5	3.7%	$0.07
Office Equipment	1.2	0.6%	$0.02	1.1	0.4%	$0.00	1.3	1.4%	$0.03
Computers	3.4	1.8%	$0.05	3.9	1.6%	$0.02	2.6	2.7%	$0.06
Other	16.1	8.6%	$0.24	18.1	7.3%	$0.07	13.2	14.0%	$0.28
Total	187.7	100%	$2.76	249.2	100%	$2.76	94.6	100%	$2.01

Note(s): 1) Due to rounding, end-uses do not sum to total.

Source(s): EIA, 2003 Commercial Building Energy Consumption Survey, Energy End-Uses, Oct. 2008, Table E.2A.

What is using your energy?

System - 001 — **Terminal Reheat**

COOLING COIL PEAK

Peaked at Time: Mo/Hr: 7 / 15
Outside Air: OADB/WB/HR: 95 / 74 / 97

	Space Sens. + Lat. Btu/h	Plenum Sens. + Lat Btu/h	Net Total Btu/h	Percent Of Total (%)
Envelope Loads				
Skylite Solar	0	0	0	0
Skylite Cond	0	0	0	0
Roof Cond	0	10,028	10,028	2
Glass Solar	73,833	0	73,833	12
Glass/Door Cond	9,620	0	9,620	2
Wall Cond	6,934	6,346	13,279	2
Partition/Door	0		0	0
Floor	0		0	0
Adjacent Floor	0	0	0	0
Infiltration	29,795		29,795	5
Sub Total ==>	120,181	16,374	136,555	22
Internal Loads				
Lights	19,597	4,899	24,497	4
People	69,093	0	69,093	11
Misc	25,081	0	25,081	4
Sub Total ==>	113,771	4,899	118,670	19
Ceiling Load	20,172	-20,172	0	0
Ventilation Load	0	0	195,425	31
Adj Air Trans Heat	21,591		21,591	3
Dehumid. Ov Sizing			0	0
Ov/Undr Sizing	55,910		55,910	9
Exhaust Heat		-2,701	-2,701	0
Sup. Fan Heat			58,926	9
Ret. Fan Heat		13,676	13,676	2
Duct Heat Pkup		0	35,856	6
Underflr Sup Ht Pkup			0	0
Supply Air Leakage		0	0	0
Grand Total ==>	331,625	12,076	633,908	100.00

CLG SPACE PEAK

Mo/Hr: Sum of
OADB: Peaks

	Space Sensible Btu/h	Percent Of Total (%)
Envelope Loads		
Skylite Solar	0	0
Skylite Cond	0	0
Roof Cond	0	0
Glass Solar	103,055	40
Glass/Door Cond	3,864	1
Wall Cond	6,991	3
Partition/Door	0	0
Floor	0	0
Adjacent Floor	0	0
Infiltration	8,307	3
Sub Total ==>	122,216	47
Internal Loads		
Lights	32,860	13
People	37,496	15
Misc	24,197	9
Sub Total ==>	94,553	37
Ceiling Load	17,916	7
Ventilation Load	0	0
Adj Air Trans Heat	21,591	8
Ov/Undr Sizing		
Exhaust Heat	1,587	1
OA Preheat Diff.		
RA Preheat Diff.		
Additional Reheat		
Underflr Sup Ht Pkup		
Supply Air Leakage		
Grand Total ==>	257,863	100.00

HEATING COIL PEAK

Mo/Hr: Heating Design
OADB: -10

	Space Peak Space Sens Btu/h	Coil Peak Tot Sens Btu/h	Percent Of Total (%)
Envelope Loads			
Skylite Solar	0	0	0.00
Skylite Cond	0	0	0.00
Roof Cond	0	-14,219	2.66
Glass Solar	0	0	0.00
Glass/Door Cond	-43,154	-43,154	8.08
Wall Cond	-11,532	-22,001	4.12
Partition/Door	0	0	0.00
Floor	0	0	0.00
Adjacent Floor	0	0	0
Infiltration	-59,648	-59,648	11.17
Sub Total ==>	-114,334	-139,022	26.03
Internal Loads			
Lights	0	0	0.00
People	0	0	0.00
Misc	0	0	0.00
Sub Total ==>	0	0	0.00
Ceiling Load	-24,688	0	0.00
Ventilation Load	0	-365,703	68.46
Adj Air Trans Heat	-29,442	-29,442	6
Ov/Undr Sizing	0	0	0.00
Exhaust Heat		0	0.00
OA Preheat Diff.		0	0.00
RA Preheat Diff.		0	0.00
Additional Reheat		0	0.00
Underflr Sup Ht Pkup		0	0.00
Supply Air Leakage		0	0.00
Grand Total ==>	-168,464	-534,167	100.00

TEMPERATURES

	Cooling	Heating
SADB	59.6	79.4
Ra Plenum	78.0	65.2
Return	74.8	70.0
Ret/OA	80.0	49.6
Fn MtrTD	0.3	0.0
Fn BldTD	0.7	0.0
Fn Frict	2.2	0.0

AIRFLOWS

	Cooling	Heating
Diffuser	16,573	16,573
Terminal	16,573	16,573
Main Fan	16,573	16,573
Sec Fan	0	0
Nom Vent	4,226	4,226
AHU Vent	4,226	4,226
Infil	689	689
MinStop/Rh	16,573	16,573
Return	15,385	15,385
Exhaust	3,038	3,038
Rm Exh	1,877	1,877
Auxiliary	0	0
Leakage Dwn	0	0
Leakage Ups	0	0

ENGINEERING CKS

	Cooling	Heating
% OA	25.5	25.5
cfm/ft²	1.03	1.03
cfm/ton	313.73	
ft²/ton	304.02	
Btu/hr·ft²	39.47	-57.39
No. People	179	

COOLING COIL SELECTION

	Total Capacity ton	Total Capacity MBh	Sens Cap. MBh	Coil Airflow cfm	Enter DB/WB/HR °F	Enter DB/WB/HR °F	Enter DB/WB/HR gr/lb	Leave DB/WB/HR °F	Leave DB/WB/HR °F	Leave DB/WB/HR gr/lb
Main Clg	52.8	633.9	493.2	16,573	80.0	64.9	70.9	54.3	51.9	55.6
Aux Clg	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Opt Vent	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0.0
Total	52.8	633.9								

AREAS

	Gross Total ft²	Glass ft²	Glass (%)
Floor	16,060		
Part	0		
Int Door	0		
ExFlr	0		
Roof	3,974	0	0
Wall	5,574	1,186	21
Ext Door	0	0	0

HEATING COIL SELECTION

	Capacity MBh	Coil Airflow cfm	Ent °F	Lvg °F
Main Htg	-449.4	16,573	54.3	79.4
Aux Htg	0.0	0	0.0	0.0
Preheat	-84.8	16,573	49.6	54.3
Reheat	-280.9	16,573	54.3	70.0
Humidif	-387.5	17,262	0.7	33.7
Opt Vent	0.0	0	0.0	0.0
Total	-921.7			

Building Envelope

Just add more insulation, right?

MONTHLY UTILITY COSTS

By Design Collaborative

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
	------- Monthly Utility Costs -------												
Base Building - Code Minimum													
Electric													
On-Pk Cons. ($)	2,214	2,001	2,209	2,303	2,998	3,084	3,253	3,150	2,910	2,376	2,134	2,213	30,846
On-Pk Demand ($)	343	343	343	413	465	491	495	487	463	415	376	343	4,976
Total ($):	2,557	2,344	2,552	2,716	3,463	3,575	3,748	3,637	3,373	2,791	2,510	2,556	35,822
Gas													
On-Pk Cons. ($)	992	911	810	554	423	370	358	380	405	568	647	939	7,358
Monthly Total ($):	3,548	3,255	3,362	3,270	3,886	3,946	4,106	4,017	3,777	3,359	3,158	3,494	43,180
Building Area = 16,060 ft²													
Utility Cost Per Area = 2.69 $/ft²													
Improved Wall Insulation													
Electric													
On-Pk Cons. ($)	2,179	1,969	2,175	2,266	2,948	3,034	3,201	3,099	2,861	2,338	2,100	2,178	30,347
On-Pk Demand ($)	338	339	338	407	458	484	488	480	456	409	371	338	4,904
Total ($):	2,517	2,308	2,512	2,673	3,406	3,518	3,689	3,578	3,317	2,747	2,470	2,516	35,251
Gas													
On-Pk Cons. ($)	947	869	771	527	401	351	338	359	383	539	615	895	6,995
Monthly Total ($):	3,464	3,177	3,284	3,199	3,808	3,869	4,027	3,937	3,700	3,286	3,085	3,411	42,247
Building Area = 16,060 ft²													
Utility Cost Per Area = 2.63 $/ft²													

What about HP glass?

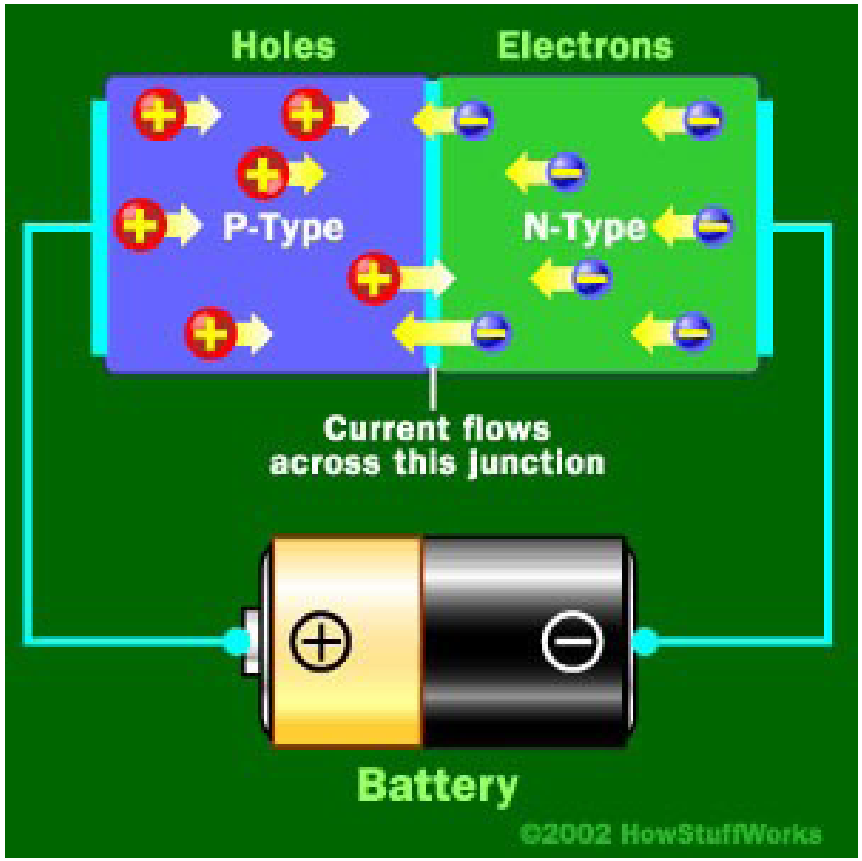
MONTHLY UTILITY COSTS

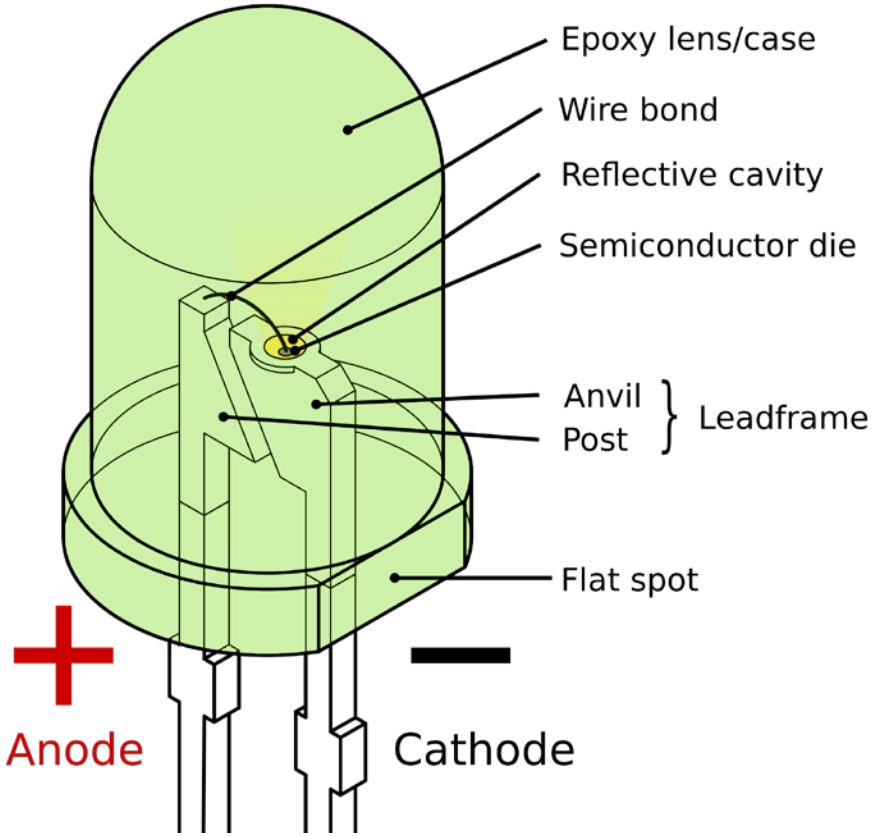
By Design Collaborative

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
	------- Monthly Utility Costs -------												
Base Building - Code Minimum													
Electric													
On-Pk Cons. ($)	2,214	2,001	2,209	2,303	2,998	3,084	3,253	3,150	2,910	2,376	2,134	2,213	30,846
On-Pk Demand ($)	343	343	343	413	465	491	495	487	463	415	376	343	4,976
Total ($):	2,557	2,344	2,552	2,716	3,463	3,575	3,748	3,637	3,373	2,791	2,510	2,556	35,822
Gas													
On-Pk Cons. ($)	992	911	810	554	423	370	358	380	405	568	647	939	7,358
Monthly Total ($):	3,548	3,255	3,362	3,270	3,886	3,946	4,106	4,017	3,777	3,359	3,158	3,494	43,180
Building Area =	16,060 ft²												
Utility Cost Per Area =	2.69 $/ft²												
High Efficiency Low-E Glass													
Electric													
On-Pk Cons. ($)	1,915	1,731	1,911	2,011	2,608	2,695	2,850	2,747	2,531	2,086	1,869	1,914	26,867
On-Pk Demand ($)	303	303	303	365	410	436	440	433	409	366	360	303	4,431
Total ($):	2,218	2,034	2,213	2,375	3,018	3,131	3,290	3,180	2,939	2,452	2,229	2,217	31,298
Gas													
On-Pk Cons. ($)	797	732	656	466	358	313	302	323	344	466	521	744	6,022
Monthly Total ($):	3,015	2,766	2,870	2,841	3,377	3,445	3,592	3,503	3,284	2,918	2,750	2,960	37,320
Building Area =	16,060 ft²												
Utility Cost Per Area =	2.32 $/ft²												

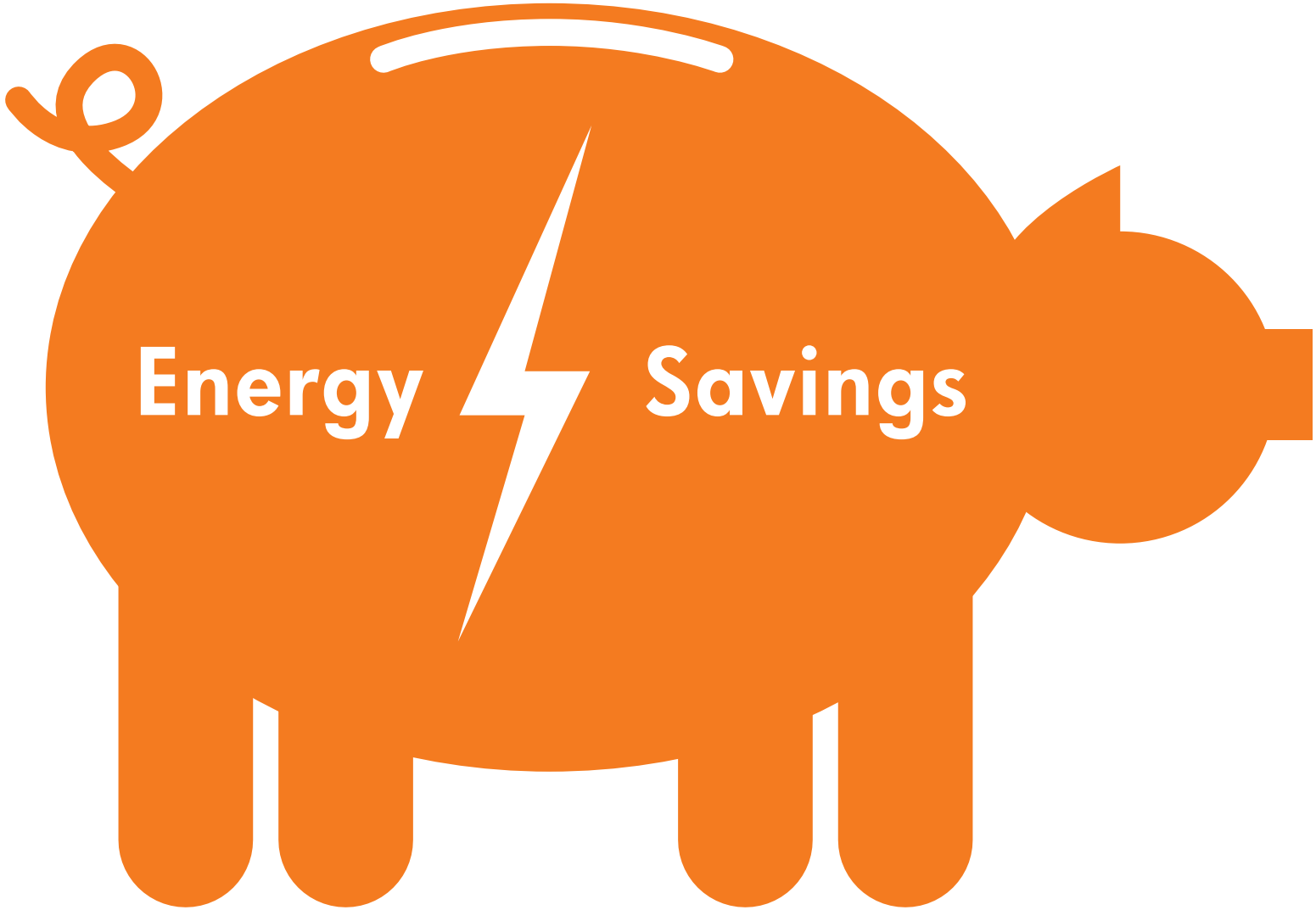
LED Lighting

What is LED lighting?

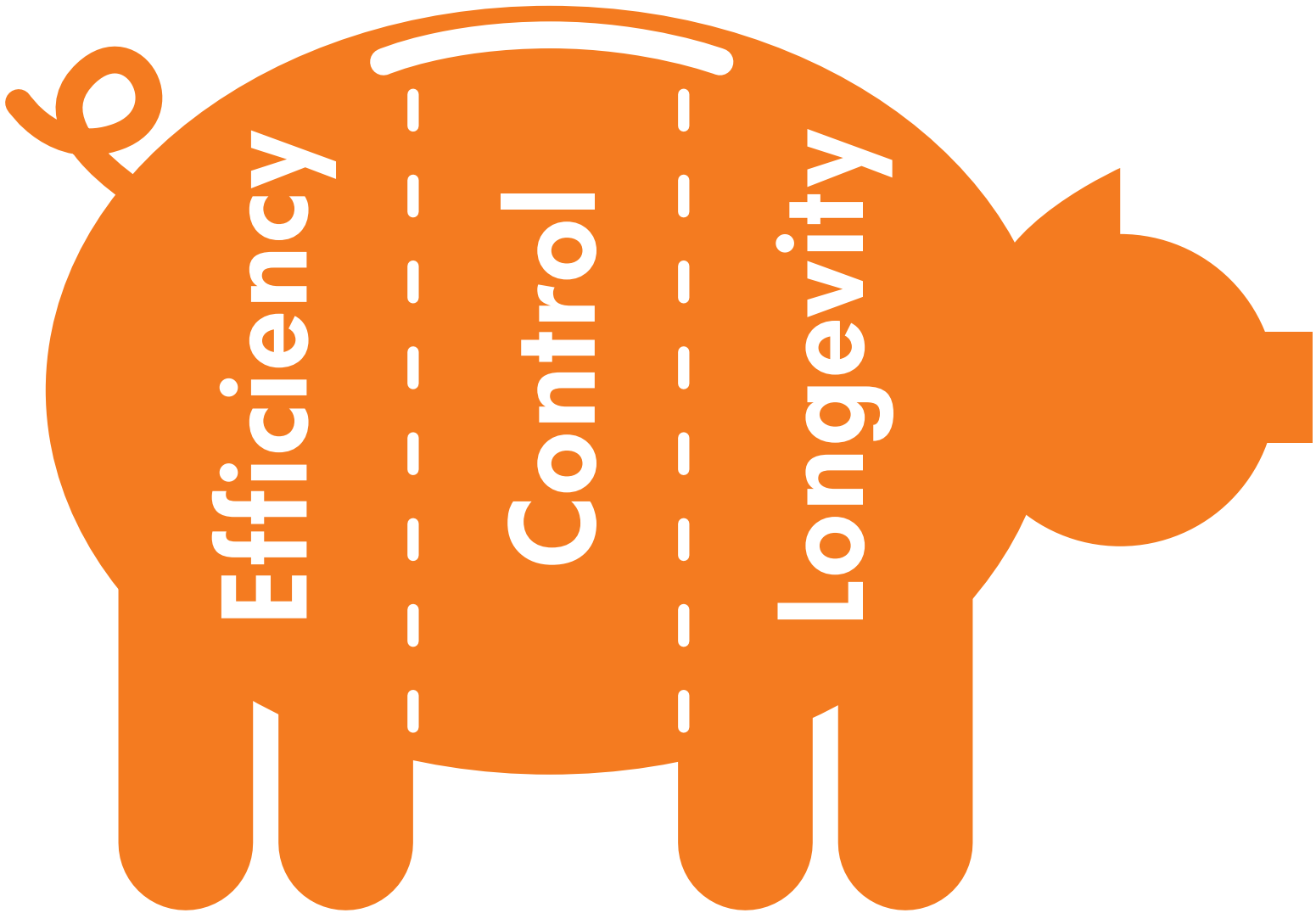




Economic advantages of LED



Economic advantages of LED



Advantage 1: Efficiency

Advantage 1: Efficiency

60w incandescent
14 L/w

50w halogen
11 L/w

53w halogen
17 L/w

32w compact fl
75 L/w

400w metal halide
88 L/w

32w T8 fl
92 L/w

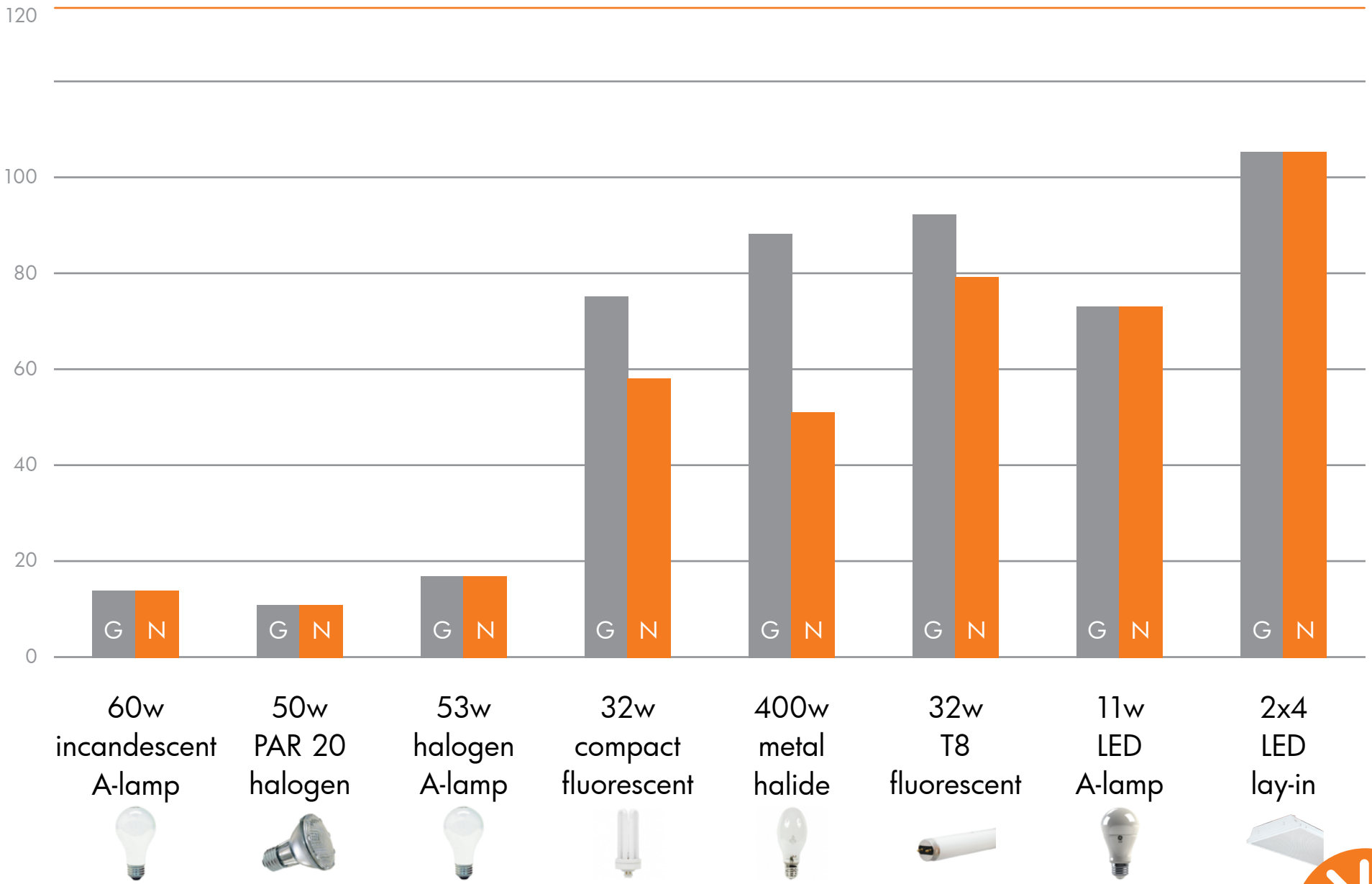
11w LED
73 L/w

71w 2x4 lay-in LED
105 L/w

Advantage 1: Efficiency

	Source	Initial (L)	Power (w)	Gross Efficacy
	60w incandescent A-lamp	730	52	14
	50w PAR 20 halogen	570	50	11
	53w halogen A-lamp	890	53	17
	32w compact fluorescent	2400	32	75
	400w metal halide	35000	400	88
	32w T8 fluorescent	2950	32	92
	11w LED A-lamp	800	11	73
	2x4 LED lay-in	7421	71	105

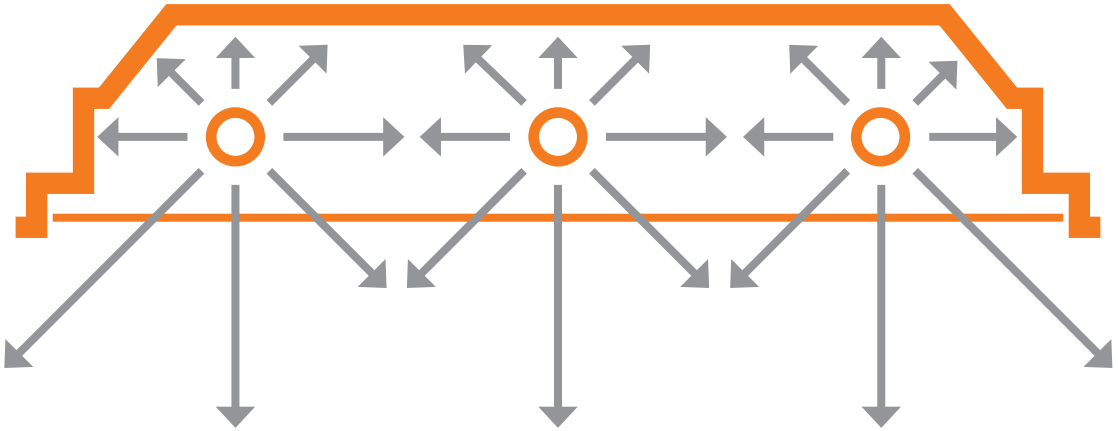
Advantage 1: Efficiency



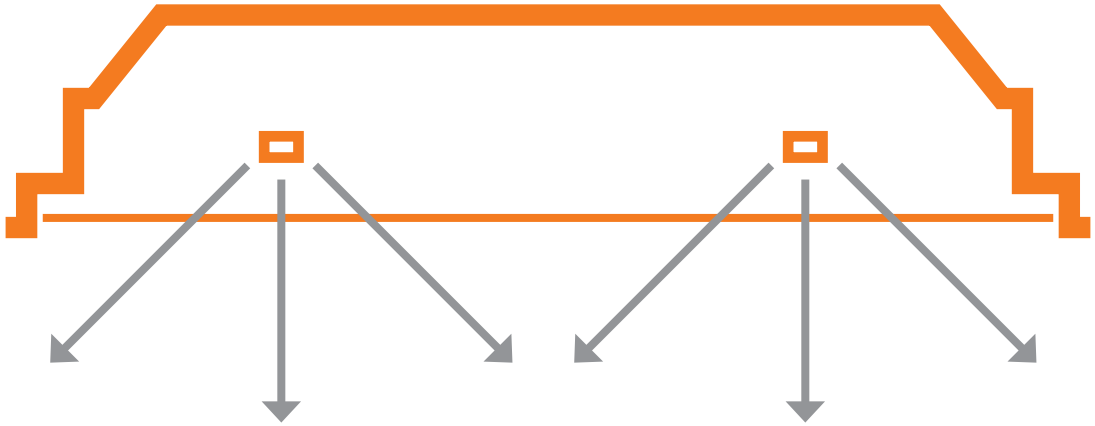
Advantage 2: Control

Advantage 2: Control

Fluorescent



LED



Advantage 2: Control

Zonal Lumens Summary

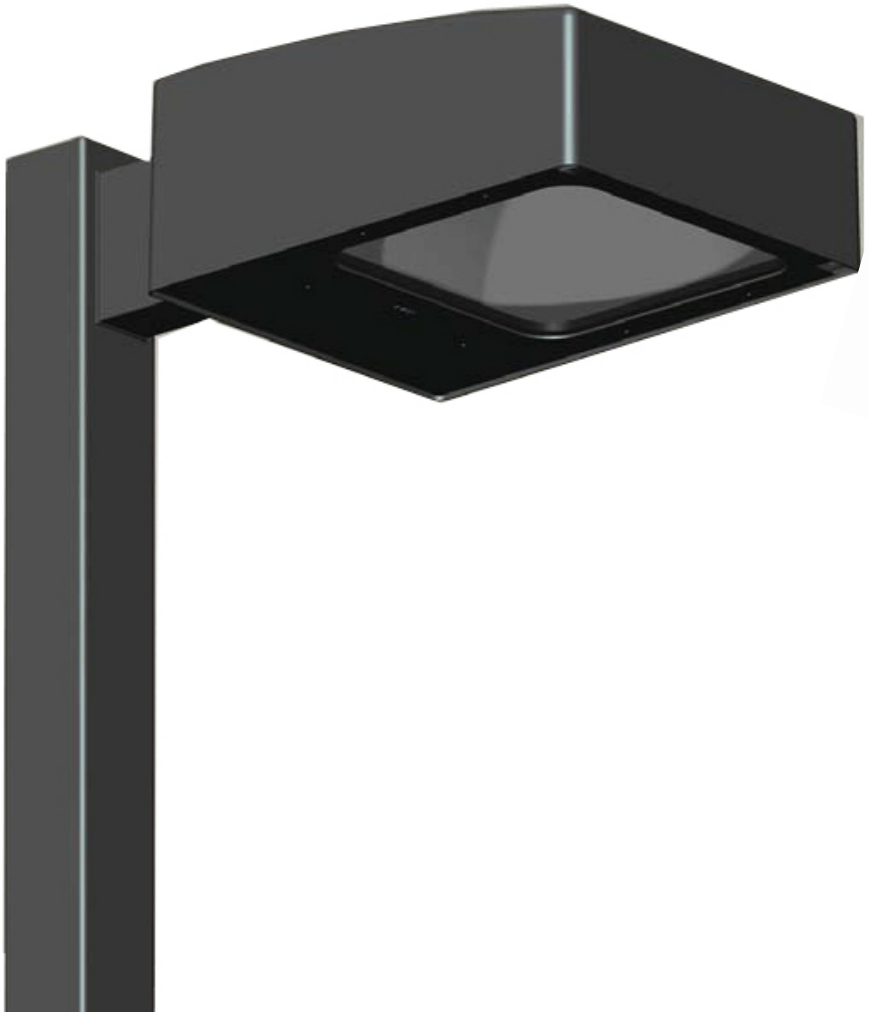
Zone	L	% Lamp	% Fixture
0-30	2066	24.2	30.2
0-40	3412	39.9	49.8
0-60	5768	67.5	84.2
0-90	6851	80.1	100.0
90-180	0	0	0
0-180	6851	80.1	100.0

Fluorescent

Zone	L	% Lamp	% Fixture
0-30	1713	35.2	35.2
0-40	2710	55.7	55.7
0-60	4192	86.2	86.2
0-90	4865	100.0	100.0
90-180	0	0	0
0-180	4865	100.0	100.0

LED

Advantage 2: Control



Advantage 3: Longevity

Advantage 3: Longevity

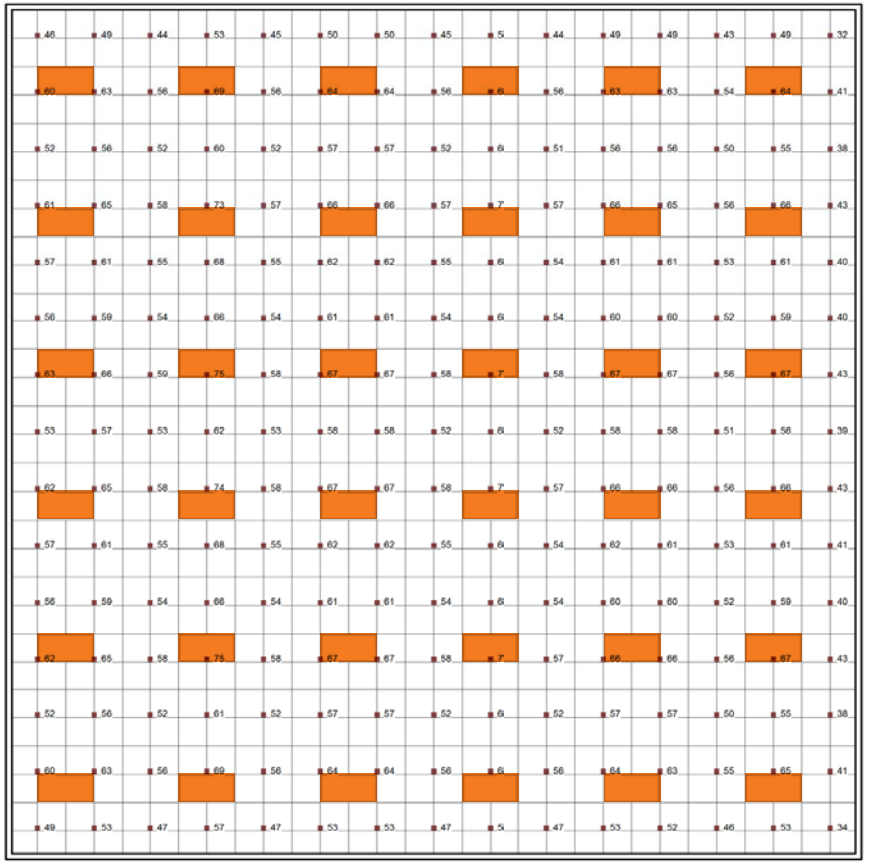
50,000-100,000 hours

IES LM-80 & IES TM-21

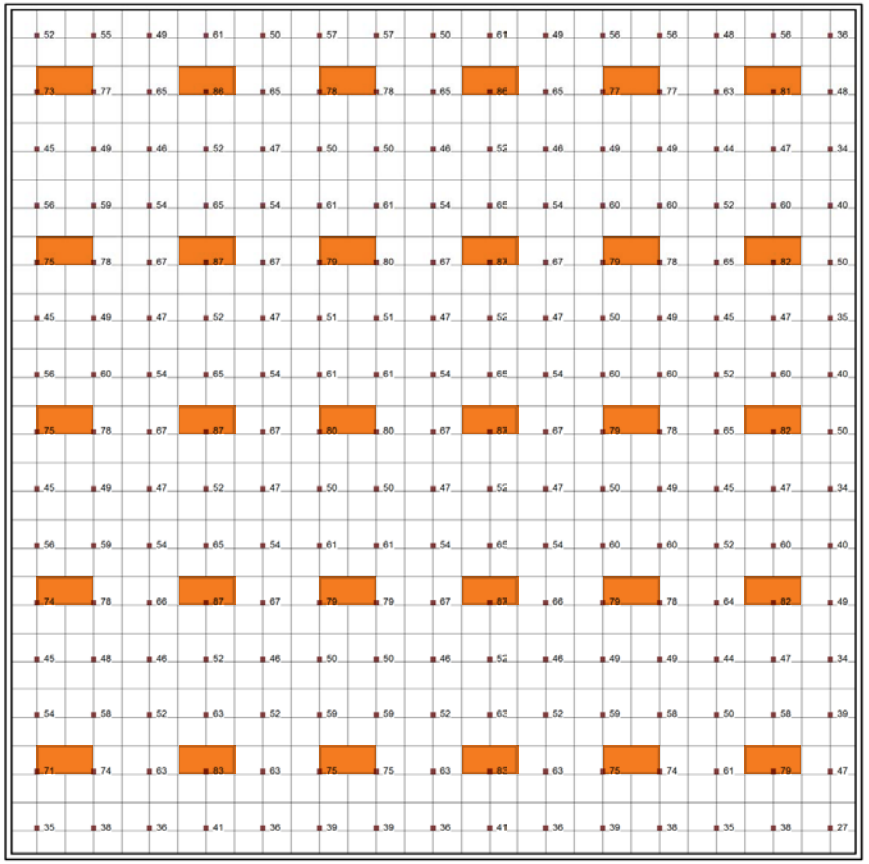
Advantage 3: Longevity

Data Set	Case Temp. [T_S]	Ambient Temp. [T_A]	Drive Current [I_F]	Average Lumen Maintenance at 6,000 hours	Average Chromaticity Shift (Δu'v') at 6,000 hours	Reported TM-21 Lifetimes
1	55°C	55°C	200 mA	98.8%	0.0005	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
2	85°C	85°C	200 mA	98.7%	0.0006	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
3	105°C	105°C	200 mA	98.5%	0.0008	L90(6k) > 36,300 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
4	55°C	55°C	375 mA	97.7%	0.0006	L90(6k) = 30,200 hrs L80(6k) > 36,300 hrs L70(6k) > 36,300 hrs
5	85°C	85°C	375 mA	97.6%	0.0007	L90(7k) = 39,600 hrs L80(7k) > 42,300 hrs L70(7k) > 42,300 hrs

Example Savings



Fluorescent



LED

Example Savings

ENERGY

Fixture	w	#	Total w	Hrs/Yr	Total KwH	Rate	Energy $
Fluorescent	85	36	3060	4160	12729.6	$.08	$1,018.37
LED	71	30	2130	4160	8860.8	$.08	$708.86

MAINTENANCE

Fixture	Lamps	Total	Life	#/Yr	Rplc $	Maint $
Fluorescent	3	108	30,000	14.976	$15.00	$224.64
LED	-	-	-	-	-	-

Example Savings

SAVINGS

Fixture	Energy + Maintenance	Savings/Yr
Fluorescent	$1,243.01	-
LED	$708.76	$534.14

Example Savings

CAPITAL COSTS

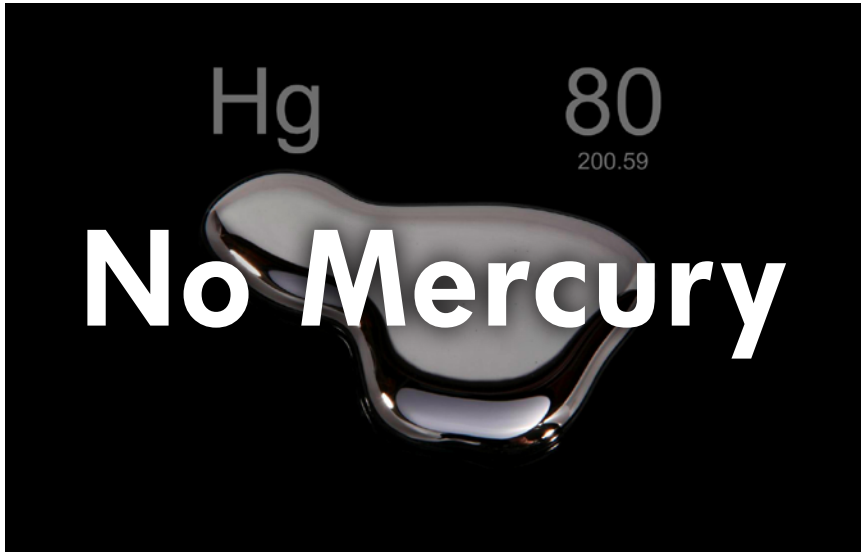
Fixture	Cost	#	Total
Fluorescent	$105	36	$3,780
LED	$170	30	$5,100

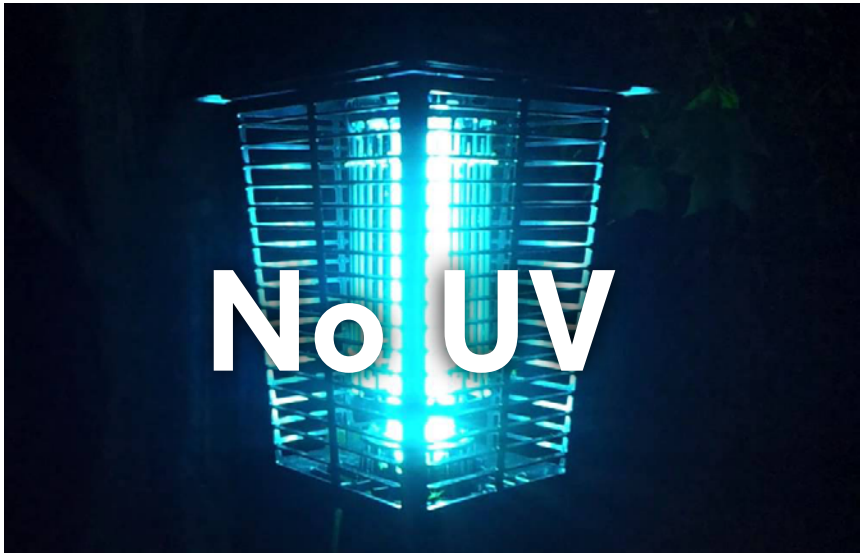
Example Savings

PAYBACK

LED Premium	Savings/Yr	Payback
$1,320	$534.14	2.47 Yrs

Additional Benefits





Additional Benefits

Efficiency & the Energy Code

ASHRAE 90.1 Table 9.3.1.1

Lighting Power Densities Using The Building Area Method

Common Space Types[a]	*LPD*, W/ft²	Building-Specific Space Types	*LPD*, W/ft²
Office—Enclosed	1.1	Gymnasium/Exercise Center	
Office—Open Plan	1.1	Playing Area	1.4
Conference/Meeting/Multipurpose	1.3	Exercise Area	0.9
Classroom/Lecture/Training	1.4	Courthouse/Police Station/Penitentiary	
For Penitentiary	1.3	Courtroom	1.9
Lobby	1.3	Confinement Cells	0.9
For Hotel	1.1	Judges' Chambers	1.3
For Performing Arts Theater	3.3	Fire Stations	
For Motion Picture Theater	1.1	Engine Room	0.8
Audience/Seating Area	0.9	Sleeping Quarters	0.3
For Gymnasium	0.4	Post Office—Sorting Area	1.2
For Exercise Center	0.3	Convention Center—Exhibit Space	1.3
For Convention Center	0.7	Library	
For Penitentiary	0.7	Card File and Cataloging	1.1
For Religious Buildings	1.7	Stacks	1.7
For Sports Arena	0.4	Reading Area	1.2
For Performing Arts Theater	2.6	Hospital	
For Motion Picture Theater	1.2	Emergency	2.7
For Transportation	0.5	Recovery	0.8
Atrium—First Three Floors	0.6	Nurses' Station	1.0
Atrium—Each Additional Floor	0.2	Exam/Treatment	1.5
Lounge/Recreation	1.2	Pharmacy	1.2
For Hospital	0.8	Patient Room	0.7
Dining Area	0.9	Operating Room	2.2
For Penitentiary	1.3	Nursery	0.6
For Hotel	1.3	Medical Supply	1.4
For Motel	1.2	Physical Therapy	0.9
For Bar Lounge/Leisure Dining	1.4	Radiology	0.4
For Family Dining	2.1	Laundry—Washing	0.6
Food Preparation	1.2	Automotive—Service/Repair	0.7
Laboratory	1.4	Manufacturing	
Restrooms	0.9	Low Bay (<25 ft Floor to Ceiling Height)	1.2
Dressing/Locker/Fitting Room	0.6	High Bay (≥25 ft Floor to Ceiling Height)	1.7
Corridor/Transition	0.5	Detailed Manufacturing	2.1
For Hospital	1.0	Equipment Room	1.2
For Manufacturing Facility	0.5	Control Room	0.5
Stairs—Active	0.6	Hotel/Motel Guest Rooms	1.1
Active Storage	0.8	Dormitory—Living Quarters	1.1
For Hospital	0.9	Museum	
Inactive Storage	0.3	General Exhibition	1.0
For Museum	0.8	Restoration	1.7
Electrical/Mechanical	1.5	Bank/Office—Banking Activity Area	1.5

Additional Benefits

Tax Deductions - (EPACT) & Utility Incentives

Previous Example:

Tax Deduction - $540.00 - 1.46 yr payback

Util. Incentive - $193.00 - 1.1 yr payback

Building Area Type	Lighting Power Density (w/sq ft)				
	1989	1999	2001	2004	2007
Automotive Facility	0.96	1.5	1.5	0.9	0.9
Convention Center	2.07	1.4	1.4	1.2	1.2
Court House	1.44	1.4	1.4	1.2	1.2
Dining: Bar Lounge/Leisure	1.37	1.5	1.5	1.3	1.3
Dining: Cafeteria/Fast Food	1.37	1.8	1.8	1.4	1.4
Dining: Family	1.37	1.9	1.9	1.6	1.6
Dormitory	1.15	1.5	1.5	1	1
Exercise Center	2.07	1.4	1.4	1	1
Gymnasium	2.07	1.7	1.7	1.1	1.1
Healthcare Clinic	1.44	1.6	1.6	1	1
Hospital	1.44	1.6	1.6	1.2	1.2
Hotel	1.15	1.7	1.7	1	1
Library	1.29	1.5	1.5	1.3	1.3
Manufacturing Facility	0.96	2.2	2.2	1.3	1.3
Motel	1.15	2	2	1	1
Motion Picture Theater	2.07	1.6	1.6	1.2	1.2
Multi-Family	1.15	1	1	0.7	0.7
Museum	2.07	1.6	1.6	1.1	1.1
Office	1.26	1.3	1.3	1	1
Parking Garage	1.03	0.3	0.3	0.3	0.3
Penitentiary	1.44	1.2	1.2	1	1
Performing Arts Theatre	2.07	1.5	1.5	1.6	1.6
Police/Fire Station	1.44	1.3	1.3	1	1
Post Office	1.44	1.6	1.6	1.1	1.1
Religious Building	2.07	2.2	2.2	1.3	1.3
Retail	2.25	1.9	1.9	1.5	1.5
School/University	1.29	1.5	1.5	1.2	1.21
Sports Arena	2.07	1.5	1.5	1.1	1.1
Town Hall	1.44	1.4	1.4	1.1	1.1
Transportation	2.07	1.2	1.2	1	1
Warehouse	1.03	1.2	1.2	0.8	0.8
Workshop	0.96	1.7	1.7	1.4	1.4

Things to Consider

Retrofit Options

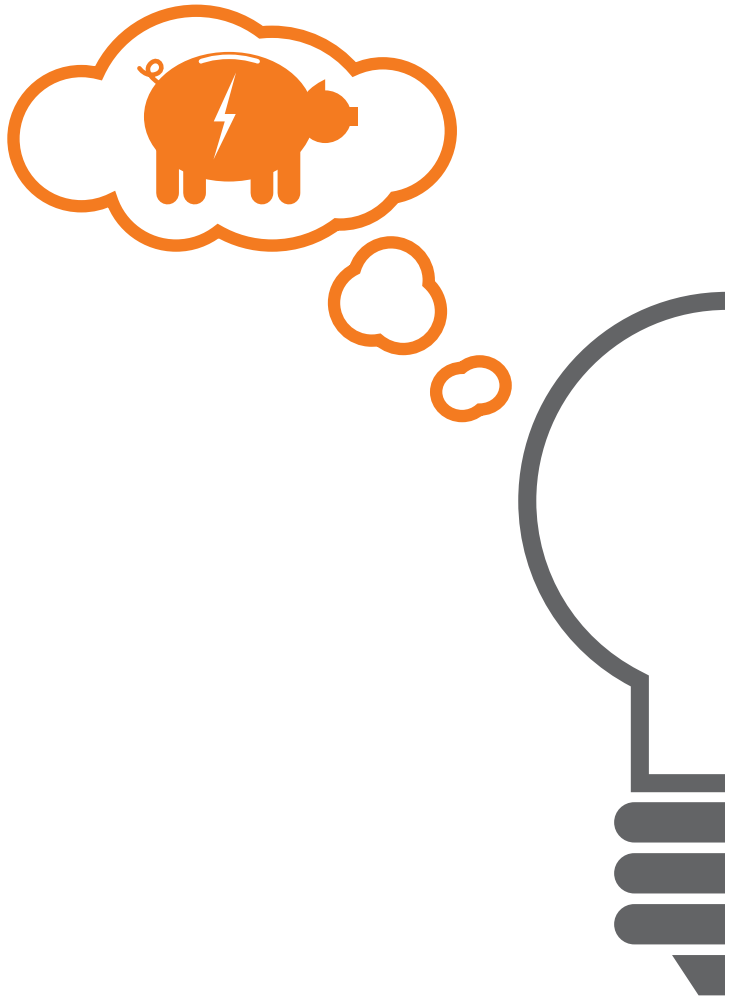
Color Consistency

Drivers

Dimming

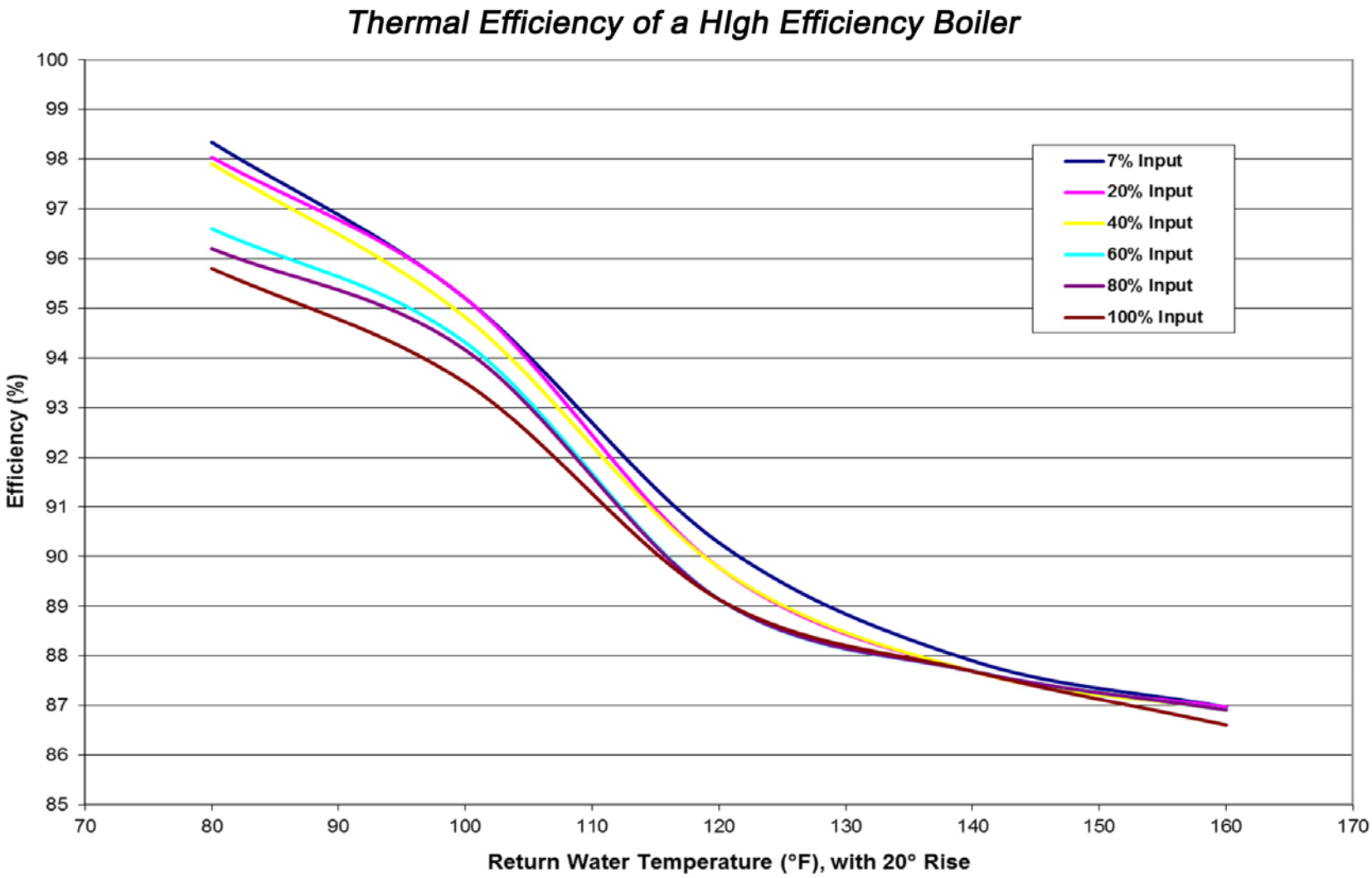
Lifespan

Manufacturers



Mechanical Systems

What about HE boilers?



What does efficiency gain me?

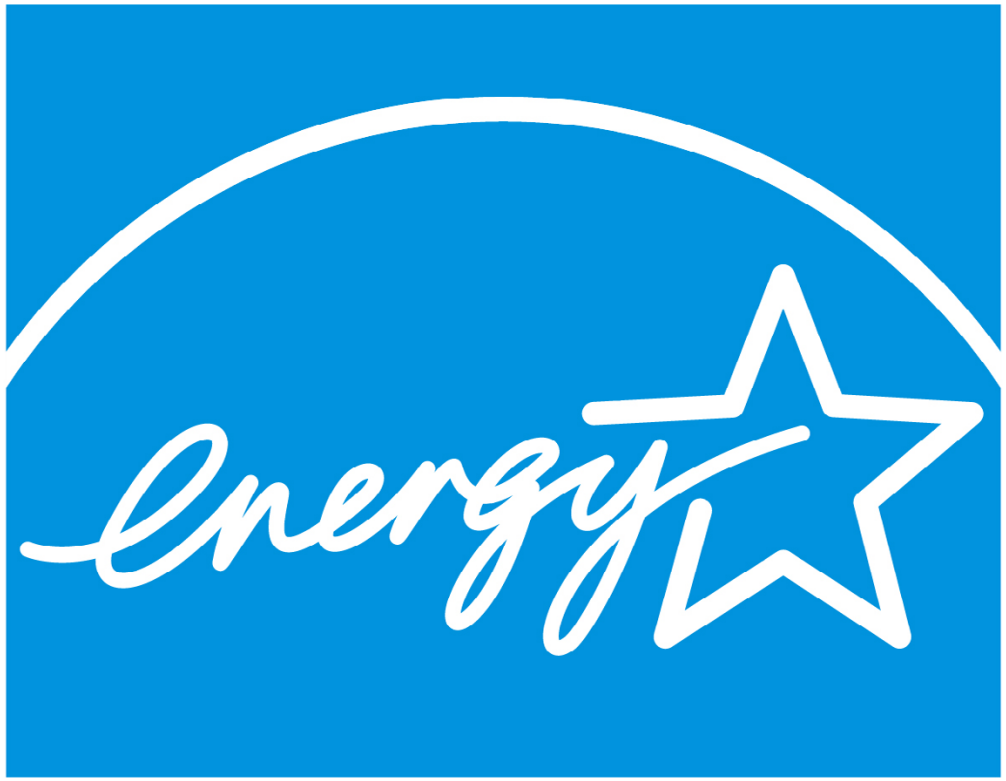
MONTHLY UTILITY COSTS

By Design Collaborative

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
	------- Monthly Utility Costs -------												
Base Building - Code Minimum													
Electric													
On-Pk Cons. ($)	2,214	2,001	2,209	2,303	2,998	3,084	3,253	3,150	2,910	2,376	2,134	2,213	30,846
On-Pk Demand ($)	343	343	343	413	465	491	495	487	463	415	376	343	4,976
Total ($):	2,557	2,344	2,552	2,716	3,463	3,575	3,748	3,637	3,373	2,791	2,510	2,556	35,822
Gas													
On-Pk Cons. ($)	992	911	810	554	423	370	358	380	405	568	647	939	7,358
Monthly Total ($):	3,548	3,255	3,362	3,270	3,886	3,946	4,106	4,017	3,777	3,359	3,158	3,494	43,180
Building Area =	16,060 ft²												
Utility Cost Per Area =	2.69 $/ft²												
High Efficiency Chiller													
Electric													
On-Pk Cons. ($)	2,073	1,874	2,068	2,161	2,786	2,841	2,989	2,906	2,702	2,224	1,998	2,072	28,694
On-Pk Demand ($)	324	324	324	389	432	453	456	450	430	389	350	324	4,646
Total ($):	2,397	2,198	2,392	2,550	3,218	3,294	3,445	3,356	3,133	2,613	2,348	2,396	33,340
Gas													
On-Pk Cons. ($)	992	911	810	554	423	370	358	380	405	568	647	939	7,358
Monthly Total ($):	3,389	3,109	3,202	3,104	3,641	3,665	3,803	3,736	3,538	3,181	2,995	3,335	40,698
Building Area =	16,060 ft²												
Utility Cost Per Area =	2.53 $/ft²												

Energy Star

How does your building stack up?



www.energystar.gov

Questions?