



Lighting & Energy

Knowledge in Supply



Retrofit Lighting Opportunities

September 12, 2012



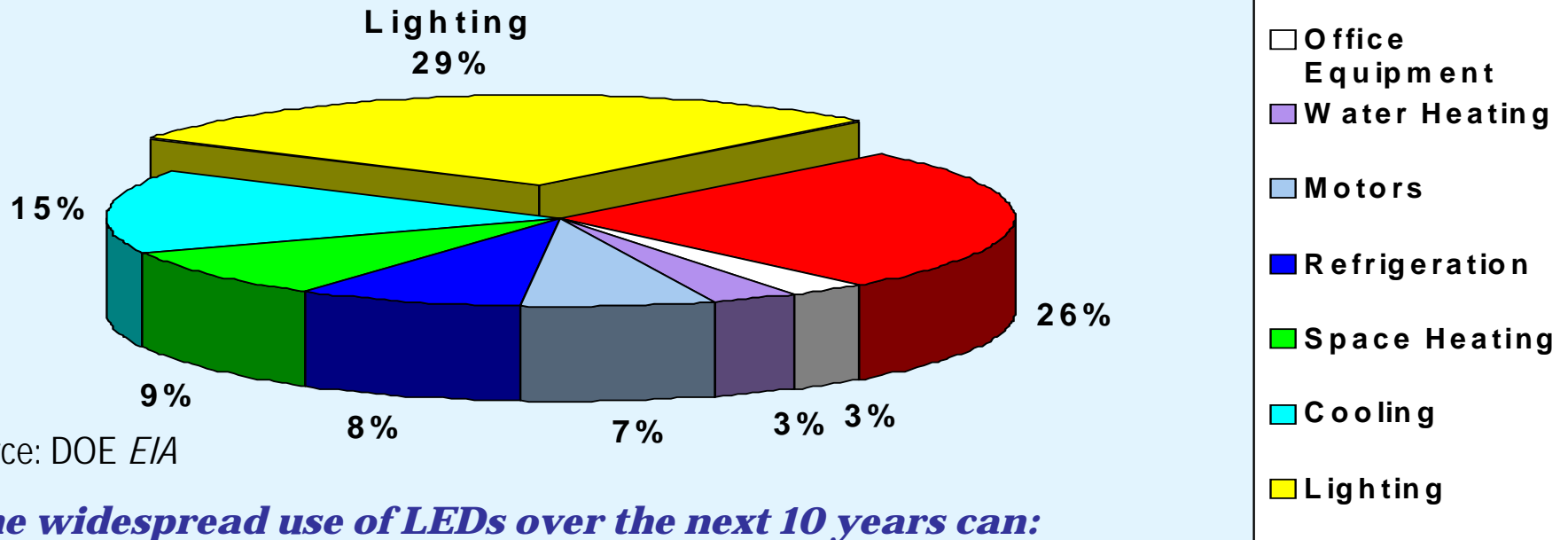
Agenda

- **Why Focus on Lighting?**
- **Lighting Technologies**
 - **LED versus other Lighting Technologies**
- **LED Performance Requirements**
- **Case Studies**
 - *Benefits & Savings*
 - *Student Center LED & Controls*
 - *Office Building Fluorescent*
 - *Parking Garage LED & Fluorescent*
 - *Site Lighting LED*



Why Lighting?

Energy Usage in Non-Residential Buildings



Source: DOE EIA

The widespread use of LEDs over the next 10 years can:

- ***Save energy (up to 60% Energy savings over standard technology within lighting sector above)***
- ***Save money***
- ***Help protect the environment (no mercury)***



LED vs. Other Technologies

- **LED**
50,000* Hour Life
- **Induction**
100,000 Hour Life
- **Fluorescent**
42,000 Hour Life
- **Ceramic Metal Halide**
20,000+ Hour Life



***LED is not always the BEST solution.
Consider the application!***

**Stated life can actually be as great as 100,000 hrs; limited lifetime claims based on LM80 test standards only rate to 50,000 at this time.*



LED Performance Requirements

Required LED Qualification Standards:

- **Energy Star – covers residential and commercial lighting products**
- **Design Lights Consortium (DLC) – covers commercial LED lighting not covered by Energy Star**

Avoid Performance & Project Roadblocks by selecting a qualified LED product from Energy Star or DLC lists.



Why LED Performance Requirements?



After less than a year of use, a poorly designed LED product can:

- **flicker**
- **shift in color**
- **look dim, offer uneven light (rapid lumen depreciation)**
- **continue to use power when turned off**

Avoid Performance Roadblock by selecting a qualified LED product from Energy Star or DLC lists.



Case Study: Student Center LED Troffer Fixtures

LOCATION	EXISTING	PRODUCT CODE	QTY	E- Watts	Total KW	RUN HRS	kWh Pre	PROPOSED	QTY	p-watts	Prop RunHRS	TOT KW	kWh Post
Corridor	TT/3FB32/E	3F32SSE	150	88	13.20	8,760	115,632	2x4 LED troffer	150	44	8,760	6.60	57,816
Corridor	TT/2FB32/E-9C	2F32SSE	100	60	6.00	8,760	52,560	2x2 LED troffer	100	22	8,760	2.20	19,272
Lobby	75w PAR30 Halogen	110075	200	75	15.00	8,760	131,400	LED- PAR30/14W	200	14	8,760	2.80	24,528
TOTAL:			450		34.20		299,592		450			11.60	101,616

Annual Savings:	\$	27,716.64
kW Reduced:		22.60
kWh Savings:		197,976

Total Incentives:	\$	21,000.00
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Total Cost :	\$	88,566.48
Total Net Cost:	\$	67,566.48
Simple Payback		2.44

Student Center: Lobby and Corridor Areas (24/7 run hours)

Existing Lighting:

- (200) 75 watt PAR30 halogen track heads
- (150) 2x4 3-lamp T8 recessed parabolic fixtures
- (100) 2x2 2-lamp T8U6 recessed parabolic fixtures

New Efficient System:

- (200) 14 watt PAR30 LED lamps
- (150) 2x4 (44w) LED recessed fixtures
- (100) 2x2 (22w) LED recessed fixtures





Case Study: Student Center LED Troffer Fixtures & Controls

LOCATION	EXISTING	PRODUCT CODE	QTY	E- Watts	Total KW	RUN HRS	kWh Pre	PROPOSED	QTY	p. watts	Prop RunHRS	TOT KW	kWh Post	% Sen saving
Corridor	TT/3FB32/E	3F32SSE	150	88	13.20	8,760	115,632	2x4 LED troffer	150	44	5,256	6.60	34,690	40%
Corridor	TT/2FB32/E-9C	2F32SSE	100	60	6.00	8,760	52,560	2x2 LED troffer	100	22	5,256	2.20	11,563	40%
Lobby	75w PAR30 Halogen	110075	200	75	15.00	8,760	131,400	LED- PAR30/14W	200	14	5,256	2.80	14,717	40%
TOTAL:			450		34.20		299,592		450			11.60	60,970	

Annual Savings:	\$	33,407.14
kW Reduced:		22.60
kWh Savings:		238,622

Total Incentives:	\$	28,700.00
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Total Cost :	\$	114,933.01
Total Net Cost:	\$	86,233.01
Simple Payback		2.58

Student Center: Lobby and Corridor Areas (24/7 run hours)

Existing Lighting:

Shown previously

New Efficient System:

additional controls added



Sensor Type	Incentive CtrlCode	PER/UNIT INCENTIVE	Number Of CntrlS
Ceiling Sensor	61	\$ 85.00	50
Ceiling Sensor	61	\$ 85.00	20
Wall Sensor	64A	\$ 35.00	50





Case Study: Office Fluorescent Fixtures

		CODE			KW	HRS	Pre				RunHRS	KW	Post
STAIR 3B	4' (2 lamp) 32w T-8 strip w/ electronic ballast.	2F32SSE	1	60	0.06	8760	526	RB/2F28/L	1	42	8,760	0.04	368
OPEN OFFICE	1x4 (2Lamp) 32w T8 8-Cell Parabolic Troffer w/electronic ballast	2F32SSE	21	60	1.26	3000	3,780	RB/2F28/L	21	42	3,000	0.88	2,646
OFFICES	2'x2' (2 lamp) 32w T-8U6 Troffer w/ electronic ballast 9 Cell Parabolic	2F32SSE	48	60	2.88	3000	8,640	RB/2FB28/L	48	42	3,000	2.02	6,048
HALL	4' (2 lamp) 32w T-8 strip w/ electronic ballast.	2F32SSE	2	60	0.12	3000	360	RB/2F28/L	2	42	3,000	0.08	252
CUSTODIAN	2'x4' (2 lamp) 32w T-8 troffer w/ electronic ballast	2F32SSE	1	60	0.06	3000	180	RB/2F28/L	1	42	3,000	0.04	126
MENS ROOM	2'x4' (4 lamp) 32w T-8 troffer w/ electronic ballast	4F32SSE	1	112	0.11	3000	336	RKETF/2F28/L-REN	1	42	3,000	0.04	126
WOMENS ROOM	2'x4' (4 lamp) 32w T-8 troffer w/ electronic ballast	4F32SSE	1	112	0.11	3000	336	RKETF/2F28/L-REN	1	42	3,000	0.04	126
MECH ROOM	4' (2 lamp) 32w T-8 wrap w/ electronic ballast.	2F32SSE	1	60	0.06	4000	240	RB/2F28/L	1	42	4,000	0.04	168
LAB - MEZZ, 3-B-1	2'x4' (2 lamp) 32w T-8 troffer w/ electronic ballast	2F32SSE	40	60	2.40	3000	7,200	RB/2F28/L/XL	40	42	3,000	1.68	5,040
OFFICE	4' (2 lamp) 32w T-8 strip w/ electronic ballast.	2F32SSE	4	60	0.24	3000	720	RB/2F28/L	4	42	3,000	0.17	504
OFFICES	2'x4' (2 lamp) 32w T-8 troffer w/ electronic ballast	2F32SSE	6	60	0.36	3000	1,080	RB/2F28/L	6	42	3,000	0.25	756
New production line	1x4 (2 Lamp) 32w T8 Troffer w/ES - Magnetic Ballast	2F32SSM	410	70	28.70	6240	179,088	RB/2F28/L/XL	410	42	6,240	17.22	107,453
New production line, Hall	1x4 (2 Lamp) 32w T8 Troffer w/ES - Magnetic Ballast	2F32SSM	40	70	2.80	6240	17,472	RB/2F28/L/XL	40	42	6,240	1.68	10,483
New production line, Hall	1x4 (2 Lamp) 32w T8 Troffer w/ES - Magnetic Ballast	2F32SSM	15	70	1.05	6240	6,552	RB/2F28/L/XL	15	42	6,240	0.63	3,931
New production line, Hall	1x2 (2 Lamp) 17w T8 Troffer w/ES - Magnetic Ballast	2F17SSM	2	45	0.09	6240	562	RB/2F17/L	2	27	6,240	0.05	337
TOTAL:	All line items		889		60.47		328,537		889			37.54	202,802

Annual Savings:	\$	17,602.93
kW Reduced:		22.94
kWh Savings:		125735.23

Total Incentives:	\$	19,495.00
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Total Cost :	\$	58,038.92
Total Net Cost:	\$	38,543.92
Simple Payback		2.19

Office: Various run hours from 3,000- 6,240

Existing Lighting:

(889) 32w T8 fluorescent fixture

New Efficient System:

(889) 28w T8 , Low power relamp/reballast



Case Study: Garage LED Fixtures

LOCATION	EXISTING	PRODUCT CODE	QTY	E- Watts	Total KW	RUN HRS	kWh Pre	PROPOSED	QTY	p- watts	Prop RunHRS	TOT KW	kWh Post
Garage	MH175/Garage Lowbay	1M0175S	110	205	22.55	8,760	197,538	LED 47 watt garage	110	47	8,760	5.17	45,289
TOTAL:			110		22.55		197,538		110			5.17	45,289

Annual Savings:	\$	21,314.83
kW Reduced:		17.38
kWh Savings:		152,249

Total Incentives:	\$	22,000.00
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Total Cost:	\$	76,785.59
Total Net Cost:	\$	54,785.59
Simple Payback		2.57

Garage: Metal Halide Lowbay Fixtures (24/7 run time)

Existing Lighting:

(110) 175 watt Metal Halide garage fixture

New Efficient System:

(110) 47 watt LED Garage fixture





Case Study: Garage LED Fixtures

LOCATION	EXISTING	PRODUCT CODE	QTY	E- Watts	Total KW	RUN HRS	kWh Pre	PROPOSED	QTY	p. watts	Prop RunHRS	TOT KW	kWh Post
Garage	MH175/Garage Lowbay	1M0175S	110	205	22.55	4,380	98,769	LED 47 watt garage	110	47	4,380	5.17	22,645
TOTAL:			110		22.55		98,769		110			5.17	22,645

Annual Savings:	\$	10,657.42
kW Reduced:		17.38
kWh Savings:		76,124

Total Incentives:	\$	22,000.00
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Total Cost:	\$	76,785.59
Total Net Cost:	\$	54,785.59
Simple Payback		5.14

Garage: Metal Halide Lowbay Fixtures (Dusk to Dawn run time)

Existing Lighting:

(110) 175 watt Metal Halide garage fixture

New Efficient System:

(110) 47 watt LED Garage fixture





Case Study: Garage

Vapor Tight Fluorescent Fixtures

LOCATION	EXISTING	PRODUCT CODE	QTY	E- Watts	Total KW	RUN HRS	kWh Pre	PROPOSED	QTY	p- watts	Prop RunHRS	TOT KW	kWh Post
Garage	MH175/Garage Lowbay	1M0175S	110	205	22.55	4,380	98,769	3L 4FT T8 VAPORTITE	120	82	4,380	9.84	43,099
TOTAL:			110		22.55		98,769		120			9.84	43,099

Annual Savings:	\$	7,793.77
kW Reduced:		12.71
kWh Savings:		55,670

Total Incentives:	\$	9,000.00
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Total Cost:	\$	25,330.63
Total Net Cost:	\$	16,330.63
Simple Payback		2.10

Garage: Metal Halide Lowbay Fixtures (Dusk to Dawn run time)

Existing Lighting:

(110) 175 watt Metal Halide garage fixture

New Efficient System:

(120) 3- 32 watt T8 Fluorescent Vaport Tight

Garage fixture





Case Study: Site Lighting

LOCATION	EXISTING	PRODUCT CODE	QTY	E-Watts	Total KW	RUN HRS	kWh Pre	ANNUAL COST	PROPOSED	QTY	P-watts	TOT KW	kWh Post
								\$0.140					
Decorative Lantern	Decorative Post Top, 250W	1M0250S	50	295	14.75	4,380	64,605	\$9,044.70	Retrofit Kit Decorative	50	66	3.30	14,454
Wallpack - 250w	MH250/FLD, Wallpack	1M0250S	25	295	7.38	4,380	32,303	\$4,522.35	Wallpack-60W LED DS	25	60	1.50	6,570
Wallpack- 100w	MH100/FLD, Wallpack	1M0100S	5	120	0.60	4,380	2,628	\$367.92	Wallpack-20W LED DS	5	20	0.10	438
Wallpack- 175w	MH175/FLD, Wallpack	1M0175S	20	205	4.10	4,380	17,958	\$2,514.12	Wallpack-40W LED DS	20	40	0.80	3,504
TOTAL:			100		26.83		117,494	\$16,449.09		100		5.70	24,966

Annual Savings:	\$	12,953.85
kW Reduced:		21.13
kWh Savings:		92,528

Total Incentives:	\$14,750.00
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Material Cost:	\$	57,747.20
Labor Cost:	\$	11,666.67
Total Cost:	\$	73,507.58
Total Net Cost:	\$	58,757.58
Simple Payback		4.54

Site Lighting: Decorative Post Top & Wall pack fixtures (Dusk to Dawn run hours)

Existing Lighting:

- (50) 250 watt Decorative Post Top Lanterns
- (25) 250 watt wall packs
- (5) 100 watt wall packs
- (20) 175 watt wall pack



New Efficient System:

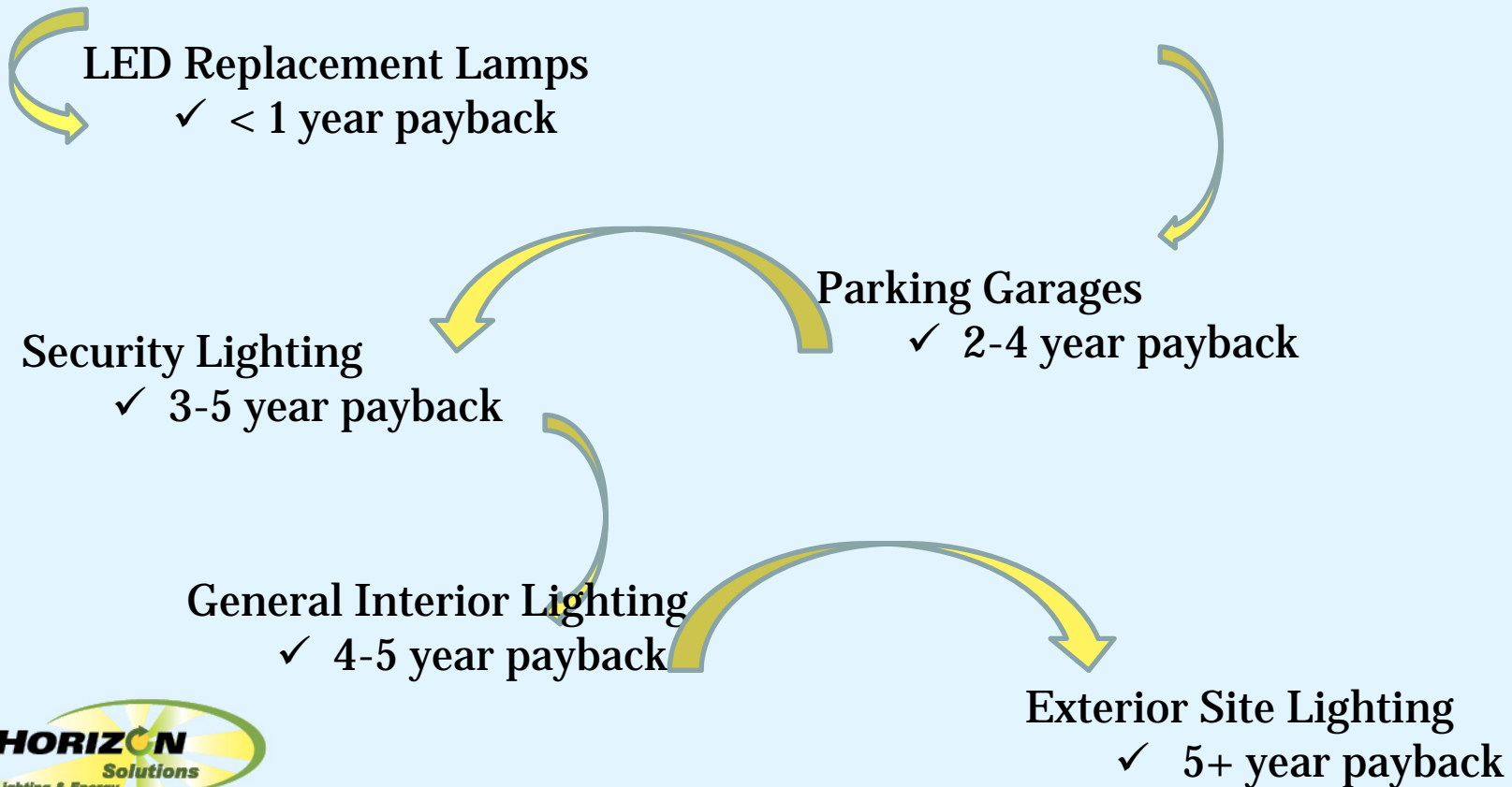
- (50) 66 watt LED retrofit kit
- (25) 60 watt LED wall pack
- (5) 20 watt LED wall pack
- (20) 40 watt LED wall pack





LED Lighting Opportunities

LED Vertical Market Roadmap





Thank You

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