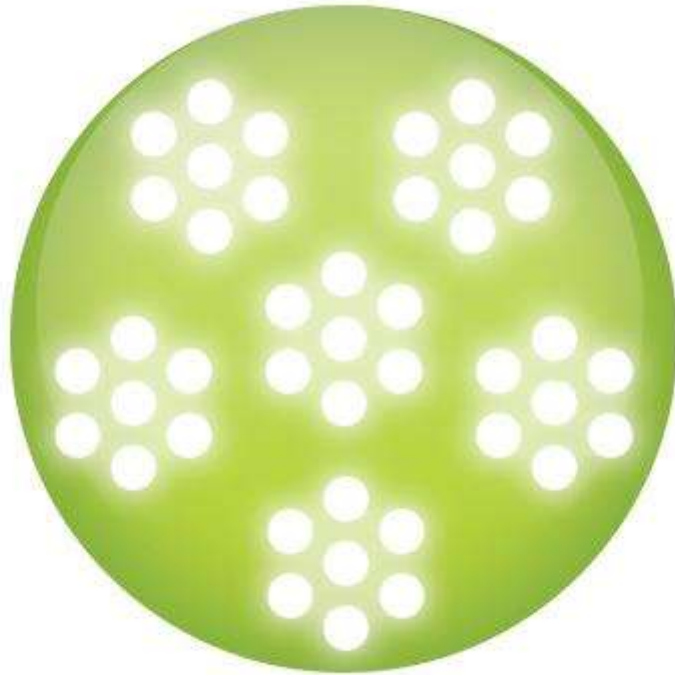


**NOTE: THIS COST BENEFIT ANALYSIS IS FOR ILLUSTRATION PURPOSES ONLY  
FOR MORE DETAILS, ON HOW LEDS PERTAIN TO YOUR SPECIFIC APPLICATION  
CONTACT US AT (212) 537-5788**



## **Cost Benefit Analysis**

# **Complete Retrofit of Commercial Apartment Building**



## Executive Summary

### Project Overview

#### Cost of Project

Total Material Cost and Labor (\$)	49,039
Less Rebates and Incentives (\$)	0
<b>Net Cost of Project (\$)</b>	<b>49,039</b>

#### Annual Operating Savings

Energy Savings (\$)	14,992
Maintenance Savings (\$)	10,351
<b>Total Annual Operating Savings (\$)</b>	<b>25,343</b>

#### Operating Savings Over 10 Years

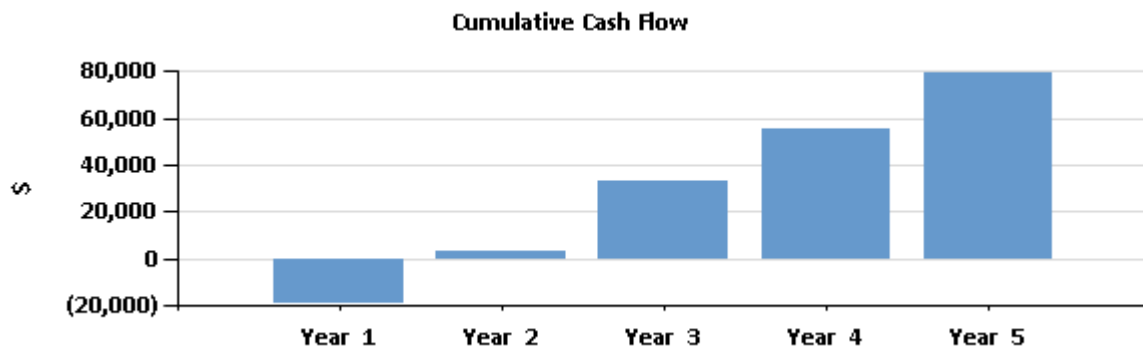
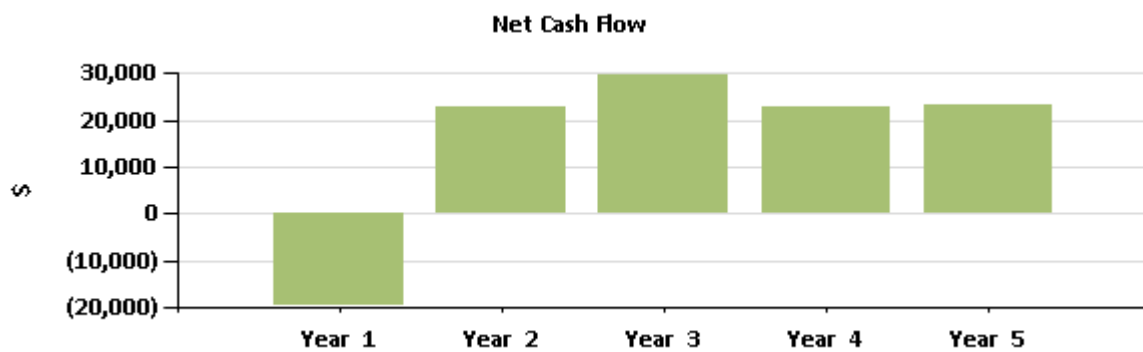
Energy Savings (\$)	149,928
Maintenance Savings (\$)	103,510
<b>Total Operating Savings Over 10 Years (\$)</b>	<b>253,439</b>

Payback Period (years)	3.3
Net Present Value (\$)	143,068
Internal Rate of Return (%)	73.03

## Cash Flow Analysis

### 10 Year Cash Flow Analysis (\$)

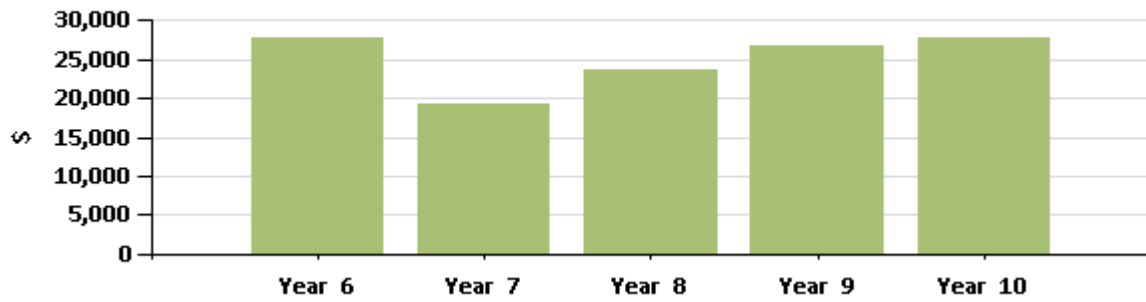
	Year 1	Year 2	Year 3	Year 4	Year 5
Product Costs	31,620	-	-	-	-
Installation Services	17,419	-	-	-	-
Energy Savings	14,993	14,993	14,993	14,993	14,993
Maintenance Savings	14,442	7,867	14,577	7,879	8,434
<b>Net Cash Flow</b>	<b>(19,604)</b>	<b>22,860</b>	<b>29,570</b>	<b>22,872</b>	<b>23,427</b>
<b>Cumulative Cash Flow</b>	<b>(19,604)</b>	<b>3,256</b>	<b>32,825</b>	<b>55,697</b>	<b>79,124</b>



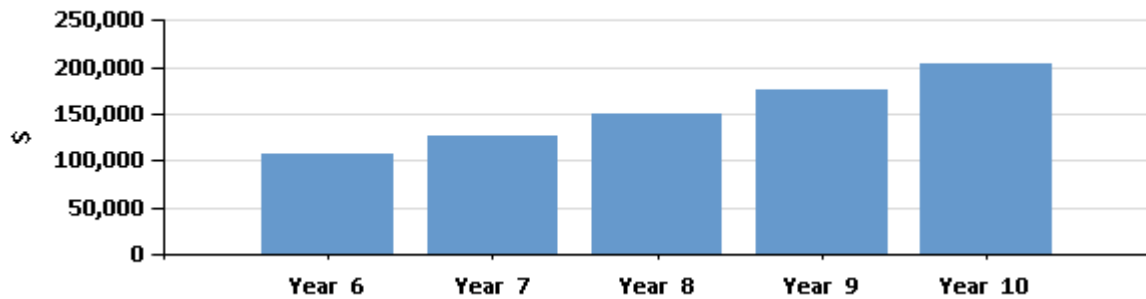
### 10 Year Cash Flow Analysis (\$)

	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Product Costs	-	-	-	-	-	31,620
Installation Services	-	-	-	-	-	17,419
Energy Savings	14,993	14,993	14,993	14,993	14,993	149,929
Maintenance Savings	12,734	4,176	8,700	11,777	12,925	103,511
<b>Net Cash Flow</b>	<b>27,727</b>	<b>19,169</b>	<b>23,693</b>	<b>26,769</b>	<b>27,918</b>	<b>204,400</b>
<b>Cumulative Cash Flow</b>	<b>106,851</b>	<b>126,020</b>	<b>149,713</b>	<b>176,482</b>	<b>204,400</b>	<b>204,400</b>

**Net Cash Flow**



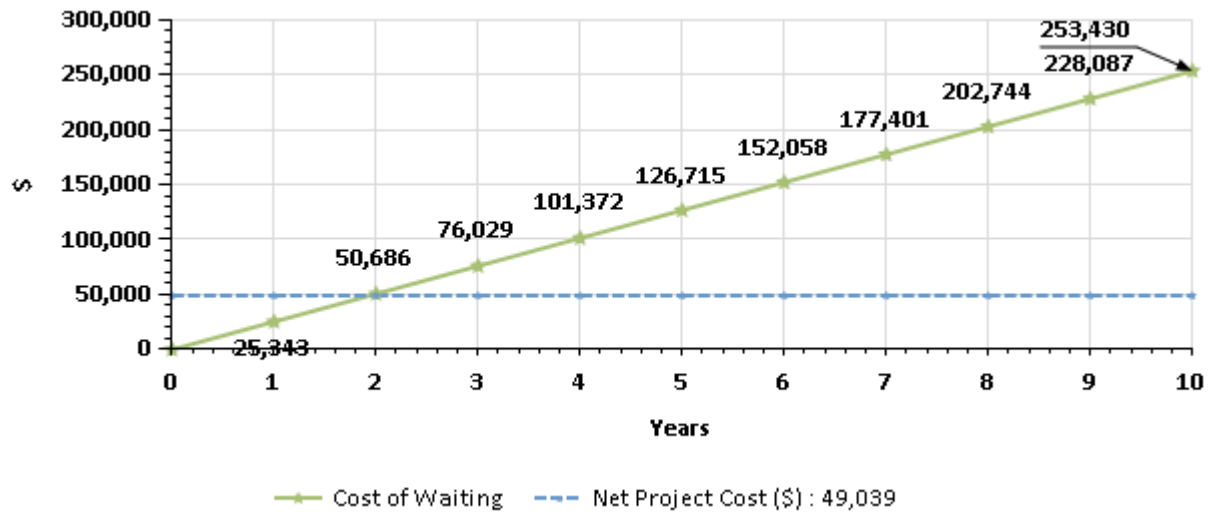
**Cumulative Cash Flow**



## Cost of Waiting

### Cost of Waiting

Monthly (\$)	Yearly (\$)	10 Years (\$)
2,111	25,343	253,430

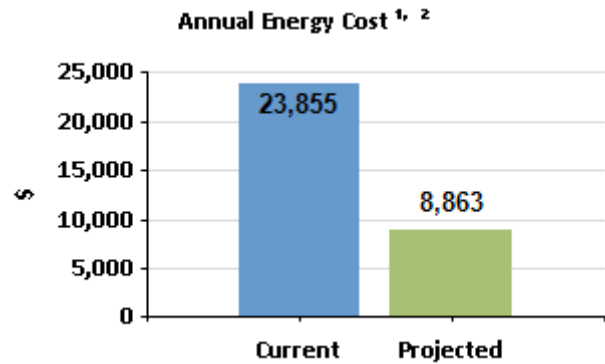
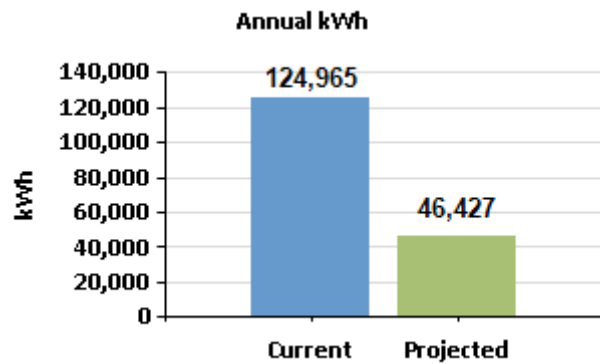


## Energy Usages and Costs

### Annual Energy Usage Reduction

Current Usage (kWh)	Projected Usage (kWh)	Reduction (kWh)	Reduction (%)
124,965	46,427	78,537	63

### Energy Comparison



1. Energy Cost (\$) = 0.1909/kWh; Annual energy cost escalation (%) = 0.00
2. Energy costs are averaged over 10 year analysis period

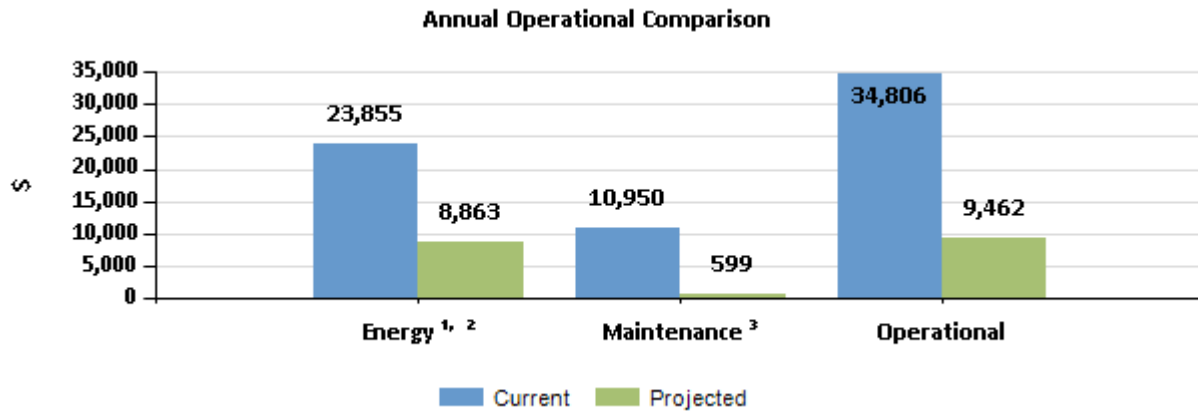
## Operational Overview

### Operational Savings Summary

Operational Area	Current Annual (\$)	Projected Annual (\$)	Reduction (%)	Current 10 Year (\$)	Projected 10 Year (\$)	Reduction (%)
Energy <sup>1, 2</sup>	23,855	8,863	63	238,558	88,630	63
Maintenance <sup>3</sup>	10,950	599	95	109,509	5,998	95
<b>Total</b>	<b>34,806</b>	<b>9,462</b>	<b>73</b>	<b>348,067</b>	<b>94,628</b>	<b>73</b>

1. Energy cost (\$) = 0.1909/kWh; Annual energy cost escalation (%) = 0.00
2. Energy costs are averaged over 10 year analysis period
3. Maintenance costs are averaged over 10 year analysis period

### Annual Operational Savings Comparison



1. Energy cost (\$) = 0.1909/kWh; Annual energy cost escalation (%) = 0.00
2. Energy costs are averaged over 10 year analysis period
3. Maintenance costs are averaged over 10 year analysis period

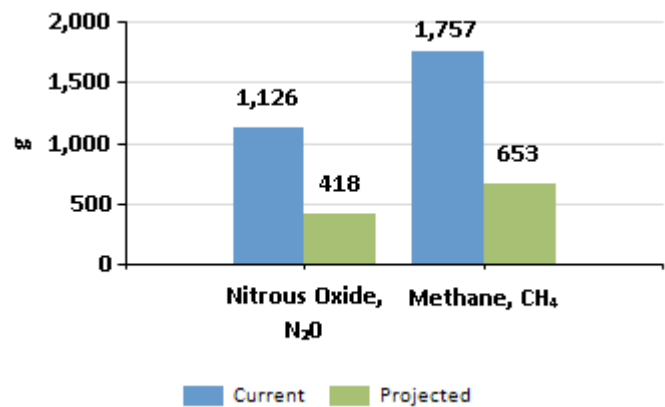
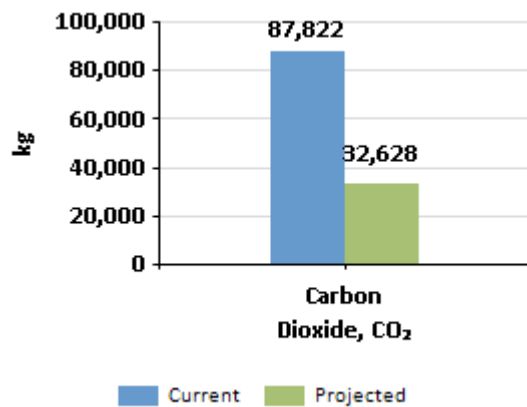
## Environmental Impact

### Greenhouse Gas Analysis

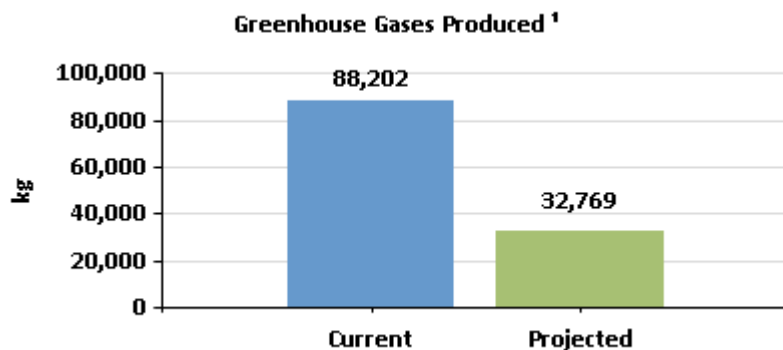
#### Greenhouse Gas Comparisons<sup>1</sup>

Greenhouse Gas	Current <sup>1</sup>	Projected <sup>1</sup>	Avoided	Environmental Effect
Carbon Dioxide, CO <sub>2</sub> (kg)	87,822	32,628	55,194	Greenhouse Gas, Global Warming
Nitrous Oxide, N <sub>2</sub> O (g)	1,126	418	708	Greenhouse Gas, Global Warming
Methane, CH <sub>4</sub> (g)	1,757	653	1,104	Greenhouse Gas, Global Warming
Nitrogen Oxides, NO <sub>x</sub> (g)	76,833	28,545	48,288	Smog, Acid rain, Global Warming
Sulfur Oxides, SO <sub>x</sub> (g)	166,178	61,739	104,439	Acid rain

1. Average emission rates per kWh are based on estimates from eGrid 2012



#### Greenhouse Gas Comparables



#### Comparable Metrics

Barrels of oil consumed: 129

Urban forests (acre): 45

Fewer cars on the road: 12

Gasoline consumed (gallon):  
6238

1. Average emission rates per kWh are based on estimates from eGrid 2012



## Upgrade Analysis

### Component Upgrade by Space

Area	Space	Existing Fixture	Qty	Proposed Upgrade	Qty	Scheduled Hours
1st floor	Canopy	15 watt CFL spiral	6	Lamps: 1 A19V2WW	6	8,760
1st floor	Elevator lobby	CFL, 13W	4	Lamps: 1 A19V2WW	4	8,760
1st floor	Elevator lobby	Incandescent, 100W	5	Lamps: 1 A19V2WW	5	8,760
1st floor	Mail room	3ft, 2 lamp F25T8	1	Lamps: 2 3FT LEDTLNW	2	8,760
1st floor	Mail room	4ft, 2 lamp F32T8	3	Lamps: 2 4FT LEDTLNW	6	8,760
1st floor	Mail room	5ft, 2 lamp F40T-8	1	Lamps: 2 5FT LEDTLNW	2	8,760
1st floor	Main lobby	CFL BR30	24	Lamps: 1 DFN Series, BR30, LED, 1L-15W, 120V, Neutral White	24	8,760
1st floor	Package room	2ft, 1 lamp F40T12 U Bent	2	Lamps: 1 2FT LEDTLNW	2	8,760
1st floor	Package room bathroom	CFL, 13W	2	Lamps: 1 A19V2WW	2	365
1st floor	Service corridor	2ft, 1 lamp F20T12	3	Lamps: 1 2FT LEDTLNW	3	8,760
1st floor	Service corridor	2ft, 2 lamp F20T12	1	Lamps: 2 2FT LEDTLNW	2	8,760
1st floor	Service corridor	4ft, 2 lamp F32T12	1	Lamps: 2 4FT LEDTLNW	2	8,760
2nd	Hallways	2D, 38 watts	5	Lamps: 1 8" Circular LED Retrofit Kit	5	8,760
2nd	Roof	90-watt PAR 38	11	Lamps: 1 DFN Series ,PAR 38, LED, 1L-24W, 120V, Neutral White, FL, Hi-output	11	4,745
2nd	Service corridor	2ft, 1 lamp F20T12	7	Lamps: 1 2FT LEDTLNW	7	8,760
Basement	Boiler room	4ft, 4 lamp F32T12	3	Lamps: 4 4FT LEDTLNW	12	521
Basement	Boiler room	8ft, 4 lamp F60T12	3	Lamps: 8 4FT LEDTLNW	24	521

Basement	Compactor north	CFL, 13W	1	Lamps: 1 A19V2WW	1	8,760
Basement	Compactor south	4ft, 1 lamp F32T12	2	Lamps: 1 4FT LEDTLNW	2	8,760
Basement	Compactor south	CFL, 13W	1	Lamps: 1 A19V2WW	1	8,760
Basement	Electric meter room 1	CFL, 13W	4	Lamps: 1 A19V2WW	4	100
Basement	Electric meter room 2	CFL, 13W	4	Lamps: 1 A19V2WW	4	100
Basement	Gas meter room 1	CFL, 13W	4	Lamps: 1 A19V2WW	4	100
Basement	Gas meter room 2	CFL, 13W	2	Lamps: 1 A19V2WW	2	100
Basement	Hallway	2ft, 1 lamp F17T8	5	Lamps: 1 2FT LEDTLNW	5	8,760
Basement	Hallway	2ft, 2 lamp F20T12	1	Lamps: 2 2FT LEDTLNW	2	8,760
Basement	Hallway	4ft, 2 lamp F32T12	18	Lamps: 2 4FT LEDTLNW	36	8,760
Basement	Hallway	CFL, 13W	1	Lamps: 1 A19V2WW	1	8,760
Basement	Hallway short east	2ft, 1 lamp F20T12	1	Lamps: 1 2FT LEDTLNW	1	8,760
Basement	Hallway short east	4ft, 1 lamp F40T12	4	Lamps: 1 4FT LEDTLNW	4	8,760
Basement	Hallway short east	4ft, 2 lamp F32T12	1	Lamps: 2 4FT LEDTLNW	2	8,760
Basement	Locker room	2ft, 1 lamp F20T12	1	Lamps: 1 2FT LEDTLNW	1	5,840
Basement	Locker room	8ft, 2 lamp F60T12	2	Lamps: 4 4FT LEDTLNW	8	5,840
Basement	Locker room	CFL, 13W	2	Lamps: 1 A19V2WW	2	5,840
Basement	Office	4ft, 2 lamp F32T12	1	Lamps: 2 4FT LEDTLNW	2	4,380
Basement	Office	8ft, 4 lamp F60T12	1	Lamps: 8 4FT LEDTLNW	8	4,380
Basement	Shop	8ft, 1 lamp F60T12	2	Lamps: 2 4FT LEDTLNW	4	8,760
Basement	Shop	8ft, 2 lamp F60T12	2	Lamps: 4 4FT LEDTLNW	8	8,760
Basement	Slop sink	CFL, 13W	2	Lamps: 1 A19V2WW	2	8,760
Basement	Storage met life	2ft, 1 lamp F20T12	3	Lamps: 1 2FT LEDTLNW	3	25
Basement	Storage met life	4ft, 2 lamp F32T12	1	Lamps: 2 4FT LEDTLNW	2	25
Basement	Storage	CFL, 13W	2	Lamps: 1 A19V2WW	2	30

	room					
Basement	Storage room by gas meter	4ft, 2 lamp F32T12	6	Lamps: 2 4FT LEDTLNW	12	200
Basement	Storage room next to boiler	4ft, 2 lamp F32T12	6	Lamps: 2 4FT LEDTLNW	12	2,086
Elevator	Freight	Incandescent, 100W	4	Lamps: 1 A19V2WW	4	8,760
Elevator	Passenger	4ft, 1 lamp F32T12	8	Lamps: 1 4FT LEDTLNW	8	8,760
Elevator	Passenger	Par20, 50 watt	8	Lamps: 1 DFN Series, PAR20, LED, 1L-8W, 120V, Neutral White, FL	8	8,760
Outside	Wall pack	MH, 70W, Elec Pulse	4	Lamps: 1 WALL PACK	4	4,745
Resident floor	Laundry rooms (11qt)	2ft, 1 lamp F17T8	1	Lamps: 1 2FT LEDTLNW	1	8,760
Resident floor	Laundry rooms (11qt)	4ft, 1 lamp F32T12	1	Lamps: 1 4FT LEDTLNW	1	8,760
Resident floor	Trash compactor (22qt)	Incandescent, 100W	1	Lamps: 1 A19V2WW	1	52
Resident floor 3-7	Lower floor (5 floors)	2D, 38 watts	80	Lamps: 1 8" Circular LED Retrofit Kit	80	8,760
Resident floor 8-13	upper floor (6 floors)	2D, 38 watts	84	Lamps: 1 8" Circular LED Retrofit Kit	84	8,760
Roof	Elevator machine room	4ft, 2 lamp F32T12	7	Lamps: 2 4FT LEDTLNW	14	250
Roof	Elevator machine room	CFL, 13W	2	Lamps: 1 A19V2WW	2	250
Stair case	A	2ft, 1 lamp F20T12	15	Lamps: 1 2FT LEDTLNW	15	8,760
Stair case	B	2ft, 1 lamp F20T12	15	Lamps: 1 2FT LEDTLNW	15	8,760
Stair case	C	2ft, 1 lamp F20T12	15	Lamps: 1 2FT LEDTLNW	15	8,760
		<b>Total Fixtures:</b>	<b>407</b>	<b>Total Lamps:</b>	<b>506</b>	



**Bill of Materials** **NOTE: EVERY JOB IS DIFFERENT AND THESE PARTICULAR SOLUTIONS MAY NOT APPLY TO YOUR OPERATION. THEY ARE FOR ILLUSTRATION PURPOSES ONLY.**

**CALL US TO DISCUSS YOUR APPLICATION (212) 537-5788**

**Products**

**Lamps**

Part Number	Short Description	Qty	Cost (\$)	Extended (\$)
RRWLEDSPAR20FLNW	DFN Series,PAR20,LED,1L-8W,120V,Neutral White,FL	8	27.50	220.00
RRWLEDSPAR38FLNW	DFN Series ,PAR 38,LED,1L-24W,120V,Neutral White,FL,Hi-output	11	53.75	591.25
RRWLEDWPRK	WALL PACK	4	138.67	554.68
RRWLEDSA19V2WW	A19V2WW	47	36.25	1,703.75
RRWLEDSBR30	DFN Series,BR30,LED,1L-15W,120V,Neutral White	24	45.33	1,087.92
TL8IN Flush Mount 500K	8" Circular LED Retrofit Kit	169	94.23	15,924.87
RRWLEDFTL24NW	2FT LEDTLNW	72	33.33	2,399.76
RRWLEDFTL36NW	3FT LEDTLNW	2	38.67	77.34
RRWLEDFTL48NW	4FT LEDTLNW	167	46.27	7,727.09
RRWLEDFTL60NW	5FT LEDTLNW	2	58.68	117.36
<b>Total</b>				<b>30,404.02</b>

**Additional Items**

Part Number	Short Description	Qty	Cost (\$)	Extended (\$)
RRWLEDSPWF	WALL PACK BARE FIXTURE	4	91.68	366.72
RRWLED8TO4(B)	8ft 1 OR 2 lamp to 4ft 2 lamp	6	22.58	135.48
RRWLEDPOC	PUSH ON CONNECTORS	420	0.22	92.40
RRWLEDSSSKTL	NON SHUNTED LONG SOCKET	374	1.23	460.02
RRWLEDNSS	T-8 Sockets	8	2.68	21.44
RRWLED8TO4(B)	8ft 1 OR 2 lamp to 4ft 2 lamp	4	35.00	140.00
<b>Total</b>				<b>1,216.06</b>



## Installation

Description	Qty	Cost (\$)	Extended (\$)
INSTALLATION	24	7.78	186.72
INSTALLATION	68	62.22	4,230.96
INSTALLATION	2	62.22	124.44
INSTALLATION	44	62.22	2,737.68
INSTALLATION	15	62.22	933.30
INSTALLATION	3	62.22	186.66
INSTALLATION	47	7.78	365.66
INSTALLATION	4	62.22	248.88
INSTALLATION	4	62.22	248.88
INSTALLATION	2	62.22	124.44
INSTALLATION	4	62.22	248.88
INSTALLATION	1	62.22	62.22
INSTALLATION	1	62.22	62.22
INSTALLATION	11	7.78	85.58
INSTALLATION	8	7.78	62.24
INSTALLATION	169	44.44	7,510.36
<b>Total</b>			<b>17,419.12</b>

## Appendix

### Financial Assumptions

Cost of Capital (%)	Analysis Period (yrs)	Energy Cost (\$/kWh)
6.0	10	0.1909

### Financial Assumptions

Analysis Period (yrs)	10
Payback Calculation Method	Simple Payback
Cost of Capital (%)	6.0
Energy Cost (\$/kWh)	0.1909
Energy Cost Annual Increase (%)	0.00
Product Tax Rate (%)	0
Service Tax Rate (%)	0
Cooling Savings Factor	0
Cooling Season Months	0
Heating Cost Factor	0
Heating Season Months	0

### Schedules

Schedule Name	Description	Hours/Year
BasementOfficeT-12 60wa01		4,380
1st floor Package rIncandesc01		365
Dusk till Dawn		4,745
Basement Storage 4ft, 2 la01		2,086
BasementMetersIncandesc01		100
Basement Locker roT-12 60 w01		5,840
Basement Gas meterIncandesc01		100
Basement Electric Incandesc01		100
Basement Storage rIncandesc01		30
Roof Elevator 4ft, 2 la01		250
Default Lighting Schedule		2,868



BasementMetropoli2ft, 1 la01		25
Basement Storage r4ft, 2 la01		200
Basement Boiler roT-12 60wa01		521
Basement Gas meterIncandesc02		100
Resident Trash comIncandesc01		52
Continuous (24x7)		8,760

### **Disclaimer**

All values contained herein are a best good faith estimate derived from data that you or one of your employees has provided. Retrofit and Relamp with LEDs Inc. is not responsible for discrepancies in this report if the information provided is false or incorrect. Additionally, this proposal is for the removal of existing florescent lamps and the installation of new LED tube lights ONLY. It does not take into account or provide for repair or rewiring of any fixture that currently does not have power at the fixture.