



# Energy Smart Services

solutions &  
incentives for  
business

## SECTION 2B

### STANDARD INCENTIVES FOR LIGHTING



- **Lighting** is the biggest energy cost in many commercial buildings and an obvious place to start looking for savings. Since systems operate for long hours and lighting is relatively easy to replace, lighting efficiency projects often produce excellent energy savings and short payback periods. And from a facility management perspective, standardization of lamp types in a new system can greatly simplify inventory practices and ease of maintenance.
- For retrofits in existing facilities, the Standard Incentive Worksheets accurately estimate energy savings for proposed systems. The results of several installation options can be easily explored, and their kWh reductions, financial savings, incentive amounts, and payback periods compared.
- Since proposed systems in new construction and major retrofit projects must exceed current energy code requirements to qualify for financial incentives, Seattle City Light offers a higher incentive level to those projects that go beyond these already high levels of efficiency.
- But it's not all about efficiency and economics. Whenever a lighting system is replaced or lighting is selected for a new facility, there's an opportunity to improve comfort and aesthetics. Lighting upgrades can reduce visual fatigue, improve employee comfort, increase productivity, enhance learning in educational facilities, and increase sales in retail environments.
- At City Light, we recognize our customers' need for high performance, high quality lighting design. That's why we partner with private design professionals to help customers select lighting system upgrades that yield multiple benefits, enhancing lighting operation while saving energy.

from  Seattle City Light

## **Section 2B. Standard Incentives for Lighting**

- Instructions for Filling out the Funding Calculation Worksheets for Lighting
- Funding Calculation Worksheets for Lighting in Existing Facilities
- Funding Calculation Worksheets for Lighting in New Construction
- Standard Specifications for Lighting
- Lighting Waste Disposal Form for Lamps and Ballasts

## Instructions for Filling out the Funding Calculation Worksheets for Lighting

See also Section 2A–*Simple Rebates*, for information on exit signs and occupancy sensors.

### 1. Eligible Energy Conservation Measures

The following technologies are eligible for Energy Smart Services Funding:

- T5, T8 fluorescent lamps, ballasts, and fixtures (with electronic ballasts)
- Compact fluorescent (with detachable lamps)
- Metal halide
- High pressure sodium
- Low pressure sodium
- Central lighting controls

The following equipment is **not** eligible for funding:

- T12 and T10 fluorescent
- Unitary compact fluorescent (unless fixtures cannot be replaced and only unitary fit)
- Incandescent and halogen incandescent
- Mercury vapor
- Neon
- Low voltage

### 2. Selecting the Correct Funding Calculation Worksheets

Seattle City Light funding for lamps, ballasts and fixtures is based on a calculation of annual kWh savings for going from a “baseline” to the proposed lighting. Determining the proper baseline to use is key to accurately calculating funding amounts.

Regardless of the baseline selected for the energy savings calculations, all projects must conform to the requirements of the Energy Code, which makes a distinction between existing buildings and new construction.

***New Construction.*** For new construction projects, the baseline is the lighting wattage allowed by the Energy Code, and the calculation of funding is made using the *Funding Calculation Worksheets for New Construction*.

***Existing Facilities.*** For major remodels, the Energy Code is baseline and the New Construction Worksheets are used. If a lighting project would have gone forward with or without SCL funding, and the Energy Code establishes a maximum Lighting Power Allowance, the Energy

Code is baseline and the New Construction Worksheets are used. If a lighting project wouldn't have gone forward in the absence of Seattle City Light funding, the existing equipment may be used as baseline and the funding calculation is placed on the *Funding Calculation Worksheets for Existing Facilities*. The worksheets are in Excel and have built-in formulas. Information is entered into the highlighted areas and the white portions of the worksheets are filled out automatically. The worksheets should be completed electronically, and can be downloaded at [www.EnergySmartServices.com](http://www.EnergySmartServices.com).

### **3. For Projects Using the Energy Code As Baseline use “Worksheets for Lighting in New Construction”**

In the *Funding Calculation Worksheets for Lighting in New Construction*, the lighting wattage allowed by the Energy Code is compared to the lighting wattage being proposed. The lighting wattage allowed by the Energy Code (the “lighting power allowance”, or LPA) is calculated as part of the building permit application and is approved by Design, Construction and Land Use (DCLU). Seattle City Light should receive a copy of the same paperwork submitted to and approved by DCLU in addition to the Energy Smart Services *Funding Calculation Worksheets*. In describing the proposed lighting, include all lighting to serve the square footage being addressed, per DCLU calculation requirements. In the Seattle City Light Fixture Schedule worksheet, enter a zero value for “material cost per fixture” in column “h”, for fixture types such as halogen that aren't eligible for Seattle City Light funding. See the list of eligible equipment, above.

### **4. For Projects Using the Existing Equipment As Baseline Use “Worksheets for Lighting in Existing Facilities”**

The *Funding Calculation Worksheets for Lighting in Existing Facilities* include a description of the existing lighting and the proposed lighting.

***Fixture Schedule Worksheet.*** The existing and proposed fixture types are described in the Fixture Schedule, with one line per fixture type. For the existing fixtures, typical input watts for various fixture types are provided in a reference table located near the end of the worksheet file.

For proposed fixtures, the watts will need to match the ballast manufacturer's rated input watts for the ballasts/lamp combination. For existing fixtures, the fixture input watts should not include lamps that have been removed from the fixtures. The total number of fixtures of each type is automatically calculated once the *Fixture Count Worksheet* has been filled out. The per-unit material cost is entered into this form and the total material cost is automatically calculated. Fixture retrofits are entered into the Fixture Schedule in the same way as a new fixture, except that the column “N or R” is marked “R”, for retrofit, and the proposed “Fixture Description” column should describe the type of retrofit.

***Fixture Count Worksheet.*** Enter the fixture counts for existing and proposed fixtures by location, and the estimated annual savings are calculated automatically. For the description of the existing equipment, do not include fixtures that were disconnected or delamped before the project started.

Enter **N**, **R**, **A**, or **D** in column “g” to indicate whether the existing fixtures for that location are to be replaced with **N**ew fixtures, **R**etrofitted, left **A**s is, or **D**isconnected (or removed) but not replaced. If the number of new fixtures in a given location is less than the number that is being replaced, enter **N** not **D**. **D**, for disconnected (or removed), is only to be entered if fixtures are to be removed or disconnected in an area where no other lighting changes are being made. Fixtures to be disconnected or removed may also be entered for clarity in spaces receiving new fixtures, but this will reduce the funding level. The **D** option will rarely be used—primarily for reduction of lighting in overlit spaces. Fixtures that are being left unchanged may either be entered into the worksheet with the designation “As-is”, for clarity, or left out of the worksheet entirely. Their presence in the worksheet does not affect funding levels.

For column “c”, the codes to use for the Heating and Cooling System description are given in the “H & C Codes” reference table located on a separate tab near the end of the worksheet file. The hours of operation are the average burn hours for the lighting, which may be less than the facility hours of occupancy. The fixture type designations in columns “e” and “m” must be exactly the same as those used on the Fixture Schedule so that the corresponding fixture information can be automatically transferred.

**Central Lighting Controls Worksheet.** Central lighting controls are covered by a separate worksheet, and receive funding under a simplified calculation that assumes the controls reduce lighting consumption 20% for the fixtures they affect. See *Simple Rebates* for information about Energy Smart Services funding for occupancy sensor lighting controls.

**Summary Form.** If the Energy Smart Services lighting worksheets are used as the basis of a lighting bid, the Trade Ally completes and signs this form.

## 5. Drawings

In order to receive a Seattle City Light contract, the Trade Ally or customer provides drawings or sketches of floor plans showing where existing and proposed lighting fixtures are located. Fixture type designations should be consistent with those used on the Fixture Schedule worksheet, which is part of the *Funding Calculation Worksheets*.

If the information on the *Fixture Count Worksheet* is given by room number, it’s not necessary to submit a drawing of the fixtures, but floor plans showing the room locations should be provided.

## 6. Equipment Submittals

Equipment submittals must demonstrate compliance with the Energy Smart Services *Standard Specifications for Lighting* and must support the fixture wattages indicated on the *Funding Calculation Worksheets for Lighting*. The “type” designation used in the Lighting Worksheet Fixture Schedule must be clearly marked on the corresponding equipment submittals. Submittals must provide a picture of the device, and the manufacturer and model number. Clearly indicate the ballast manufacturer and model number(s) for each fixture type.

## 7. Inspections

During the inspection, the Trade Ally or owner must open up fixtures selected by the Energy Management Analyst to expose ballasts and lamps funded under the Seattle City Light contract.

## 8. Related Documents

The following documents should also be read before initiating a project funded by Seattle City Light.

- *Financial Incentives for ECM Installation–Steps to Participate*, located in Section 2.
- *Standard Specifications for Lighting* at the end of Section 2B. These specifications are attached to the Energy Smart Services ECM Installation Incentive contracts as requirements to be met prior to Seattle City Light payment.
- Section 2A–*Simple Rebates*. See this section for information on exit sign and occupancy sensor funding.
- For more detailed lamp and ballast disposal information, see the *Resource Directory* at the end of this manual.

**Seattle City Light Energy Smart Services**  
**GUIDE TO SELECTING the APPROPRIATE**  
**WORKSHEETS for LIGHTING**

<b>Equipment to be Funded</b>	<b>Funding Calculation Worksheets for Lighting in Existing Facilities</b>	<b>Funding Calculation Worksheets for Lighting in New Construction</b>
<p style="text-align: center;"><b>Lamps, Ballasts or Fixtures</b> (other than exit signs)</p>	<ul style="list-style-type: none"> <li>■ Fixture Schedule</li> <li>■ Fixture Counts</li> <li>■ Summary</li> </ul>	<ul style="list-style-type: none"> <li>■ Energy Code Baseline</li> <li>■ Fixture Schedule</li> <li>■ Fixture Counts</li> <li>■ Summary</li> </ul>
<p style="text-align: center;"><b>Central Lighting Controls</b></p>	<ul style="list-style-type: none"> <li>■ Central Lighting Controls</li> </ul>	<p style="text-align: center;">N/A</p>
<p style="text-align: center;"><b>Exit Signs</b></p>	<p style="text-align: center;">See Section 2A, <i>Simple Rebates</i></p>	<p style="text-align: center;">N/A</p>
<p style="text-align: center;"><b>Occupancy Sensors</b></p>	<p style="text-align: center;">See Section 2A, <i>Simple Rebates</i></p>	<p style="text-align: center;">See Section 2A. <i>Simple Rebates</i></p>



**Seattle City Light / Energy Smart Services  
Funding Calculation Worksheets for Lighting in Existing Facilities  
- Fixture Counts -**

Facility name \_\_\_\_\_ Date \_\_\_\_\_  
Form completed by \_\_\_\_\_

**(Complete the shaded areas only. The non-shaded areas are calculated and filled out automatically.)**

Line #	Location (floor, room #, etc)	H & C Code	Hours / Year	Existing Fixtures				Proposed Fixtures										
				Fixture ID	# Lamp / Lamp Watts	N, R, A or D	Qty	Input Watts / Fixture	Total kW	kWh / Yr	Notes	Fixture ID	# Lamp / Lamp Watts	N, R, A or D	Qty	Input Watts / Fixture	Total kW	kWh / Yr
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
+Lines	Click button to add lines.																	
				<b>Totals, Existing</b>				<b>Totals, Proposed</b>										
				New Fixtures				Retrofitted Fixtures				As-Is Fixtures						
				Disconnected / Removed Fixtures				Total										
<b>kWh/yr Savings</b>																		
New Fixtures																		
Retrofitted Fixtures																		
As-Is Fixtures																		
Removed Fixtures																		
Total Savings																		

**Instructions**

**General.** See the *Instructions for Filling out the Funding Calculation Worksheets* in section 2B of the Program Manual. These worksheets apply only if the Energy Code is not baseline. Otherwise use the *Funding Calculation Worksheets for Lighting in New Construction*.

**Column c, Heating and Cooling System Code.** See the *Lighting Reference Table 1. Heating and Cooling System Codes* under a tab near the end of the workbook for the codes to enter here. Enter an H & C code for every line used.

**Column d, Hours/year.** Average hours the lamp burns per year. Enter hours for every line used (Existing = Proposed).

**Column e, Fixture ID.** Enter the fixture ID exactly as it appears on the Fixture Schedule worksheet.

**Columns f and n, # lamps/ lamp watt.** The number of lamps per fixture, and the watts per lamp.

**Columns g and o, New, Retrofit or As-is.** Enter **N** for fixtures to be replaced with new fixtures; **R** for fixtures to be retrofitted with lamps and ballasts; **A** for fixtures to remain as-is, or **D** for fixtures to be disconnected or removed but not replaced. If the # of existing fixtures is less than the # of proposed fixtures to replace them, enter **N**, not **D**.

## Seattle City Light / Energy Smart Services Funding Calculation Worksheets for Lighting in Existing Facilities

### - Summary -

If sections IIB and VIII are filled in, this Summary may be submitted in lieu of a bid.  
The non-shaded entries are automatically filled in.

Facility Name: \_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_

Zip Code: \_\_\_\_\_

#### I. Savings Summary

Total Annual Electrical Energy Savings \_\_\_\_\_

Total Annual Dollar Savings at the average annual electrical rate of: \_\_\_\_\_ ¢ / kWh \_\_\_\_\_

#### II. Project Cost (Fill in part A or part B.)

A. Total Cost Based on Attached Bid \_\_\_\_\_

B. Total Cost Based on Attached Worksheets

Sum of material costs documented on attached worksheets \_\_\_\_\_

Labor Cost \_\_\_\_\_ hours @ \_\_\_\_\_ / hr \_\_\_\_\_

Misc. Cost (please list) \_\_\_\_\_

Washington State Sales Tax @ 8.8% \_\_\_\_\_

Total \_\_\_\_\_

#### III. Savings-Based Funding Calculations

New Fixtures (13 ¢ / kWh-yr. savings) \_\_\_\_\_

Retrofitting Fixtures (10 ¢ / kWh-yr. savings) \_\_\_\_\_

Removed Fixtures (10 ¢ / kWh-yr. savings) \_\_\_\_\_

#### IV. Calculation of Funding

Value of Savings to SCL \_\_\_\_\_

Cost Cap (70% of Total Cost) \_\_\_\_\_

The project is not eligible for ESS funding if the total incentive amount is less than \$500.

#### V. Estimated Seattle City Light Funding

This figure is the lesser of the two numbers calculated under section IV, above. This is an ESTIMATE only, and is subject to review by Seattle City Light. The funding amount is finalized in the SCL contract offered to the customer.

#### VI. Net Customer Cost

#### VII. Project Simple Payback for Customer

Incentives are reduced as necessary to yield a simple payback to the customer of no less than 6 months.

#### VIII. Contractor Information (Complete, sign & date this portion if this sheet and attachments are submitted in lieu of a bid.)

Company Name: \_\_\_\_\_

Contractor Name: \_\_\_\_\_

Street Address: \_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_

Zip Code: \_\_\_\_\_

Email Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

Authorized Signature: \_\_\_\_\_

Date: \_\_\_\_\_

The project description and costs shown in this proposal are valid until \_\_\_\_\_ (date)

Note: These worksheets apply only if the Energy Code is not baseline. Otherwise use the *Funding Calculation Worksheets for Lighting in New Construction*.

**Seattle City Light / Energy Smart Services**  
**Funding Calculation Worksheets for Lighting in Existing Facilities**  
**- Central Lighting Controls -**

Facility name \_\_\_\_\_

Form completed by \_\_\_\_\_

Date \_\_\_\_\_

(Complete the shaded areas only. The non-shaded areas are calculated and filled out automatically.)

Line #	Location	H & C Code	Control Description / Model (manufacturer, brand, etc)	Qty	Total kW Affected	Average Operating Hrs / Yr	kWh / Yr Savings	
a	b	c	d	e	f	g	h	
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
+Lines	Click the button to add lines.							
Total:								

**III. COST & FUNDING**

Cost	Cost related to the project	
Cost Type	Total, Material, or Incremental (enter T, M or I)	
Cost Cap	25% of Total Cost, 50% of Material Cost, 100% of Incremental Cost	
Value of Savings to SCL	21¢ x kWh/yr Savings	
Max SCL Incentive Amount	The lesser amount of the Value of Savings and the Cost Cap	

**Instructions**

**General.** These worksheets apply only if the Energy Code is not baseline. Otherwise use the *Funding Calculation Worksheets for Lighting in New Construction*. See the *Instructions for Filling out the Funding Calculation Worksheets for Lighting* in section 2B of the Program Manual. This form is not a guarantee of funding from Seattle City Light. That guarantee is only offered through a formal contract between the customer and Seattle City Light.

**Column c, Heating and Cooling System Code.** See the *Lighting Reference Table 1. Heating and Cooling System Codes*, under a separate tab near the end of this workbook.

**Column f, kW Affected.** Enter the total kW connected to, and therefore affected by, this control.

**Column g, Average Operating Hours per Year.** Enter average existing operating hours per year of the fixtures connected to these controls.

**Column h, kWh/yr Savings.** For SCL funding calculations, the savings assumed to be 20% of the current energy use by these fixtures.

**Seattle City Light / Energy Smart Services**  
**Funding Calculation Worksheets for Lighting in New Construction**  
**- Baseline, Energy Code -**

Facility name \_\_\_\_\_

Form completed by \_\_\_\_\_

Date \_\_\_\_\_

**(Complete the shaded areas only. The non-shaded areas are calculated and filled out automatically.)**

Line #	Location			Energy Code Power Allowance			Annual Use	
	Location (floor, room number)	Floor Area (SqFt)	H & C Code	Occupancy Description (retail, office, classroom, etc)	Watts / SqFt Allow'd	Total kW Allowed	Hours / Yr	kWh / Yr
a	b	c	d	e	f	g	h	i
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
+Lines	Click button to add lines.							
		Total Area:		Total kW Allowed:				

**Instructions**

**General.** See the *Instructions for Filling out the Funding Calculation Worksheets for Lighting* in section 2B of the Program Manual. These worksheets apply only if the Energy Code is not baseline. Otherwise use the *Funding Calculation Worksheets for Lighting in New Construction*.

**Column d, Heating and Cooling System Code.** See the *Lighting Reference Table 1. Heating and Cooling System Codes* under a separate tab near the end of this workbook for the codes to enter here.

**Column f, Allowed Watts per Square Foot.** Enter the watts per square foot allowed by the Energy Code.

**Column h, Hours per Year.** Enter the average hours per year that the fixtures will be on.



**Seattle City Light / Energy Smart Services**  
**Funding Calculation Worksheets for Lighting in New Construction**  
**- Fixture Counts -**

Facility name \_\_\_\_\_

Form completed by \_\_\_\_\_

Date \_\_\_\_\_

(Complete the shaded areas only. The non-shaded areas are calculated and filled out automatically.)

Line #	Location Name (floor, room number, etc)	H & C Code	Hours / Year	Fixture ID	Quantity	# Lamp / Lamp Watts	Input Watts / Fixture	kW	kWh / Yr
a	b	c	d	e	f	g	h	i	j
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
+Lines	Click button to add lines.								
Total:							Total:		
						Estimated Annual Savings:			

**Instructions**

**General.** The *Funding Calculation Worksheets for Lighting in New Construction* are also used for lighting in existing facilities if the Energy Code is baseline. In section 2B of the Program Manual, see the *Instructions for Filling out the Funding Calculation Worksheets for Lighting*.

**Column c, Heating and Cooling System Code.** See the *Lighting Reference Table 1. Heating and Cooling System Codes*, under a separate tab near the end of the workbook.

**Column d, Hours/year.** The hours per year on this worksheet must match the hours per year given in the *Baseline, Energy Code* worksheet. For that reason, fixtures serving areas with different LPAs (lighting power allowances) should be entered under separate rows in this worksheet.

**Column e, Fixture ID.** Use the same fixture IDs as were entered in the Fixture Schedule worksheet.

**Column g, # Lamp / Lamp Watts.** The number of lamps per fixture, and the watts per lamp.

# Seattle City Light Energy Smart Services Funding Calculation Worksheets for Lighting in New Construction

## - Summary -

If sections IIB and VIII are filled in, this Summary may be submitted in lieu of a bid.  
The non-shaded entries are automatically filled in.

Facility Name: \_\_\_\_\_

Street Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

**I. Savings Summary**

Total Annual Electrical Energy Savings \_\_\_\_\_  
Total Annual Dollar Savings at the average annual electrical rate of \_\_\_\_\_ ¢ / kWh \_\_\_\_\_

**II. Material Costs** (Complete section A or B. Exclude fixtures, such as halogen, that aren't eligible for funding.)

A. Material Cost Based on Attached Bid \_\_\_\_\_  
B. Material Cost Based on Attached Worksheets \_\_\_\_\_  
Sum of material costs documented on attached worksheets \_\_\_\_\_  
Washington State Sales Tax @ 8.8% \_\_\_\_\_  
Total \_\_\_\_\_

**III. Savings-Based Funding Calculations**

Lighting (14 ¢ / kWh-yr. savings) \_\_\_\_\_

**IV. Funding Calculations**

Value of Savings to SCL \_\_\_\_\_  
Cost Cap (50% of Material Cost) \_\_\_\_\_  
The project is not eligible for ESS funding if the total incentive amount is less than \$500.

**V. Estimated Seattle City Light Funding**

This figure is the lesser of the two numbers calculated under section IV, above. This is an ESTIMATE only, and is subject to review by Seattle City Light. The funding amount is finalized in the SCL contract offered to the customer.

**VI. Net Customer Cost**

\_\_\_\_\_

**VII. Project Simple Payback for Customer**

\_\_\_\_\_

Incentives are reduced as necessary to yield a simple payback to the customer of no less than 6 months.

**VIII. Contractor Information** (Complete, sign & date this portion if this sheet and attachments are submitted in lieu of a bid.)

Company Name: \_\_\_\_\_ Contractor Name: \_\_\_\_\_

Street Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Email Address: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Authorized Signature: \_\_\_\_\_ Date: \_\_\_\_\_

The project description and costs shown in this proposal are valid until: \_\_\_\_\_ (date)

## Seattle City Light Energy Smart Services Funding Calculation Worksheets for Lighting

### - Lighting Reference Table 1. Heating and Cooling System Codes -

Use this table to find the **Heating and Cooling System ("H&C") Code** inputs  
for the *Fixture Counts* worksheet.

Heating and Cooling System Types		Heating and Cooling System Code	kWh Adjustment Factor <sup>1</sup>	
Fixtures Located Indoors <b>WITHOUT</b> Air Conditioning	No electric heating (unheated, or heated by some other fuel)		A	1
	Electric resistance heat	Building is 1-3 stories	B	0.67
		Building is 4 or more stories	C	0.83
	Heat pump heat	Building is 1-3 stories	D	0.83
		Building is 4 or more stories	E	0.92
Fixtures Located Indoors <b>WITH</b> Air Conditioning	No electric heating (unheated, or heated by some other fuel)		F	1
	Electric resistance heat	Building is 1-3 stories	G	0.78
		Building is 4 or more stories	H	0.94
	Heat pump heat	Building is 1-3 stories	I	0.94
		Building is 4 or more stories	J	1
<b>Fixtures Located Outside</b>		<b>K</b>	1	

1) **KWh Adjustment Factor.** This column is included for information only. The Adjustment Factor is automatically used in the *Funding Calculation Worksheets* when you enter the Heating and Cooling System Code in the *Fixture Counts* worksheet.

## Seattle City Light Energy Smart Services Funding Calculation Worksheets for Lighting

### - Lighting Reference Table 2. Fixture Wattages -

The **input watts / fixture** given in this table may be used in the *Fixture Schedule* worksheet descriptions of the existing fixtures. For input wattages of proposed equipment, use information from manufacturers' cut sheets, not this table.

#### Fluorescent Fixtures

Lamp Type	Lamp Rated Watts	Number of Lamps	Input Watts/ Fixture Standard Ballast	Input Watts/ Fixture "Energy Efficient" Ballast
F40 T12, Standard	40	2	96	86
F40 T12, Energy Efficient	34	2	81	74
F96 T12, Standard	75	2	173	158
F96 T12, Energy Efficient	60	2	138	123
F96 T12, HO, Standard	120	2	257	237
F96 T12, HO, Energy Efficient	95	2	227	207
F96 T12, VHO, Standard	225	2	450	-
F96 T12, VHO, Energy Efficient	195	2	415	-
F40 T12, Standard	40	3	148	134
F40 T12, Energy Efficient	34	3	129	105

#### High-Intensity Discharge Fixtures

Lamp Type	Lamp Rated Watts	Number of Lamps	Input Watts/Fixture
Mercury Vapor	75	1	94
	100	1	127
	175	1	205
	250	1	286
	400	1	440
	1000	1	1090
Metal Halide	175	1	210
	250	1	300
	400	1	460
	1000	1	1055
High Pressure Sodium	35	1	45
	50	1	63
	70	1	87
	100	1	130
	150	1	175
	250	1	305
	400	1	465
1000	1	1100	
Low Pressure Sodium	18	1	31
	35	1	60
	55	1	80
	90	1	125
	135	1	178
	180	1	200

## Standard Specifications For Lighting

These specifications do not cover exit signs and occupancy sensors, which are handled as “Simple Rebates”.

### 1. Related Documents

*Standard Specifications for All ECM Installation Incentives* apply to this project.

### 2. Technologies Not Funded

Energy Smart Services provides funding for a wide variety of lighting technologies. However, the following are not eligible for funding:

- T12, T10 Fluorescent
- Unitary Compact Fluorescent
- Incandescent
- Halogen
- Mercury Vapor
- Low Voltage
- Neon

### 3. General Requirements

All fixtures shall be certified for the specific type of application (wet, dry, damp, etc).

The rated input wattages shall be published by the manufacturer for each funded ballast and lamp combination and shall agree with fixture wattages used in the *Funding Calculation Worksheets*.

### 4. Fluorescent Ballasts (Except Those Serving Compact Fluorescent Lamps)

All T8 and T5 ballasts shall meet ANSI C82.11-1993 (High Frequency Fluorescent Lamp Ballasts) and UL 935 standards and bear the appropriate UL label. The following additional requirements must also be met:

- The power factor (PF), for 4 foot T8 & T5 shall be greater than or equal to 95%. Ballasts serving other lamp types must have a power factor greater than or equal to 90%
- Total harmonic distortion (THD) shall be less than or equal to 20%
- The manufacturer shall provide written warranty against defects in material and workmanship, including replacement, for five years from date of manufacture

- Ballasts shall be electronic
- Ballasts shall have a Class A sound rating
- Ballasts for T5 and T5HO lamps shall be “Program Start” (as defined in ANSI C82.11) and shall have end-of-life detection
- Ballasts shall not contain PCBs
- Ballasts shall be UL 935 listed, Class P, Type 1 Outdoor CSA Certified where applicable

## 5. Fluorescent Ballasts Serving Compact Fluorescent Lamps

- Electronic ballasts covered by this specification shall withstand input power line transients as defined in ANSI C62.41 (High Frequency Fluorescent Lamp Ballasts).
- The lamps shall be detachable so they can be replaced without replacing the ballast.
- Ballasts with detachable lamps shall have end-of-life detection.
- The power factor for all ballasts shall be 90% or higher.
- Total harmonic distortion (THD) of the input current shall not exceed 33% of the fundamental 60 Hz. current.
- Electronic ballasts shall comply with FCC rules and regulations Part 18, concerning Electromagnetic & Radio Frequency Interference (EMI and RFI).
- Electronic ballasts shall meet ANSI C82.11-1993 (High Frequency Fluorescent Lamp Ballasts).
- All equipment covered by this specification shall be Class “P” thermally protected where required by code.
- The ballast shall be capable of starting the designated lamp at the minimum temperature established by the lamp manufacturer. Integral units shall state minimum starting temperature.
- All ballasts shall be class “A” sound rated.
- Ballasts shall not contain PCBs.

## 6. High-Intensity Discharge (HID) Fixtures

Existing mercury vapor (MV) fixtures for retrofit with high-pressure sodium lamps (HPS) and ballasts must be certified by the manufacturer to accommodate the new components.

## 7. Delamping

To receive funding for delamping, the lamps must be removed and the wiring to the corresponding tombstones removed. The removal of wiring to the tombstones must be done in a manner that meets all applicable fire and electrical safety standards and codes. The delamped configuration must be one of the lamp configurations listed on the ballast.

## 8. Fixture Disconnect

If a fixture is to be disconnected and left in place, all of the tombstones, lamps and ballasts must be removed from the fixture, and the electrical wiring to the fixture must be removed to the J-box. This will be verified during inspection.

## 9. Operations and Maintenance Manuals

Provide an operations and maintenance manual that includes at least the following: Operating and calibration instructions for all occupancy sensors, photocells and other lighting controls; written warranties for controls and ballasts; manufacturer and model numbers for compact fluorescent fixture components so that removable lamps can be replaced; and information about where replacement lamps and ballasts can be purchased by the customer.

## 10. Disposal

Dispose of ballasts containing PCBs in accordance with Federal, State, and local regulations, including compliance with Environmental Protection Agency guidelines and the Toxic Substances Control Act. Discarded fixtures, lamps, and associated equipment shall be removed from the project site and disposed of in compliance with Federal, State, and local regulations. Prior to disposal, lighting waste shall be properly stored, labeled and transported. Before a project is approved for final payment, the customer is required to certify they have complied with these regulations by submitting a *Lighting Waste Disposal Form* (included here).

There are a number of public agencies and private firms that can assist with proper disposal. King County Hazardous Waste provides financial assistance in some cases. For additional information and referral specifics concerning waste disposal requirements, please see the *Resource Directory* in this manual or check the program Web site at [www.EnergySmartServices.com](http://www.EnergySmartServices.com). A copy of the Seattle City Light *Lighting Lamp and Ballast Waste Disposal Guidelines* are available at that Web site, and may be ordered by calling Seattle City Light at 684-3254.

## 11. Submittals

Prior to payment, the customer shall submit:

- A signed copy of the attached City Light *Lighting Waste Disposal Form*
- An as-built set of floor plans showing the proposed fixture locations (if any changes have been made)
- As-built *Funding Calculation Worksheets* (if any changes have been made)

## 12. Inspection

If any equipment will be inaccessible after installation, the Energy Management Analyst must be called to the job site to inspect the equipment after delivery and before it is installed. Also contact the Energy Management Analyst after the installation is complete and fully functional for an on-site inspection. During Seattle City Light inspections, a qualified person (customer or

Trade Ally) shall open fixtures selected by the Energy Management Analyst to expose ballasts and lamps funded under the Seattle City Light contract.

The Energy Management Analyst will check that the numbers entered into the *Funding Calculation Worksheets* are accurate. If the equipment counts or efficiency ratings have changed, the calculated energy savings and incentive amounts will be recalculated.

## Lighting Waste Disposal Form for Lamps and Ballasts

Project Address \_\_\_\_\_

Utility Account Number \_\_\_\_\_ SCL Contract Number \_\_\_\_\_

Lighting Installer Firm Name \_\_\_\_\_

*All lamps and ballasts have been disposed of in accordance with all applicable federal, state and local waste disposal regulations. These include the U.S. EPA and Washington Department of Ecology's Universal Waste Rules for disposal of lamps containing mercury, and the U.S. Toxics Substances Control Act and EPA Rules for disposal of ballasts containing PCBs.*

**Number of LAMPS disposed** \_\_\_\_\_

**LAMP disposal firm name** \_\_\_\_\_

**Disposal method (check all that apply)**

**Recycled** Recycling firm name: \_\_\_\_\_

**Hazardous waste disposal facility**       **Municipal landfill**

*In King County, the municipal landfill option is restricted to small quantity generators with written waste clearance from Public Health, (206) 296-4633. Elsewhere, check with landfill/transfer station operator, local health department, or solid waste agency.*

**Number of BALLASTS disposed** \_\_\_\_\_

**BALLAST disposal firm name** \_\_\_\_\_

**Disposal method (check all that apply)**

**Recycled** Recycling firm name: \_\_\_\_\_

**Transported to commercial store or destination hazardous waste disposal facility**

*The "Transported..." option may include temporary storage, treatment, incineration, recycling and/or final disposal to a destination hazardous waste landfill.*

Authorized Signatures:

Lighting Installer

Owner Representative

\_\_\_\_\_  
(date) \_\_\_\_\_

\_\_\_\_\_  
(date) \_\_\_\_\_