

BPA Lighting Calculator 2.3 Brown Bag

Bringing the Value of the River
to the People



Introduction

- Training opportunities will be available
 - Through NW TAN (TBD)
 - Directly through BPA
- Review customizing lighting calculator
- Focus on changes in version 2.3

Highlighting Changes on 2.3

- Expanded Master Measure List
 - More baseline options
 - More proposed options
- More LED Deemed Measures
 - New category to incorporate outdoor LEDs
 - Higher LED Wattage Options
- **\$0.50 / kWh Total Project Cap**
- Added Language to Program Offerings

New Home Page

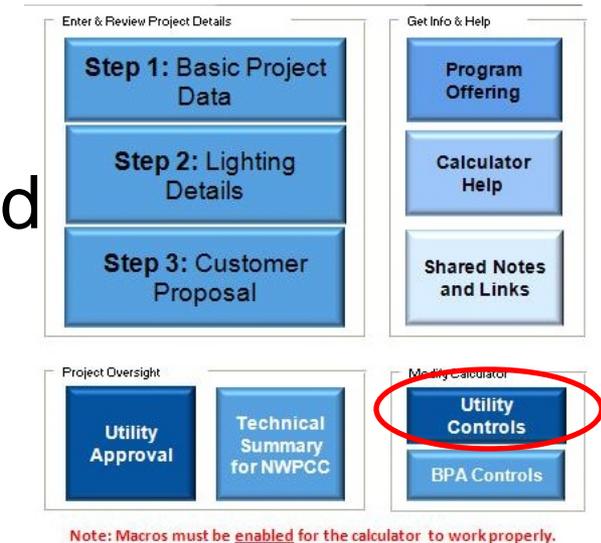
The screenshot displays a web interface with four main sections, each containing several buttons:

- Enter & Review Project Details:** Contains three stacked buttons: "Step 1: Basic Project Data", "Step 2: Lighting Details", and "Step 3: Customer Proposal".
- Get Info & Help:** Contains three stacked buttons: "Program Offering", "Calculator Help", and "Shared Notes and Links".
- Project Oversight:** Contains two side-by-side buttons: "Utility Approval" and "Technical Summary for NWPC".
- Modify Calculator:** Contains two stacked buttons: "Utility Controls" and "BPA Controls".

Note: Macros must be enabled for the calculator to work properly.

Customizing the Calculator

- From Utility Controls
 - Setting Utility Rates
 - Changing Calculator Title
 - \$/kWh Measure Level Threshold
 - Max Incentive Set at \$0.50
 - Utility Willingness to Pay
 - Adding Utility Logo
 - And More...



Customizing Lighting Calc 2.3

Main Menu

Lock Sheets

Unlock Sheets

Hide Headers, Tabs, and Equation Bar

Utility Controls

Utility Contact Information:

Utility Name	We the People Power
Utility Contact Name	Johnny Conservation
Utility Phone	(123) 456-7894
Utility Email	power@gmail.com
Utility Address	123 Power St
Utility City/State/Zip	Tacoma, WA 98407
Utility Website	power@power.com

Calculator Options:

Calculator Title	BPA C&I Lighting Calculator
Calculator Title for Lighting Details	BPA C&I Lighting Calculator Existing Building Retrofit
Freeze calculator when project is approved?	YES

Text to display on customer offer letter until project has been approved	THIS PROJECT IS PENDING UTILITY APPROVAL. ALL SAVINGS AND INCENTIVES VALUES STATED HERE ARE CONSIDERED PRELIMINARY.
--	---

Customizing Lighting Calc 2.3

Utility Controls

Setting Utility Rates



Rate Class	Energy Rate (\$/kWh)	Demand Rate (\$/kW)
<i>USER-SPECIFIED</i>		
General	\$0.08000	\$0.000
Commercial	\$0.05000	\$7.300

Customizing Lighting Calc 2.3

More Customization

Utility Controls

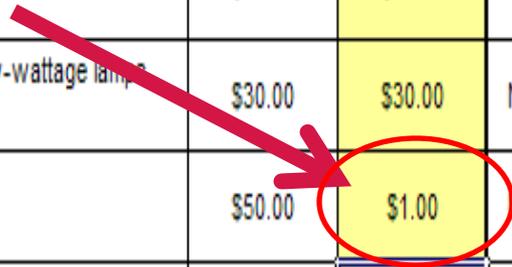
75				
76				
77	Incentive Controls			
78				
79	Maximum % of Project Cost			
80			BPA	Utility
81	Commercial		70%	70%
82	Industrial		70%	70%
83	Agricultural		70%	70%
84	Maximum \$/kWh Incentive			
85			BPA	Utility
86	per project		\$0.50	\$0.50
87	\$/kWh Measure Level Incentive Thresholds for Color Coding			
88			\$/kWh greater than ...	
89		yellow background	\$0.20	Set these very high if you don't want them activated
90		red background	\$0.40	
91	Existing Building Retrofits	Measure	Description	
92		A	High-performance (HP) T8 or Normal Light-Output T5 Lamps and Ballasts	
93	T12, I, MV, MH, HPS	A1	Upgrade to 1 HP lamp with HP electronic ballast	
94	T12, I, MV, MH, HPS	A11	Upgrade to 1 HP lamp with HP electronic ballast and either a) low-ballast factor ballast (BF<0.8) or b) low-wattage lamp (≤28 watts)	



Customizing Lighting Calc 2.3

Setting Utility Willingness to Pay Utility Controls

Measure	Description	Incentive Per Unit	Utility	Installation Type
A	High-performance (HP) T8 or Normal Light-Output T5 Lamps and Ballasts			
A1	Upgrade to 1 HP lamp with HP electronic ballast	\$25.00	\$25.00	New Fixture, Retrofit
A11	Upgrade to 1 HP lamp with HP electronic ballast and either a) low-ballast factor ballast (BF<0.8) or b) low-wattage lamp (≤28 watts)	\$30.00	\$30.00	New Fixture, Retrofit
A2	Upgrade to 2 to 4 HP lamps with HP electronic ballast	\$50.00	\$1.00	New Fixture, Retrofit
A21	Upgrade to 2 to 4 HP lamps with HP electronic ballast and either a) low-ballast factor ballasts (BF<0.8) or b) low-wattage lamps (≤28 watts)	\$55.00	\$55.00	New Fixture, Retrofit
A3	Upgrade to HP lamps with HP electronic ballast with de-lamping from a T12 baseline (proposed fixture must have minimum 1 fewer lamp and/or 25% linear lamp footage reduction)	\$65.00	\$65.00	New Fixture, Retrofit



Customizing Lighting Calc 2.3

Setting Utility Willingness to Pay

Example

Area 1 offices	4	ExistingFixtures	T12 4ft	Bi-Pin/Standard Lamp, w/Magnetic Ballast	40	2
	4	NewFixtures	T8 4ft High-Performan	HP Lamp, w/ Normal Light Output Ballast	32	2
		Controls		% Reduction in Hours >>		

	kWh/year - Adjusted for HVAC	kW	Watts/ fixture	Lumens	Lumens/ W	Costs		Maximum Eligible Rebate*	Incentive Details			
						Unit Cost	Total Cost		Incentive Name	Incentive Amount (\$/unit)	Incentive Quantity	Incentive \$/kWh
Baseline	956	0.4	96	19,471	51							
Proposed (w/ controls)	548	0.2	55	20,733	94			\$4.00	A2	\$1.00	4	\$0.01
Savings or % increase	408	0.2		6%	86%							

Customizing Lighting Calc 2.3

Inserting Utility Logo

- Unlock Sheet from Utility Controls
 - Return to Home Page
 - Delete “Add Logo Here” Text
 - Select Box and ‘Right Click’ with Mouse
 - Select Format Shape
 - Select Fill (picture or texture fill)
 - Select Insert Picture from File
-
- Select Reasonably Sized Image (<100 kb preferably)
 - Adjust Size Once Inserted
 - Repeat Steps Wherever Necessary

Questions?

Basic Project Data



Note: Macros must be enabled for the calculator to work properly.

Basic Project Data

- Is this a federal building? (New)
- Will be defaulted to NO

Basic Project & Building Information

Project Name		Street Address		City	State Abbreviation	Zip Code
Big Project		1234 St.		Tacoma	WA	98407
Sector	Building Type		Project Type		Is this a federal building?	
Commercial	Office <20,000 sf		Existing Building Retrofit		NO	

Total Square Footage, for New Construction projects, as been relocated

Primary Building Space Conditioning

Cooling and Heating	Heating Type
Not conditioned	No space heating

than 52 weeks

Total Square Footage
0

[Click here to see the list of valid space types and baseline lighting power densities.](#)

Revised Text

Whole Bldg Check Box has removed

Role	Company	Contact Name	Phone Number	Email

Primary Building Operating Schedule

Daily Hours of Operation						
Su	M	Tu	W	Th	F	Sa
12	12	12	12	12	12	12

Weeks per Year	Annual Hours*
52	4,380

*annual hours are scaled up slightly to account for one year being a day longer than 52 weeks

Primary Building Space Conditioning

Cooling and Heating	Heating Type
Not conditioned	No space heating

Space-Specific Lighting Schedules & Other Details

Space Type	Daily Hours of Lighting Usage								Space Conditioning			Square Footage (New Constr. Only)
	Use Primary Bldg. Schedule	Su	M	Tu	W	Th	F	Sa	Use Primary Bldg. Conditioning	Cooling and Heating	Heating Type	
outdoor	YES	12	12	12	12	12	12	12	YES	Not conditioned	No space heating	

Basic Project Data

- Reminder to group areas with the same hours of operation and heat type
- Do not list individual spaces

Primary Building Operating Schedule

Daily Hours of Operation						
Su	M	Tu	W	Th	F	Sa
0	12	12	12	12	12	0

Weeks per Year	Annual Hours*
52	3,129

Primary Bu
Cooling at
Cooled i

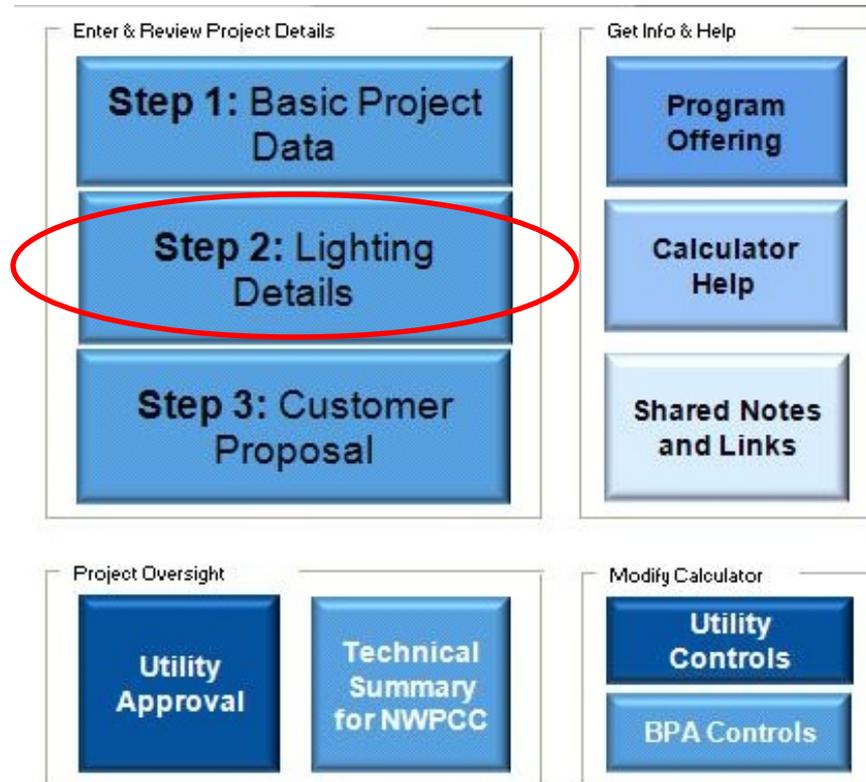
*annual hours are scaled up slightly to account for one year being a day longer than 52 weeks

Space-Specific Lighting Schedules & Other Details

Space Type	Daily Hours of Lighting Usage								Space Conditioni	
	Use Primary Bldg. Schedule	Su	M	Tu	W	Th	F	Sa	Use Primary Bldg. Conditioning	Cooling and Heating
space A	YES	0	12	12	12	12	12	0	YES	Cooled & heated
Space B	YES	0	12	12	12	12	12	0	YES	Cooled & heated
Exterior Lighting	NO	12	12	12	12	12	12	12	NO	Not conditioned
Cooler Lights	NO	24	24	24	24	24	24	24	NO	Refrigerated space
Exit Signs	NO	24	24	24	24	24	24	24	YES	oled & heated

Questions?

Lighting Details



Note: Macros must be enabled for the calculator to work properly.

Lighting Details

- Drop down boxes have been condensed

N	Warehouse	16	ExistingFixtures	HID - (HPS, MH & MV)	
	conference rooms		Controls	HID - (HPS, MH & MV)	
M	Gym	16	ExistingFixtures	HID - (MH-Ceramic)	
		16	Retrofit	Incandescent	
	reflectors		Controls	Induction	
4	Area 2	16	ExistingFixtures	LED	
		16	Retrofit	T12 2ft & 3ft	

Lighting Details

- \$ / kWh color coding thresholds

2	Warehouse	16	ExistingFixtures	HID - (HPS, MH & MV)	Metal-Halide Magnetic Ballast	400	1
		16	NewFixtures	T8 4ft High-Performan	HP Lamp, w/ High Light Output Ballast	32	6
			Controls	None			
3	Gym	16	ExistingFixtures	HID - (HPS, MH & MV)	Metal-Halide Magnetic Ballast	400	1
		16	NewFixtures	T8 4ft High-Performan	HP Lamp, w/ High Light Output Ballast	32	6
			Controls	None			
			ExistingFixtures				

Baseline	29,922	7.3	458	376,000	51					
Proposed (w/ controls)	14,504	3.6	222	336,437	95	\$2,560.00	H3	\$160.00	16	\$0.17
Savings or % increase	15,419	3.8		-11%	85%					
Baseline	10,947	7.3	458	376,000	51					
Proposed (w/ controls)	5,306	3.6	222	336,437	95	\$2,560.00	H3	\$160.00	16	\$0.45
Savings or % increase	5,641	3.8		-11%	85%					
Baseline										

Lighting Details

- 6 Lamp T5 vs. T8
- 5 & 6 Lamp T5 has been added to v2.3
- Will receive an H2 incentive vs. H3 incentive

C	Warehouse	16	ExistingFixtures	HID - (HPS, MH & MV)	Metal-Halide Magnetic Ballast	400	1
		16	NewFixtures	T8 4ft High-Performan	HP Lamp, w/ High Light Output Ballast	32	6
			Controls	None			
C	Warehouse	16	ExistingFixtures	HID - (HPS, MH & MV)	Metal-Halide Magnetic Ballast	400	1
		16	NewFixtures	T5 4ft	HO/High-Output Lamp, w/Program-start Ballast	54	6
			Controls	None			

Baseline	29,922	7.3	458	376,000	51					
Proposed (w/ controls)	14,504	3.6	222	336,437	95	\$2,560.00	H3	\$160.00	16	\$0.17
Savings or % increase	15,419	3.8		-11%	85%					
Baseline	29,922	7.3	458	376,000	51					
Proposed (w/ controls)	21,560	5.3	330	456,000	86	\$2,240.00	H2	\$140.00	16	\$0.27
Savings or % increase	8,363	2.0		21%	68%					

Lighting Details

- Incandescent to Fluorescent now deemed

16	ExistingFixtures	Incandescent	General Purpose Lamp	100	1
16	NewFixtures	T8 4ft High-Performan	HP Lamp, w/ Normal Light Output Ballast	32	1
	Controls	None			

Baseline	6,533	1.6	100	24,624	15					
Proposed (w/ controls)	1,764	0.4	27	41,466	96	\$400.00	A1	\$25.00	16	\$0.08
Savings or % increase	4,769	1.2		68%	524%					
Baseline										

Examples of N2 Measure (Screw-in / Plug-in LED)

Area 2 reflectors	16	Existing Fixtures	Incandescent	Halogen, Par Reflector Lamp	75	1
	16	Retrofit	LED	LED Reflector Lamp, greater than 40 lumens/watt	12	1
		Controls	None			
Area 2	16	Existing Fixtures	Incandescent	Halogen, MR16 Lamp	50	1
	16	Retrofit	LED	LED Reflector Lamp, greater than 40 lumens/watt	10	1

Baseline	2,988	1.2	75	11,232	9					
Proposed (w/ controls)	478	0.2	12	10,368	54	\$320.00	N2	\$20.00	16	\$0.13
Savings or % increase	2,510	1.0		-8%	477%					
Baseline	1,992	0.8	50	9,600	12					
Proposed (w/ controls)	398	0.2	10	8,640	54	\$320.00	N2	\$20.00	16	\$0.20
Savings or % increase	1,593	0.6		-10%	350%					

Refrigeration Case Lighting

Insert total feet into quantity

	16	Existing Fixtures	T12 4ft	HO/High-Output Lamp, w/Magnetic Ballast	60	1	
∞	64	New Fixtures	LED	Refrigerated Case Lighting, specify linear foot of L	3	1	
	brrrr....	Controls	None				

Baseline	15,488	1.4	85	52,496	39			
Proposed (w/ controls)	2,186	0.2	3	13,056	68	\$960.00	F4	\$15.00
Savings or % increase	13,301	1.2		-75%	76%			
						TOTALS	\$1,600	

LED Outdoor Example (F21 Measure)

6	Outdoor Lights	12	Existing Fixtures	HID - (HPS, MH & MV)	High-pressure Sodium Magnetic Ballast	100	1
		12	New Fixtures	LED	LED Outdoor Wall Pack or Sconce ≤ 74watts	50	1
		1	Controls	Photocells	panel-mounted	% Reduction in Hours >>	0%

Baseline	6,307	1.4	120	98,280	68				
Proposed (w/ controls)	2,628	0.6	50	31,200	52	\$600.00	F21	\$50.00	12
Savings or % increase	3,679	0.8		-68%	-24%	\$60.00	J2	\$60.00	1

For outdoor lighting controlled by photocell, if hours are entered as 12 / day, % reduction in hours should be adjusted to 0%

Bus Bar Savings

- Applies to utilities and BPA
- Does not apply to end user
- Added below Total Project Cost
- Represents savings from reduced line loss

From Customer Proposal

Project Name: Big Project

Estimated Annual Energy Savings	21,084 kWh
Estimated Energy Savings (Percent)	79%
Estimated Annual Utility Bill Savings	\$1,687 per year

Total Project Cost	
If you would prefer, you may enter a single, total project cost here, rather than specifying the itemized costs above	
Cost Specification	Total Project Cost
Total Project Cost	
Baseline Cost	\$0.00
Incremental Cost	\$0.00

Annual Busbar Energy Savings Adjusted for HVAC Interaction (kWh)	22,993
--	--------



Total Project Cost Cap

- Important for BPA and Utilities
- Applied to project as a whole - not by individual measure line

Space ID	Quantity	Equipment	Type	Sub-type	Fixture	Wattage
Deemed Lighting Measures						
	24	ExistingFixtures	HID - (HPS, MH & MV)	Metal-Halide Magnetic Ballast	400	1
Gym	24	NewFixtures	T8 4ft High-Performan	HP Lamp, w/ High Light Output Ballast	32	6
		Controls	None			

	kWh/year - Adjusted for HVAC	kW	Watts/ fixture	Lumens	Lumens/ W	Unit Cost	Total Cost	Maximum Eligible Rebate*	Incentive Name	Incentive Amount (\$/unit)	Incentive Quantity	Incentive \$/kWh
Baseline	5,474	11.0	458	564,000	51							
Proposed (w/ controls)	2,653	5.3	222	504,655	95			\$3,840.00	H3	\$160.00	24	\$1.36
Savings or % increase	2,820	5.7		-11%	85%							
						TOTALS		\$3,840			24	

Total Project Cost Cap

- \$0.50 / kWh cap kicks in just like 70% threshold

Project Summary: Energy and Demand Savings					
Inclusion of Non-Standard Measures*	Energy Savings (kWh)	Energy Savings (%)	Demand Savings (kW)	Demand Savings (%)	
Excluding Non-Standard Measures	2,820	52%	5.66	52%	
Including Non-Standard Measures (BPA pre-approval required)	2,820	52%	5.66	52%	

Project Summary: Costs & Incentives		
Inclusion of Non-Standard Measures*	Incentives	Costs
Excluding Non-Standard Measures	\$1,410	\$10,000
Including Non-Standard Measures (BPA pre-approval required)		
Incentive is limited to \$0.50/kWh		

Questions?

Program Offerings Language

- Category A
 - T5 NLO's now deemed
 - Must be >85 Lumens / watt
 - Now allows incandescent baseline

Program Offerings Language

- Category F (LED Fixtures)
 - Most applicable products...
 - Proposed LED only needs to be on one list
 - 4' linear LEDs do not qualify for BPA program
 - F21 Measure for outdoor LED Wall Packs, Sconces & Parking Lot Lights (\$50 / Fixture)
 - Must be <50% original fixture wattage
 - Excludes LED Street Lights, Industrial and Flood Fixtures
 - F4 Measure incorporates linear LED applications

Program Offerings Language

- Category J Reminder for Controls
 - <50 Watts is not currently incented
 - BPA is considering this
 - BPA does not incent where controls already exist
- Category K
 - T8 HO / VHO with de-lamp has been added

Program Offerings Language

- Measure N2 (\$20 / LED Lamp)
 - Screw-in / Plug-in and / or Twist-in Lamps
 - Increased Wattage Options
 - Needs to be on at least one of the approved lists
 - Minimum >40 lumens / watt & $<25\%$ of existing lamp wattage

Version 2.3 Helpful Reminders

- Auto save feature takes a few seconds
- Entering all Basic Project Data is critical to avoiding 'run-time' errors
- Use 'Update All Lighting Details' as necessary
- Footnotes on printed pages give dates and file name for better filing and clarification

Lighting@BPA.gov

- BPA Lighting Team
 - John Wilson 503.230.7319
 - Craig Ciranny 503.230.5865
 - Corky Clark 971.678.3325

Questions?