

Performance Path Calculator

Version 1.2

The following worksheets detail the information regarding the recommended scope of work and document the achievement of the 15% Performance Target. Some cells are protected to prevent accidental over-writing of formulas.

Note that throughout these worksheets, common information from cells are linked and should automatically update. Only cells shaded in blue need to be entered manually. Entering values into white or orange cells will override pre-determined formulas.

Basic Info

In blue cells only, enter the basic information about the building (number of units, square footage of the apartments and commercial spaces, type of garage (if applicable) and indicate the level of space conditioning in each zone). All other square footages will auto-fill after completion of the Interior Lighting worksheet.

Reporting Summary

In blue cells only, enter general information about the project, the model and specifics about the ASHRAE compliant components of the Baseline Building and the energy efficient components in the Proposed Design.

SIR by Measure

Although not required by the EPA to earn the ENERGY STAR, if incremental costs are entered, this worksheet can be used to determine the cost effectiveness for each recommended measure and for the project as a whole.

Windows eQUEST

For eQUEST users only, this calculates the Shading Coefficient for entry into eQUEST and modifies the NFRC U-factor to exclude the air-film.

Water Savings

By entering data in blue cells only, this worksheet will calculate the water savings in gallons based on the proposed flow rates entered. This information does not affect the Performance Rating but can be used when calculating SIR to justify measures that reduce consumption of water.

DHW Demand

Enter in occupancy usage characteristic (low/medium/high) and information about the appliances that consume water in the building. You must enter data in the Basic Info and Water Savings tab, prior to this tab.

Appliances

Enter data in blue cells. Values are calculated in W/Sf or kWh/yr for entry into software.

Lighting Schedule

Developed for eQUEST users, but can be used with other software to translate total operating hours/day into an hourly schedule that meets the requirements from the Simulation Guidelines.

In-Unit Lighting

Enter details and counts of installed lighting fixtures in apartments only. Square footage not illuminated by these fixtures will have a default lighting power density of 1.1 W/Sf assigned to both baseline and proposed. Installed fixtures in rooms where supplemental light will be provided by the occupant or through switched outlets, shall not be modeled as providing illumination for the entire room. Overall lighting power density is calculated on this worksheet for input into software.

Interior Lighting

Using floor plans, a lighting schedule, and lighting cut sheets, fill in the details of this worksheet. This will sum the square footages by ASHRAE space type for reporting purposes on the Basic Info tab, and calculate the lighting power density to be modeled per room. It also provides the maximum wattage allowed by ASHRAE 90.1 for that room, which can be more useful to the design team than the lighting power density. To help project compliance with program Prerequisites, zones are highlighted in red that exceed ASHRAE LPD's by more than 20%, which reduce the energy savings of the building, as well as zones that have insufficient illumination.

Exterior Lighting

Enter details in blue cells only on exterior areas to be illuminated. The total wattage will be provided for input into the simulation software.

Infiltration&Ventilation

Although developed initially for eQUEST users, the approach can be used for other simulation software if needed. The approach allows for infiltration and exhaust in apartments to be combined in the worksheet and a combined value to be entered into the software.

EIR for PTAC or PTHP

Although developed initially for eQUEST users, the approach can be used for other simulation software if the energy efficiency of these systems are entered in terms of EIR, rather than EER.

Results from eQUEST

For eQUEST users only, this worksheet is based upon the Parns.csv file that is generated upon simulation of your building. If those results are pasted into this worksheet, according to the directions, the performance rating will automatically calculate in the Simulation Summary worksheet.

Simulation Summary

This worksheet requires you to enter the fuel prices in order to calculate the overall energy cost savings, which are required to demonstrate achievement of the Performance Target. This tab links to the Results eQUEST tab and is based on natural gas or electric heat. To use oil, modifications to this tab would be needed.

	Instructions:						
1	First fill in the Interior Lighting tab (this information will populate the square footages for this table)						
2	Only fill in cells highlighted with this color.						
Basic Project Information							
Number of Units (per building)							
Studio							
1 - Bedroom							
2 - Bedroom							
3 - Bedroom							
4 - Bedroom							
Building Areas (per building)							
	Building Area	Total Square Ft	Conditioned?		Lighting (W/sf)		
Apartment					#DIV/0!		
Storage, active		0			#DIV/0!		
Storage, inactive		0			#DIV/0!		
Lobby		0			#DIV/0!		
Corridor/Transition		0			#DIV/0!		
Stairs - Active		0			#DIV/0!		
Restroom		0			#DIV/0!		
Office		0			#DIV/0!		
Conference/meeting/multipurpose		0			#DIV/0!		
Electrical/Mechanical		0			#DIV/0!		
Workshop		0			#DIV/0!		
Parking garage		0	Unconditioned		#DIV/0!		
Nonresidential Spaces (ie. commercial)							
		0					
Type of Garage							

**ENERGY STAR Multifamily High Rise
Reporting Summary, Version 1.2**

Table 1. General Project Information			
Current Project Status:		Builder / Developer:	
Estimated Construction Completion Date (m/yr):		Name of contact:	
Project Name:		Phone:	
Project Address:		E-mail:	
Project City, State, Zip:			

Table 2. Modeling Information			
Model:		Simulation Program & Version #:	
Company:		Baseline:	
Phone:		Weather File Location (City, ST):	
E-mail:		Climate Zone:	

Table 3. Building Information					
# of stories:		Total Bldg Ft ² :			0
Space heating fuel:		Residential:			0
CHW fuel:		Common space:			0
Heating system:		Commercial:			0
Cooling system:		Other:			0
Ventilation system:		Conditioned ft ² :			0
CHW system:		Heated & cooled:			0
		Heated only:			0
		Cooled only:			0
Apartment type:	Studio	1 BR	2 BR	3 BR	4 BR
# of apartments:	0	0	0	0	0
Average ft ² :	NA	NA	NA	NA	#DIV/0!

Table 4. ENERGY STAR Portfolio Manager Input	
Gross Floor Area	0
Number of bedrooms	0
Number of Floors	0
Number of in-apartment laundry hookups	0
Number of common area laundry hookups	0
Number of dishwashers	0
% gross floor area that is heated	#DIV/0!
% gross floor area that is cooled	#DIV/0!

Table 5. Comparison of Inputs			
Model Input Parameter	Example Unit	Baseline Design (provide description and specification)	Proposed Final Design (provide description and specification)
Building envelope			
Ext. wall construction (above grade)	U-factor or R		
Ext. wall construction (below grade)	C-factor or R		
Floor construction	U-factor or R		
Slab-on-grade construction (unheated)	F-factor		
Slab-on-grade construction (embedded heat)	F-factor		
Slab-below-grade construction	C-factor		
Roof construction	U-factor or R		
Window/wall area ratio	%		
Window type and U-factor	U-factor		
Window SHGC	SHGC		
Shading devices	U-factor		
Doors			
Lighting & appliances			
In-unit lighting power density	W/ft ²	1.1 W/ft ²	#DIV/0! W/ft ²
Common lighting power density	W/ft ²	0.5 W/ft ²	#DIV/0! W/ft ²
Other interior lighting	W/ft ²	#DIV/0! W/ft ² , per ASHRAE 90.1 Table 9.3.1.2	#DIV/0! W/ft ²
Exterior lighting	W	0	0
Lighting controls			
Refrigerator	ENERGY STAR?		
Dishwasher	ENERGY STAR?		
Clothes Washer	ENERGY STAR?		
HVAC systems			
Primary HVAC system type			
Apartment Ventilation System	CFM/ft ²		
Common Outdoor Air Supply	AFUE / HSPF		
Primary System Heating efficiency	SEER / EER		
Primary System Cooling efficiency	kW		
Fan supply power			
Domestic Hot Water System			
Equipment efficiency	EF, %E1		
Kitchen Faucets	GPM	2.5 @ 80 psi	0.00
Lavatory Faucets	GPM	2.5 @ 80 psi	0.00
Showerheads	GPM	2.5 @ 80psi	0.00
Solar DHW system			
% of load			
Renewable Electric Generation System			
Type of system	kW		
Rated capacity			
Other			

Table 6. Comparison of Estimated Consumption						
End Use	Units	Baseline Annual Consumption	Proposed Design Annual Consumption	% Savings by end-use	% Savings toward Target	
Electric loads						
Ventilation fans	kWh	#DIV/0!	0		#DIV/0!	#DIV/0!
Space heating	kWh	#DIV/0!	0		#DIV/0!	#DIV/0!
Space cooling	kWh	#DIV/0!	0		#DIV/0!	#DIV/0!
Domestic hot water	kWh	#DIV/0!	0		#DIV/0!	#DIV/0!
Interior lighting	kWh	#DIV/0!	0		#DIV/0!	#DIV/0!
Exterior lighting	kWh	0	0		NA	#DIV/0!
Appliances	kWh	#DIV/0!	0		#DIV/0!	#DIV/0!
Pumps and Aux	kWh	#DIV/0!	0		#DIV/0!	#DIV/0!
Other exterior	kWh	#DIV/0!	0		#DIV/0!	#DIV/0!
Plug loads	kWh	0	0		NA	#DIV/0!
Gas loads						
Space heating	MMBtu	#DIV/0!	0		#DIV/0!	#DIV/0!
Domestic hot water	MMBtu	#DIV/0!	0		#DIV/0!	#DIV/0!
Appliances	MMBtu	#DIV/0!	0		#DIV/0!	#DIV/0!
DHW	MMBtu	#DIV/0!	0		#DIV/0!	#DIV/0!
Heat loads						
Space heating	MMBtu				NA	#DIV/0!
Domestic hot water	MMBtu				NA	#DIV/0!
Other	MMBtu				NA	#DIV/0!
Water						
Electric loads	kWh	#DIV/0!	0		#DIV/0!	#DIV/0!
Gas loads	MMBtu	#DIV/0!	0		#DIV/0!	#DIV/0!
Oil loads	MMBtu	0	0		NA	#DIV/0!

Table 7. Fuel Cost		
Natural Gas	0.54/kWh	
Natural Gas	0.00 \$/therm	
Fuel Oil	0.00 \$/gallon	

Table 8. Performance Rating Calculation								
	Baseline			Proposed			Savings, %	Savings, \$
	Fossil Fuel, Btu	Electricity, Btu	Cost, \$	Fossil Fuel, Btu	Electricity, Btu	Cost, \$		
Annual Heating	#DIV/0!	#DIV/0!	#DIV/0!	0	0	0	#DIV/0!	#DIV/0!
Annual Cooling	#DIV/0!	#DIV/0!	#DIV/0!	0	0	0	#DIV/0!	#DIV/0!
Annual Lighting	#DIV/0!	#DIV/0!	#DIV/0!	0	0	0	#DIV/0!	#DIV/0!
Annual Hot Water	#DIV/0!	#DIV/0!	#DIV/0!	0	0	0	#DIV/0!	#DIV/0!
Annual Appliances	#DIV/0!	#DIV/0!	#DIV/0!	0	0	0	#DIV/0!	#DIV/0!
Annual Other	#DIV/0!	#DIV/0!	#DIV/0!	0	0	0	#DIV/0!	#DIV/0!
Total without Renewable	#DIV/0!	#DIV/0!	#DIV/0!	0	0	0	#DIV/0!	#DIV/0!
Annual Renewable	0	0	0	0	0	0	0%	0%
Total with Renewable	#DIV/0!	#DIV/0!	#DIV/0!	0	0	0	#DIV/0!	#DIV/0!

Table 9. Energy Usage per Square Foot of Conditioned Area		
	Baseline Btu/sqft	Proposed Btu/sqft
Annual Heating	0	0
Annual Cooling	0	0
Annual Lighting	0	0
Annual Hot Water	0	0
Annual Appliances	0	0
Annual Other	0	0
Total without Renewable	0	0

Instructions:

- Using ASHRAE 90.1-2007 Table 5.5 (copied below), enter values for your Climate Zone and framing in the Baseline column.
- Baseline fenestration is based on construction. Wood-frame buildings use nonmetal framing; all others use applicable metal framing.
- Enter actual NFRC values in the Proposed column.
- Use calculated values as inputs into eQUEST Glass Type Properties - Basic Specifications screen.

Climate Zone

Construction Type

ASHRAE 90.1-2007

	Residential		Nonresidential	
	Baseline	Proposed	Baseline	Proposed
NFRC SHGC				
NFRC U-value				
eQUEST SC	0.000	0.000	0.000	0.000
eQUEST U-value	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

	Climate Zone 1		Climate Zone 2		Climate Zone 3		Climate Zone 4		Climate Zone 5		Climate Zone 6		Climate Zone 7		Climate Zone 8	
	U-value	SHGC	U-value	SHGC	U-value	SHGC	U-value	SHGC	U-value	SHGC	U-value	SHGC	U-value	SHGC	U-value	SHGC
Residential																
Nonmetal Framing (all)	1.20	0.25	0.75	0.25	0.65	0.25	0.40	0.40	0.35	0.40	0.35	0.40	0.35	NR	0.35	NR
Metal Framing (storefront)	1.20	0.25	0.70	0.25	0.60	0.25	0.50	0.40	0.45	0.40	0.45	0.40	0.40	NR	0.40	NR
Metal Framing (entrance door)	1.20	0.25	1.10	0.25	0.90	0.25	0.85	0.40	0.80	0.40	0.80	0.40	0.80	NR	0.80	NR
Metal Framing (all other)	1.20	0.25	0.75	0.25	0.65	0.25	0.55	0.40	0.55	0.40	0.55	0.40	0.45	NR	0.45	NR
Nonresidential																
Nonmetal Framing (all)	1.20	0.25	0.75	0.25	0.65	0.25	0.40	0.40	0.35	0.40	0.35	0.40	0.35	0.45	0.35	0.45
Metal Framing (storefront)	1.20	0.25	0.70	0.25	0.60	0.25	0.50	0.40	0.45	0.40	0.45	0.40	0.40	0.45	0.40	0.45
Metal Framing (entrance door)	1.20	0.25	1.10	0.25	0.90	0.25	0.85	0.40	0.80	0.40	0.80	0.40	0.80	0.45	0.80	0.45
Metal Framing (all other)	1.20	0.25	0.75	0.25	0.65	0.25	0.55	0.40	0.55	0.40	0.55	0.40	0.45	0.45	0.45	0.45

Instructions:

- 1 First, fill in Basic Info tab.
- 2 In the "Baseline Fixture" table, enter an estimated number of uses/day for urinals in the appropriate space. Enter "0" if there are no urinals in building.
- 3 The baseline usage values will generate automatically.
- 4 In the "Proposed Fixture" table, enter the flow rate for each proposed fixture type.
- 5 When on-site collected graywater or rainwater is used for sewage conveyance, the total estimated annual graywater quantity may be subtracted from the total annual design case water usage. Estimated graywater quantity may not be greater than the total usage of fixtures that utilize it. For example, if graywater will be used only in flush toilets, the estimated graywater quantity cannot be greater than the total annual water used by the toilets. Estimate graywater usage for each fixture type and enter the value in the appropriate cell.
- 6 The remaining values will generate automatically. Water usage savings and cost savings may be reported as indicated in the Water Savings section of the Simulation Guidelines.

Average Price per Gallon of Water	
No. of Occupants	0
Dishwasher Savings (Gal/yr)	0
Clothes Washers Savings (Gal/yr)	0

Baseline Fixture		Baseline Flow Rates (GPF/GPM)	Baseline Usage (Gallons/year)
Toilets	<Enter "0" below if no urinals>	1.6	0
Urinals		1.0	0
Showerheads		2.5	0
Bathroom Faucets		2.5	0
Kitchen Faucets		2.5	0
Total			0

Proposed Fixture	Proposed Fixture Flow Rate (GPM/GPF)	Graywater Usage (Gallons/year)	Proposed Usage (Gallons/year)
Toilets			0
Urinals			0
Showerheads (@80 psi)			0
Bathroom Faucets (@80 psi)			0
Kitchen Faucets (@80 psi)			0
Total			0

Savings by Fixture Type	Water Usage Savings (Gallons/year)	Cost Savings (\$/year)
Toilets	0	\$0.00
Urinals	0	\$0.00
Showerheads	0	\$0.00
Bathroom Faucets	0	\$0.00
Kitchen Faucets	0	\$0.00
Total	0	\$0.00

Instructions:

- 1 First fill in the Basic Info and Water Savings tabs.
- 2 Fill in cells highlighted with this color.
- 3 Data to be entered into software.

	Proposed	Baseline
Avg Faucet gpm (@ 80 psi)	#DIV/0!	2.5
Showerhead gpm (@ 80 psi)	0.0	2.5
Total Gal/day (occupant only)	#DIV/0!	0
Total Gal/day (w/both DW & CW)	#DIV/0!	-
GPM w/DOE APT DHW schedule	#DIV/0!	-

Schedule	DOE APT DHW	Proposed	Baseline
0.05	0	#DIV/0!	-
0.05	1	#DIV/0!	-
0.05	2	#DIV/0!	-
0.05	3	#DIV/0!	-
0.05	4	#DIV/0!	-
0.05	5	#DIV/0!	-
0.3	6	#DIV/0!	-
0.5	7	#DIV/0!	-
0.4	8	#DIV/0!	-
0.3	9	#DIV/0!	-
0.3	10	#DIV/0!	-
0.35	11	#DIV/0!	-
0.4	12	#DIV/0!	-
0.35	13	#DIV/0!	-
0.35	14	#DIV/0!	-
0.3	15	#DIV/0!	-
0.3	16	#DIV/0!	-
0.5	17	#DIV/0!	-
0.5	18	#DIV/0!	-
0.4	19	#DIV/0!	-
0.35	20	#DIV/0!	-
0.45	21	#DIV/0!	-
0.3	22	#DIV/0!	-
0.05	23	#DIV/0!	-
6.7		#DIV/0!	-

Occupancy Low/medium/high usage (see Simulation Guidelines, 3.9.2)
44 gallons per person per day

Kitchen Faucet 0.0 GPM
 Bath Faucet 0.0 GPM
 Baseline DW 0 GAL/YR PER APT = 0 gallons/day-apt (1 dishwasher)
 Proposed DW 1290 GAL/YR PER APT = 4 gallons/day-apt (1 dishwasher)
 Baseline CW - hot water gallons/yr = - Total hot water gallons/day (all clothes washers)
 Proposed CW - hot water gallons/yr = - Total hot water gallons/day (all clothes washers)

Do apartments have dishwashers? (Y/N)
 Are they Energy Star rated? (Y/N/N/A)
 # of bedrooms
 # of apartments
 # kitchen faucets # kitchens
 # lav faucets # lavatories (that require exhaust)

of dishwashers
 # of clothes washers
 Are they Energy Star rated? (Y/N/N/A)
 washer and dryer

Central DHW
 DHW Storage Volume (gallons) 1.25 radius
 0.0 DHW Storage Volume (cubic feet) 0.0 height
 12.5 R-value
 9.8 Surface Area % EFF HIR/EIR
 0.8 UA for eQuest #DIV/0!

In-Unit Water Heater
 Volume Fuel EF HIR/EIR
 Baseline #VALUE!
 Proposed 0 0 #DIV/0!

Instructions:

- 1 First, fill out Basic Info and DHW Demand tabs.
- 2 Fill in cells highlighted with this color.
- 3 Data to be entered in eQUEST as Equipment or Internal Energy Sources.

	Proposed
Refrigerator, kWh/yr-unit	423
Refrigerator, kWh/yr-bldg	0
Refrigerator, W/SqFt	#DIV/0!
Electric Stove, kWh/yr-unit	0
Electric Stove, kWh/yr-bldg	0
Stove, W/SqFt	#DIV/0!
Dishwasher, kWh/yr-unit	0
Dishwasher, kWh/yr-bldg	0
Dishwasher, W/SqFt	#DIV/0!
In-Unit Clothes Washer, kWh/yr	0
In-Unit Clothes Washer, kWh/yr-bldg	0
In-Unit Washer, W/SqFt	#DIV/0!
In-Unit Dryer, kWh/yr-bldg	#DIV/0!
In-Unit Dryer, W/SqFt	#DIV/0!
Common Washer, kWh/yr-machine	0
Common Washer, kWh/yr-bldg	0
Common Washer, W/SqFt	#DIV/0!
Common Dryer, kWh/yr-bldg	#DIV/0!
Common Dryer, W/SqFt	#DIV/0!
In-Unit Dryer, BTU/h (PER dryer)	-
In-unit, misc. kWh/yr-SqFt (SG 2-11)	1.05
In-unit misc W/SqFt	0.50
Corridor, restrooms & Stairs W/SqFt	0.2
Elevator W/SqFt	#DIV/0!
Office W/SqFt	1.5
Other Public and Common Area W/SqFt	0.5
Hour	Common area plug load schedule, SG 2.11 (Same as T24 EQP WD)
1	0.1
2	0.1
3	0.1
4	0.1
5	0.1
6	0.3
7	0.45
8	0.45
9	0.45

10	0.45
11	0.3
12	0.3
13	0.3
14	0.3
15	0.3
16	0.3
17	0.3
18	0.3
19	0.6
20	0.8
21	0.9
22	0.8
23	0.6
24	0.3
Total	9

Baseline	Equipment # (optional)	Sensible	Latent
		Heat Ratio	Heat Ratio
529			
0			
#DIV/0!	Apt Equipment [#]	1.0	0.0
0			
0			
#DIV/0!	Apt Equipment [#]	0.0	0.0
0			
0			
#DIV/0!	Apt Equipment [#]	0.60	0.15
0			
0			
#DIV/0!	Apt Equipment [#]	0.8	0.0
#DIV/0!			
#DIV/0!	Apt Equipment [#]	0.15	0.05
0			
0			
#DIV/0!	NA	NA	NA
#DIV/0!			
#DIV/0!	NA	0.15	0.05
-	NA	NA	NA
1.05			
0.50	Apt Equipment 1	0.9	0.1
0.2	Corr & Stairs Equipment 1	1.0	0.0
#VALUE!	Elevator Equipment 1	0.1	0.0
1.5	Office Equipment 1	1.0	0.0
0.5	Common Area Equipment 1		
Apartment Plug load schedule (Same as T24 DAY EQP WD)			
0.05			
0.05			
0.05			
0.05			
0.05			
0.05			
0.05			
0.05			
0.05			
0.5			

Schedule	
T24 DAY EQP WD	
	1 Stove
	Stove Type
	0.0 Therms
T24 DAY EQP WD	
	0 # of dishwashers
T24 DAY EQP WD	
	1 F-factor
T24 DAY EQP WD	0 # of washers
	# of dryers
	1 Dryer
T24 DAY EQP WD	DRYER
	0.0 Therms
	#DIV/0! Average # bedrooms in living units
	sum of area of all common laundry rooms
T24 EQP WD	
T24 EQP WD	
T24 DAY EQP WD	
T24 DAY EQP WD	Number of Stories: 0
T24 EQP WD	Area of Elevator:
T24 EQP WD	Elevator Type:
T24 EQP WD	SG, Section 3.11
	Baseline kWh/yr for elevator
	Proposed kWh/yr (same as Baseline if not requesting perform

ance credit)

Instructions:

- 1 Use this worksheet to generate schedules for lighting inputs.
- 2 Enter hours/day in the cell highlighted in this color to generate a 24 hour schedule in column
- 3 Do not edit cells highlighted in this color.
- 4 Do not edit cells highlighted in this color. These calculated values are for editing or creating
- 5 Elevator lighting should only be assigned to ONE elevator zone.
- 6 In eQUEST, exit Signs can be added as Lighting #2 (kW) in the appropriate zones.
- 7 Credit for occupancy sensors can be applied to corridors and stairs by reducing proposed V

Daily operating hours	hr/day
Apartments and Balconies	2.34
Garage, Corridors, Lobbies & Stairs	24
Exterior Lighting	12
Non Apartment, Non 24 hour	

Hr	APT LTG WD		Adjusted Fraction Apartments
	Fraction		
1	0.05		0.015
2	0.05		0.015
3	0.05		0.015
4	0.05		0.015
5	0.05		0.015
6	0.05		0.015
7	0.25		0.077
8	0.45		0.139
9	0.45		0.139
10	0.35		0.108
11	0.35		0.108
12	0.35		0.108
13	0.25		0.077
14	0.25		0.077
15	0.25		0.077
16	0.25		0.077
17	0.25		0.077
18	0.35		0.108
19	0.7		0.217
20	0.7		0.217
21	0.7		0.217
22	0.7		0.217
23	0.6		0.186
24	0.05		0.015
Total	7.55		2.34
Apartment Adjustment	0.3099337748344		
Non Apartment, Non 24 hour			0

				0	0		0.0
				0	0		0.0

Summary	
Total in-unit area with specified lighting, SqFt	0.0
Total specified lighting, W	0.0
Specified lighting power density, W/SqFt	NA
Proposed lighting power density, W/SqFt	#DIV/0!
Baseline lighting power density, W/SqFt	1.10

0.0	0.0
0.0	0.0

Instructions:

- 1 Enter data in the cells highlighted with this color.
- 2 Use values from the cells highlighted in this color in the energy simulations.
- 3 In eQUEST, exterior lighting should be entered in the "Utility & Economics" section, un
- 4 For proposed design simulation, enter exterior lighting specified on drawings.
- 5 Apartment balcony lighting should be treated as façade lighting, and modeled using the **Exterior Lighting Allowances (Per Table 9.4.5 of ASHRAE 90.1-2007)**

<i>Area Type</i>	<i>Lighting Power Density</i>	<i>Area</i>	<i>Baseline Lighting Allowance</i>	<i>Proposed Lighting Allowance</i>
	<i>W/SqFt</i>	<i>SqFt</i>	<i>W</i>	<i>W</i>
Uncovered parking lots and drives	0.15		0	
Walkways 10ft wide or greater	0.20		0	
Exterior stairways	1.00		0	
Canopies and overhangs	1.25		0	
Building Facades (1)	0.20		0	

<i>Area Type</i>	<i>Lighting Power Density,</i>	<i>Linear feet</i>	<i>Baseline Lighting Allowance</i>	<i>Proposed Lighting Allowance</i>
	<i>W/linear foot</i>	<i>Ft</i>	<i>W</i>	<i>W</i>
Walkways less than 10 ft wide	1.00		0	
Main building entrance (2)	30.00		0	
Other exterior doors (2)	20.00		0	
Building Facades (3)	5.00		0	

Total Exterior Building Allowance to be entered in Energy Models (4)

	Baseline	Proposed	
<i>Tradable</i>	0	0	Watts
<i>Non-Tradable</i>	0	0	Watts
	0	0	Watts

Notes:

- (1) Enter area of all illuminated walls or surfaces in the Area column
- (2) Enter total linear foot of door width for main entrance doors
- (3) Enter total linear foot of all illuminated wall or surface length
- (4) Total values include additional 5% allowance per Section 9.4.5

der Electric Meter as a Direct Exterior Load, with Ambient Lighting enduse and a 12 hr/day schedule.

e 2.34 hr/day schedule for in-unit lighting.

Proposed Fixture Description

If Proposed façade lighting exceeds Baseli
If Proposed façade lighting is less than Ba:

Proposed Fixture Description

ine allowance, model proposed as designed.
seline allowance, model baseline the same as proposed.

Instructions:

- 1 In the simulation software, rather than model Outside Air and Exhaust for Apartments separately, you may combine and model as "Infiltration".
- 2 You may model Exhaust for refuse rooms and laundry rooms as equivalent "Infiltration" as well.
- 3 Fill in cells highlighted with this color.
- 4 Data to be entered into simulation software.
- 5 Corridor Supply Air can be modeled as Outside Air in software.
- 6 Supply Ventilation for Apartments should be mechanical supply or trickle vents, but not corridor make-up air.
- 7 ACH or CFM/SF can be used for data entry.
- 8 In eQUEST, electricity for exhaust fans should be modeled as Direct-Interior or Exterior Loads in Electric Meter, with Ventilation Fans entered as a load.
- 9 Red cells will indicate when continuous baseline ventilation is not properly modeled.

	Baseline	Proposed	Baseline
Space Type	Apartments		Refuse
Total Area For Space Type, SqFt	0		
Ceiling Height, Ft			
Total Volume For Space Type, CuFt	0		
Exhaust Ventilation, CFM (Design/tested flows at grilles)			
Ventilation Duct Leakage (Baseline add 10 CFM/floor per shaft)			
Exhaust Runtime, hr/day			
Assumed Infiltration Rate, ACH	0.1	0.1	0.1
Equivalent Continuous Exhaust, ACH	#DIV/0!	#DIV/0!	#DIV/0!
Supply Ventilation, CFM			
Supply Runtime, hr/day			
Equivalent Continuous Supply, ACH	#DIV/0!	#DIV/0!	#DIV/0!
Minimum Outdoor Air Requirements, ACH	0.35	0.35	
Average Combined Hourly Infiltration/Ventilation Rate, ACH	#DIV/0!	#DIV/0!	#DIV/0!
Average Combined Hourly Infiltration/Ventilation Rate, CFM/SF	#DIV/0!	#DIV/0!	#DIV/0!
Exhaust Fan Data			
Exhaust Fan Type		0	
CFM/W	#N/A		#N/A
Pfan (Watts)	#N/A	#DIV/0!	#N/A
HP	Do not Enter data	Do not Enter data	Do not Enter data
Pfan (Watts)	NA	NA	NA
BHP	Do not Enter data	Do not Enter data	Do not Enter data
Motor Efficiency	Do not Enter data	Do not Enter data	Do not Enter data
Pfan (Watts)	NA	NA	NA

Local Exhaust (62.2-2007): Kitchen Bathroom 0
 MAXIMUM CONTINUOUS LOCAL BASELINE EXHAUST: 0 30

MAXIMUM INTERMITTENT LOCAL BASELINE EXHAUST:	150	75	
	Kitchen	Bathroom	0
MINIMUM CONTINUOUS LOCAL BASELINE EXHAUST:	0	20	
MINIMUM INTERMITTENT LOCAL BASELINE EXHAUST:	100	50	

BASELINE LOCAL EXHAUST VENTILATION:	<input type="text"/>	<input type="text"/>
PROPOSED LOCAL EXHAUST VENTILATION:	<input type="text"/>	<input type="text"/>
INTERMITTENT OR CONTINUOUS?:	<input type="text"/>	<input type="text"/>
	Insufficient Ventilation Insufficient Ventilation	
Kitchen Area:	<input type="text"/>	
Kitchen Ceiling height:	<input type="text"/>	
Continuous CFM equivalent to 5ACH (62.2-2007):	0	

Whole Unit Ventilation Rate (62.2-2007):	Studios	1BR	2BR
Average Area (SqFt):	<input type="text"/>	<input type="text"/>	<input type="text"/>
Minimum CFM required:	15	15	23
Maximum CFM allowed in Baseline:	0	0	0
Proposed CFM:	<input type="text"/>	<input type="text"/>	<input type="text"/>
	Insufficient Ventilation Insufficient Ventilation Insufficient Ventilation		

	CFM	minutes/hour	hours/day
Convert Intermittent Ventilation to equivalent Continuous:	<input type="text"/>	<input type="text"/>	<input type="text"/>

	Quantity of Fans	CFM	minutes/hour
Combine Different Ventilation to equivalent Continuous:	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>
	<input type="text"/>	<input type="text"/>	<input type="text"/>

ation".

iduse.

Proposed	Baseline	Proposed	Baseline	Proposed
Room	Laundry Room			
	0		0	
0.1	0.1	0.1		
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!		
0		0		
	#N/A			
#DIV/0!	#N/A	#DIV/0!		
Do not Enter data	Do not Enter data	Do not Enter data		
NA	NA	NA		
Do not Enter data	Do not Enter data	Do not Enter data		
Do not Enter data	Do not Enter data	Do not Enter data		
NA	NA	NA		

CFM is the maximum allowed in the baseline if both fans run continuously or both fans run intermittently.

CFM is the minimum allowed in the baseline if both fans run continuously or both fans run intermittently.

3BR	4BR	
30	38	<< These values are updated once you have entered your average area.
0	0	<< These values are determined once you have entered your proposed CFM.
Insufficient Ventilation	Insufficient Ventilation	

0 CFM is the equivalent continuous ventilation rate.

hours/day	
	0
	0
	0
	0
	0

0 CFM is the equivalent continuous ventilation rate for all fans combined.

Instructions:

- 1 For gas heated buildings using System 1 - PTAC, use the top chart to calculate cooling-EIR
- 2 For electric heated buildings using System 2 - PTHP, use the bottom chart to calculate cooling-EIR
- 3 Baseline PTAC fan energy should be simulated as 0.3 W/CFM
- 4 Fill in cells highlighted with this color.
- 5 Data to be entered in simulation software.

	Baseline Design		Apartment Systems	Common Space System1
	Common Space Systems	Apartment Systems		
System Type	PTAC	PTAC		
EER	11.009	11.009		
Net Cooling Capacity, Btu/Hr				
Fan BHP	NA	NA		
Fan Motor Efficiency	NA	NA		
CFM	NA	NA		
Fan kW/CFM	0.0003	0.0003	-	-
EIR or 1/COP	0.258	0.258	#DIV/0!	#DIV/0!

	Baseline Design		Apartment Systems	Common Space System1
	Common Space Systems	Apartment Systems		
System Type	PTHP	PTHP		
Cooling EER	10.809	10.809		
Net Cooling Capacity, Btu/Hr				
Fan BHP	NA	NA		
Fan Motor Efficiency	NA	NA		
CFM	NA	NA		
Fan kW/CFM	0.0003	0.0003	-	-
EIR or 1/COP (COOLING)	0.263	0.263	#DIV/0!	#DIV/0!
Net Heating Capacity, Btu/Hr				
COP (HEATING)	3.018	3.018		
EIR or 1/COP (HEATING)	0.331	0.331	#DIV/0!	#DIV/0!

Proposed Design

Common Space System2	Common Space System3	Common Space System4	Common Space System5	Common Space System6
-	-	-	-	-
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Proposed Design

Common Space System2	Common Space System3	Common Space System4	Common Space System5	Common Space System6
-	-	-	-	-
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Instructions:

- 1 Open Parms.csv file that corresponds to baseline and proposed eQUEST models.
- 2 Copy runs corresponding to four orientation exposures from baseline Parms.csv to row 13-16 below. If not rotated, copy into r
- 3 Copy run that corresponds to proposed design from proposed Parms.csv to row 19 below
- 4 These values will used to calculate the performance rating in the Simulation Summary worksheet
- 5 **If building uses more than one fossil fuel or uses oil instead of gas for heating, adjustments are needed.**

Step1: Baseline Design (copy runs corresponding to four exposures from <project name>-Parms.csv to row 13-16 below)

Run Type	Internal Loads	Case #s	Short Name	Carry Fwd	Incremental First Cost (\$)	Incremental Annual Maint. (\$)	Date & Time of Run	File Name
Average of 4 exposures (needed in Simulation Summary)								
Step2: Proposed Design (copy run that corresponds to proposed design from <project name>-Parms.csv to row 19 below)								

Step3: Energy Savings By Measure (copy runs that correspond to EACH parametric run from <project name>-Parms.csv to r

Run Type	Internal Loads	Case #s	Short Name	Carry Fwd	Incremental First Cost (\$)	Incremental Annual Maint. (\$)	Date & Time of Run	File Name
----------	----------------	---------	------------	-----------	-----------------------------	--------------------------------	--------------------	-----------

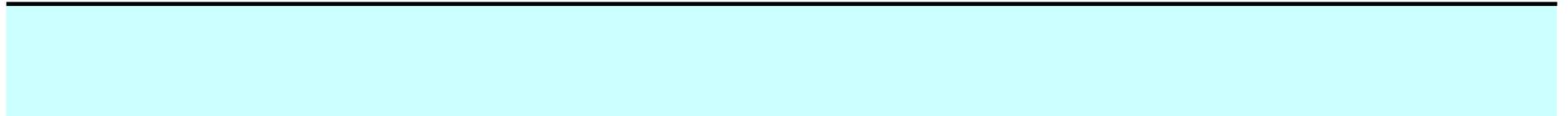
(these rows can be manually entered for calculations done outside of eQuest such as Solar Hot Water, Solar PV, etc)

Annual Other	Annual Other	Annual Appliance	Annual Heating	Annual Hot Water	Annual Other		Annual Lighting	Annual Lighting
PS-E Pumps & Aux kWh	PS-E Ventilation Fans kWh	PS-E Refrig Display kWh	PS-E Heat Pump Supplement kWh	PS-E Domestic Hot Water kWh	PS-E Exterior Usage kWh	PS-E Total kWh	Fuel Usage: PS-E Ambient Lights Therms	PS-E Task Lights Therms
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Pumps & Aux kWh	Ventilation Fans kWh	Refrig Display kWh	Heat Pump Supplement kWh	Domestic Hot Water kWh	Exterior Usage kWh	Total kWh	Ambient Lights Therms	Task Lights Therms
-----------------------	----------------------------	--------------------------	--------------------------------	------------------------------	--------------------------	--------------	-----------------------------	--------------------------

Annual Appliance	Annual Heating	Annual Cooling	Annual Cooling	Annual Other	Annual Other	Annual Appliance	Annual Heating	Annual Hot Water
------------------	----------------	----------------	----------------	--------------	--------------	------------------	----------------	------------------

PS-E Misc Equip Therms	PS-E Space Heating Therms	PS-E Space Cooling Therms	PS-E Heat Reject Therms	PS-E Pumps & Aux Therms	PS-E Ventilation Fans Therms	PS-E Refrig Display Therms	PS-E Heat Pump Supplement Therms	PS-E Domestic Hot Water Therms
---------------------------------	------------------------------------	------------------------------------	----------------------------------	----------------------------------	---------------------------------------	-------------------------------------	-------------------------------------------	-----------------------------------------



#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
---------	---------	---------	---------	---------	---------	---------	---------	---------



Misc Equip Therms	Space Heating Therms	Space Cooling Therms	Heat Reject Therms	Pumps & Aux Therms	Ventilation Fans Therms	Refrig Display Therms	Heat Pump Supplement Therms	Domestic Hot Water Therms
-------------------------	----------------------------	----------------------------	--------------------------	--------------------------	-------------------------------	-----------------------------	-----------------------------------	---------------------------------



Annual Other

		Source Energy:		TDV Energy:		Annual Utility Costs:			
PS-E	PS-E	BEPS	BEPS	TDV1	TDV1	ES-E	ES-E	ES-E	ES-E
Exterior		Bldg	Bldg	Bldg	Bldg	Total	Total	Electric	Electric
Usage	Total	Energy	EUI	Energy	EUI	Electric	Fuel	kWh	kW
Therms	Therms	MBtu	kBtu/sf/yr	TDV-MBtu	TDV-kBtu/yr	\$	\$	\$	\$
#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Exterior		Bldg	Bldg	Bldg	Bldg	Total	Total	Electric	Electric
Usage	Total	Energy	EUI	Energy	EUI	Electric	Fuel	kWh	kW
Therms	Therms	MBtu	kBtu/sf/yr	TDV-MBtu	TDV-kBtu/yr	\$	\$	\$	\$

Instructions:

- 1 First fill in the Basic Info worksheet and copy results into Result Summary eQUEST worksheet.
- 2 Fill in cells highlighted with this color.
- 3 If oil is used rather than natural gas, modifications to table are needed.
- 4 Baseline and Proposed design fuel usage is copied from the corresponding rows in Result Summary eQUEST worksheet.
- 5 Performance rating is shown in **Red Font**
- 6 Energy cost savings associated with on-site power generation, including cogeneration, photovoltaics, and wind turbines, may not be used to n

Building Area Summary (conditioned spaces only)

Space Type	Area, SqFt	Notes
Residential	0	Include total floor area of all residential units in building
Common Area	0	Include combined floor area of residential-associated spaces (corridors, recreation areas, lobbies, etc.)
Commercial Area	0	Include combined floor area of nonresidential spaces (commercial, office, retail, food sales, etc.)
Garage	0	Include floor area of enclosed/underground garages
Total Conditioned	0	

Fuel Cost

Electricity		\$/kWh
Natural Gas		\$/Therm
Fuel Oil		\$/Gallon

Performance Rating Calculation

	Baseline			Proposed		
	Fossil Fuel, Btu	Electricity, Btu	Cost, \$	Fossil Fuel, Btu	Electricity, Btu	Cost, \$
Annual Heating	#DIV/0!	#DIV/0!	#DIV/0!	0	0	\$0.00
Annual Cooling	#DIV/0!	#DIV/0!	#DIV/0!	0	0	\$0.00
Annual Lighting	#DIV/0!	#DIV/0!	#DIV/0!	0	0	\$0.00
Annual Hot Water	#DIV/0!	#DIV/0!	#DIV/0!	0	0	\$0.00
Annual Appliance	#DIV/0!	#DIV/0!	#DIV/0!	0	0	\$0.00
Annual Other	#DIV/0!	#DIV/0!	#DIV/0!	0	0	\$0.00
<i>Total without Renewable</i>	#DIV/0!	#DIV/0!	#DIV/0!	-	-	\$0.00
Annual Renewable	0	0	\$0.00			\$0.00
<i>Total with Renewable</i>	#DIV/0!	#DIV/0!	#DIV/0!	-	-	\$0.00

#DIV/0!
#DIV/0!

Utility Bill Comparison

	Baseline			Proposed		
	Fossil Fuel, therms	Electricity, kWh	Cost, \$	Fossil Fuel, therms	Electricity, kWh	Cost, \$
Annual Heating	#DIV/0!	#DIV/0!	#DIV/0!	0	0	\$0.00
Annual Cooling	#DIV/0!	#DIV/0!	#DIV/0!	0	0	\$0.00
Annual Lighting	#DIV/0!	#DIV/0!	#DIV/0!	0	0	\$0.00
Annual Hot Water	#DIV/0!	#DIV/0!	#DIV/0!	0	0	\$0.00
Annual Appliance	#DIV/0!	#DIV/0!	#DIV/0!	0	0	\$0.00
Annual Other	#DIV/0!	#DIV/0!	#DIV/0!	0	0	\$0.00
<i>Total with Renewable</i>	#DIV/0!	#DIV/0!	#DIV/0!	0	0	\$0.00

Energy Usage per Square Foot of Conditioned Area

	Baseline	Proposed
	Btu/SqFt	Btu/SqFt
Annual Heating	0	0
Annual Cooling	0	0
Annual Lighting	0	0
Annual Hot Water	0	0
Annual Appliance	0	0
Annual Other	0	0
<i>Total without Renewable</i>	0	0

meet the Performance Target of 15%, but can be listed in Row 31.

obbies, etc.)
etc.)

Site BTU Savings, %	\$ Savings, %
#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!
#DIV/0!	#DIV/0!
0.00%	0.00%
#DIV/0!	#DIV/0!

average monthly gas costs per apartment
average monthly electricity costs per apartment

