



LEED 2009 for Schools New Construction and Major Renovations

EA PREREQUISITE 2: MINIMUM ENERGY PERFORMANCE

All fields and uploads are required unless otherwise noted.

ALL OPTIONS

This active sample form has been modified for offline access. Modified fields and instructions are indicated in purple. Sample forms are for reference only.

TARGET FINDER

The following fields are required, but the values have no bearing on EA Prerequisite 2 compliance. Use the Target Energy Performance Results calculator on the [ENERGY STAR website](#) to generate the values. If using prescriptive compliance paths (Options 2 or 3), leave the Design energy consumption and cost values blank in the Target Finder website, and set the Design values equal to the Target values in this form.

	Design		Target	
Energy performance rating (1-100):	<input type="text" value="0"/>		<input type="text" value="0"/>	
CO ₂ -eq emissions:	<input type="text" value="89.3"/>	metric tons/year	<input type="text" value="103.1"/>	metric tons/year
CO ₂ -eq emissions reduction:	<input type="text" value="22"/>	%	<input type="text" value="10"/>	%

Upload EA p2-1. Provide the Target Finder Energy Performance Results (a screen capture or other documentation containing the same information) for the project building. (Optional)

Files:

- ☐ The building is not able to get a Target Finder score because the tool does not support the primary building type of the project building and/or the project is not located in the United States. (Optional)

PREREQUISITE COMPLIANCE

Total gross square footage: sf

The content highlighted in yellow above is linked to Pif1, Plf3, Eap1, EAc1, EAc2, EAc6, MRc1.1 & MRc1.2.

Select a compliance path:

- ☒ **Option 1. Whole Building Energy Simulation.** The project team will document improvement in the proposed building performance rating for ANSI/ASHRAE/IESNA Standard 90.1-2007 or California Title 24-2005 Part 6. Non-US projects may use a USGBC approved equivalent standard.
Note: Refer to "Credit Resources" for a list of USGBC approved equivalent standards.
- ☐ **Option 2. Prescriptive Compliance Path: ASHRAE Advanced Energy Design Guide.** The project team will document compliance with the ASHRAE Advanced Energy Design Guide.
- ☐ **Option 3. Prescriptive Compliance Path: Advanced Buildings Core Performance Guide.** The project team will document compliance with the Advanced Buildings™ Core Performance™ Guide.

The content highlighted in yellow above is linked to EAc1, EAc2 & EAc6.

OPTION 1. WHOLE BUILDING ENERGY SIMULATION

Complete the following sections:

Section 1.1A - General Information
Section 1.1B - Mandatory Requirements
Section 1.2 - Space Summary
Section 1.3 - Advisory Messages
Section 1.4 - Comparison of Proposed Design Versus Baseline Design Energy Model Inputs
Section 1.5 - Energy Type Summary
Section 1.6 - Performance Rating Method Compliance Report
Section 1.7 - Exceptional Calculation Measure Summary
Section 1.8 - On-Site Renewable Energy
Section 1.9A - Total Building Performance Summary
Section 1.9B - Reports & Metrics

SECTION 1.1A - GENERAL INFORMATION

- ☒ **Compliant energy simulation software:** The energy simulation software used for this project has all capabilities described in EITHER section "G2 Simulation General Requirements" in Appendix G of ASHRAE 90.1-2007 OR the analogous section of the alternative qualifying energy code used.
- ☐ **Compliant energy modeling methodology:** Energy simulation runs for both the baseline and proposed building use the assumptions and modeling methodology described in EITHER ASHRAE 90.1-2007 Appendix G OR the analogous section of the alternative qualifying energy code used.

Simulation program:

eQuest

Principal heating source:

Fossil Fuel

Energy code used:

ASHRAE 90.1 2010

List the ASHRAE addenda used in the modeling assumptions, if any. (Optional)

Zip/Postal Code:

97503

The content highlighted in yellow above is linked to SSc1 & SSc2.

Weather file:

Medford OR

Climate zone:

4C

List the climatic data from ASHRAE Standard 90.1-2007 Table D-1. Specify if another source is referenced for HDD & CDD data.

Heating Degree Days:

Cooling Degree Days:

HDD and CDD data source, if other than ASHRAE: (Optional)

New construction gross square footage:

14,980

Existing, renovated gross square footage:

Existing, unrenovated gross square footage:

Total gross square footage:

14,980

New construction percent:

100

%

Existing renovation percent:

0

%

Existing unrenovated percent:

0

%

The content highlighted in yellow above is linked to Plf2 & MRc2.

Gross square footage used in the energy model, if different than gross square footage above: (Optional)

SECTION 1.1B - MANDATORY REQUIREMENTS

- ☒ For all elements included in the Architect's scope of work for the project building, the project building design complies with all ASHRAE Standard 90.1-2007 mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) or USGBC approved equivalent standard mandatory provisions, and the information provided regarding the proposed case energy model in Section 1.4 is consistent with the building design.
- ☒ For all elements included in the Mechanical Engineer's scope of work for the project building, the project building design complies with all ASHRAE Standard 90.1-2007 mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) or USGBC approved equivalent standard mandatory provisions, and the information provided regarding the proposed case energy model in Section 1.4 is consistent with the building design.
- ☒ For all elements included in the Electrical Engineer's scope of work for the project building, the project building design complies with all ASHRAE Standard 90.1-2007 mandatory provisions (Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4) or USGBC approved equivalent standard mandatory provisions, and the information provided regarding the proposed case energy model in Section 1.4 is consistent with the building design

Provide the following [Interactive Compliance Forms](#):

Upload EAp2-2. Building Envelope Compliance Documentation (Optional)

Upload

Files:

Upload EAp2-3. HVAC Compliance Documentation (Optional)

Upload

Files:

Upload EAp2-4. Lighting Compliance Documentation (Optional)

Upload

Files:

Upload EAp2-5. Service Water Heating Compliance (Optional)

Upload

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SECTION 1.2 - SPACE SUMMARY

Table EAp2-1. Space Usage Type

Space Name / Description	Space Usage Type	Space Area (sf)	Regularly Occupied Area (sf)	Unconditioned Area (sf)	Typical Hours/ Week in Operation		
Corridor	Corridor	2,737	0	0	60	+	-
Storage	Storage	121	0	0	60	+	-
Exam Rooms	Hospital/Exam Rooms	2,677	2,677	0	60	+	-
Utility	Mechanical/Electrical	125	0	0	0	+	-
Office	Office	900	900	0	60	+	-
Break Room	Break Room	715	715	0	60	+	-
Restrooms	Restrooms	145	0	0	0	+	-
Totals		7,420	4,292	0			
Percentage of total (%)			57.84	0			

SECTION 1.3 - ADVISORY MESSAGES

Table EAp2-2. Advisory Messages

Complete the table below based on information from the energy simulation output files.

	Baseline Design (0° Rotation)	Proposed Design
Number of hours heating loads not met ¹	73	0
Number of hours cooling loads not met ¹	135	136
Total	208	136
Difference ² (Proposed minus baseline)		-72
Number of warning messages	0	0
Number of error messages	0	0
Number of defaults overridden	0	0
Unmet load hours compliance	Y	

Notes:

1 Baseline design and proposed design unmet load hours each may not exceed 300

2 Unmet load hours for the proposed design may not exceed the baseline design by more than 50 hours.

SECTION 1.4 - COMPARISON OF PROPOSED DESIGN VERSUS BASELINE DESIGN ENERGY MODEL INPUTS

Download, complete, and upload "EAp2 Section 1.4 table.xls" (found under "Credit Resources") to document the baseline and proposed design energy model inputs for the project. Documentation should be sufficient to justify the energy and cost savings numbers reported in the Performance Rating Table.

Upload EAp2-7. Provide the completed EAp2 Section 1.4 Tables available under "Credit Resources."

Upload

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SECTION 1.5 - ENERGY TYPE SUMMARY

List the energy types used by the project (i.e. electricity, natural gas, purchased chilled water or steam, etc.) and provide the the virtual energy rate from the baseline and proposed design energy model results or from manual calculations. *If revising the values in Table EAp2-3, reselect energy type in all affected rows in Table EAp2-4 and Table EAp2-5 to ensure that the revised values from Table EAp2-3 are propagated and that Table EAp2-4 and Table EAp2-5 calculations are refreshed.*

Table EAp2-3. Energy Type Summary

Energy Type	Utility Company Name	Utility Rate and Description of Rate Structure ¹	Baseline Virtual Rate ² (\$ per unit energy)	Proposed Virtual Rate ² (\$ per unit energy)	Units of Energy	Units of Demand
Electricity	Pacific Power	Rate 28	0.1596	0.1596	kWh	kW
Natural Gas	Avista	Schedule 420	0.9051	0.9051	therms	therms/hr
Steam	District Steam	Provided	0	0	therms	therms/hr

+

-

Notes:

- 1 Per ASHRAE 90.1-2007 G2.4, project teams are allowed to use the state average energy prices published by DOE's EIA for commercial building customers, available on EIA's website (www.eia.gov). If project uses backup energy for on-site renewable energy, please specify the rate of backup source energy.
- 2 Rate is defined as the total annual charge divided by the metered energy from the plant for each resource.

If the proposed and baseline rates vary significantly, describe the building input parameters (e.g. demand reduction measures) leading to the variation in energy rates, and provide detailed information regarding the utility rate structure including all demand and energy charges, and the seasonal and time-of-use structure of the utility tariff. (Required when proposed & baseline Rates vary by more than 10%.)

Upload EA2-8. Provide any documentation to support the proposed/baseline rate variance narrative. (Optional)

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SECTION 1.6 - PERFORMANCE RATING METHOD COMPLIANCE REPORT

Table EA2-4. Baseline Performance - Performance Rating Method Compliance

In the table below, list each energy end use for the project (including all end uses reflected in the baseline and proposed designs). Then check whether the end-use is a process load, select the energy type, and list the energy consumption and peak demand for each end-use for all four baseline design orientations.

End Use	Process	Baseline Design Energy Type	Units of Annual Energy & Peak Demand		Baseline (0° rotation)	Baseline (90° rotation)	Baseline (180° rotation)	Baseline (270° rotation)	Baseline Building Results
Interior Lighting	<input type="checkbox"/>	Electricity	Energy Use	kWh	99,171	99,171	99,171	99,171	99,171
			Demand	kW	26	26	26	26	26
Exterior Lighting	<input type="checkbox"/>	Electricity	Energy Use	kWh	33,870	33,870	33,870	33,870	33,870
			Demand	kW	14	14	14	14	14
Space Heating	<input type="checkbox"/>	Steam	Energy Use	therms	0	0	0	0	0
			Demand	therms/h	0	0	0	0	0
Space Cooling	<input type="checkbox"/>	Electricity	Energy Use	kWh	39,747	39,186	37,001	37,691	38,406.25
			Demand	kW	46	47	44	45	45.5
Pumps	<input type="checkbox"/>	Electricity	Energy Use	kWh	6,995	6,997	6,988	6,987	6,991.75
			Demand	kW	4	4	4	4	4
Heat Rejection	<input type="checkbox"/>		Energy Use						
			Demand						

Fans-Interior	<input type="checkbox"/>	Electricity	Energy Use	kWh	86,448	86,448	86,448	86,448	86,448
			Demand	kW	19	19	19	19	19
Fans - Parking Garage	<input checked="" type="checkbox"/>		Energy Use						
			Demand						
Service Water Heating	<input type="checkbox"/>	Natural Gas	Energy Use	therms	245	245	245	245	245
			Demand	therms/h	0.2	0.2	0.2	0.2	0.2
Receptacle Equipment	<input checked="" type="checkbox"/>	Electricity	Energy Use	kWh	53,341	53,341	53,341	53,341	53,341
			Demand	kW	15	15	15	15	15
Interior Lighting - Process	<input checked="" type="checkbox"/>		Energy Use						
			Demand						
Refrigeration Equipment	<input checked="" type="checkbox"/>		Energy Use						
			Demand						
Cooking	<input checked="" type="checkbox"/>		Energy Use						
			Demand						
Industrial Process	<input checked="" type="checkbox"/>		Energy Use						
			Demand						
Elevators and Escalators	<input checked="" type="checkbox"/>		Energy Use	kWh					
			Demand	kW					
	<input type="checkbox"/>		Energy Use						
			Demand						
Total Energy Use (MMBtu/yr)					1,114.88	1,112.97	1,105.49	1,107.84	1,110.3
Annual Process Energy (MMBtu/yr)					182				
Process Energy Modeling Compliance ¹					N				



Notes:

¹ Determined using Section 1.9 cost calculations after Section 1.9A is complete. Annual process energy costs must be at least 25% of the total energy costs for the proposed design and must be the same in the baseline and proposed cases. To claim process cost savings, use an exceptional calculation in Section 1.7.

The project does not comply with minimum compliance requirements for process energy modeling (determined after Section 1.9A is complete). Explain any exceptions, special circumstances or modeling difficulties that occurred relating to the process energy noncompliance.

Upload EA_p2-9. Provide any documentation to support the process energy noncompliance narrative. (Optional)

Upload

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Table EAp2-5. Performance Rating - Performance Rating Method Compliance

Complete the table below. List the proposed design energy consumption and peak demand for each end use.

End Use	Process	Baseline			Proposed			% Savings
		Units of Annual Energy & Peak Demand		Building Results	Design Energy Type	Units of Annual Energy & Peak Demand		Building Results
Interior Lighting		Energy Use	kWh	99171	Electricity	Energy Use	kWh	65,189
		Demand	kW	26		Demand	kW	17
Exterior Lighting		Energy Use	kWh	33870	Electricity	Energy Use	kWh	33,870
		Demand	kW	14		Demand	kW	14
Space Heating		Energy Use	therms	0	Steam	Energy Use	therms	
		Demand	therms/hr	0		Demand	therms/hr	
Space Cooling		Energy Use	kWh	38406.25	Electricity	Energy Use	kWh	41,743
		Demand	kW	45.5		Demand	kW	42
Pumps		Energy Use	kWh	6991.75	Electricity	Energy Use	kWh	10,366
		Demand	kW	4		Demand	kW	4
Heat Rejection		Energy Use			Electricity	Energy Use	kWh	2,216
		Demand				Demand	kW	11
Fans-Interior		Energy Use	kWh	86448	Electricity	Energy Use	kWh	38,896
		Demand	kW	19		Demand	kW	18
Fans - Parking Garage	X	Energy Use				Energy Use		
		Demand				Demand		
Service Water Heating		Energy Use	therms	245	Natural Gas	Energy Use	therms	244
		Demand	therms/hr	0.2		Demand	therms/hr	0.2
Receptacle Equipment	X	Energy Use	kWh	53341	Electricity	Energy Use	kWh	53,341
		Demand	kW	15		Demand	kW	15
Interior Lighting - Process	X	Energy Use			Electricity	Energy Use	kWh	
		Demand				Demand	kW	
Refrigeration Equipment	X	Energy Use				Energy Use		
		Demand				Demand		
Cooking	X	Energy Use				Energy Use		
		Demand				Demand		
Industrial Process	X	Energy Use				Energy Use		
		Demand				Demand		
Elevators and Escalators	X	Energy Use	kWh			Energy Use	kWh	
		Demand	kW			Demand	kW	

		Baseline			Proposed					
End Use	Process	Units of Annual Energy & Peak Demand		Building Results	Design Energy Type	Units of Annual Energy & Peak Demand		Building Results	% Savings	
		Energy Use				Energy Use				
		Demand				Demand				
Total Energy Use (MMBtu/yr)				1,110.3				862.46		
Process Energy (MMBtu/yr)				182				182		

Table EAp2-6. Section 1.6 Energy Use Summary

		Baseline		
Energy Type	Units	Process Subtotal	Total Energy Use	Proposed Energy Use
Electricity	kWh	53,341	318,228	245,621
Natural Gas	therms	0	245	244
Steam	therms	0	0	0
Totals	MMBtu	182	1,110.29	862.46

Table EAp2-7. Section 1.6 Energy Cost Summary (Automatic)

		Baseline		
Energy Type	Units	Process Subtotal	Total Energy Cost	Proposed Energy Cost
Electricity	\$	8,513.22	50,789.19	39,201.11
Natural Gas	\$	0	221.75	220.84
Steam	\$	0	0	0
Total	\$	8,513.22	51,010.94	39,421.96

Select one of the following:

- ☒ **Section 1.6 Automatic Cost Calculation:** Total building energy costs will be based on the "virtual" energy rate defined in Section 1.5.
- ☐ **Section 1.6 Manual Cost Input:** The project team will analyze the total building energy costs based on local utility rate structures. Costs will be input separately from the energy model.

Note: Energy cost savings are summarized in Section 1.9A Total Building Performance Summary.

SECTION 1.7 - EXCEPTIONAL CALCULATION MEASURE SUMMARY

Select one of the following:

- ☐ The energy analysis includes exceptional calculation method(s) (ASHRAE 90.1-2007, G2.5).
- ☒ The energy analysis does not include exceptional calculation methods.

SECTION 1.8 - ON-SITE RENEWABLE ENERGY

Select one of the following

- ☐ The project uses on-site renewable energy produced on-site.
- ☒ The project does not use on-site renewable energy.

SECTION 1.9A - TOTAL BUILDING PERFORMANCE SUMMARY

Table EAp2-15. Total Building Energy Use Performance

Energy Type	Units	Baseline		Proposed			Total Energy Use
		Process Subtotal	Section 1.6 Total Energy Use	Section 1.6 Energy Use	Section 1.7 Energy Savings	Section 1.8 Renewable Energy Savings	
Electricity	kWh	53,341	318,228	245,621	0	0	245,621
Natural Gas	therms	0	245	244	0	0	244
Steam	therms	0	0	0	0	0	0
Totals	MMBtu	182	1,110.29	862.46	0	0	862.46
Energy use savings (%)							22.32

Table EAp2-16. Total Building Energy Cost Performance

The values below are automatically calculated using the virtual energy rate from Section 1.5 unless the project team has opted to manually input costs in Section 1.6, 1.7, and/or 1.8. To modify these values and/or to see automatically calculated results for reference see Sections 1.6, 1.7 or 1.8.

Energy Type	Units	Baseline		Proposed			Total Energy Cost
		Process Subtotal	Section 1.6 Total Energy Cost	Section 1.6 Energy Cost	Section 1.7 Energy Savings	Section 1.8 Renewable Energy Savings	
Electricity	\$	8,513.22	50,789.19	39,201.11	0	0	39,201.11
Natural Gas	\$	0	221.75	220.84	0	0	220.84
Steam	\$	0	0	0	0	0	0
Totals	\$	8,513.22	51,010.94	39,421.96	0	0	39,421.96

Baseline process energy costs as percent of total energy costs (%)	16.69
Energy cost savings (%)	22.72
EA Credit 1 points documented	6

The content highlighted in yellow above is linked to EAc1.

SECTION 1.9B - REPORTS AND METRICS

Table EAp2-17. Energy Use Intensity

	Baseline EUI	Proposed EUI
Electricity (kWh/sf)		
Interior Lighting	6.62	4.352
Space Heating	0	0
Space Cooling	2.564	2.787
Fans - Interior	5.771	2.597
Service Water Heating	0	0
Receptacle Equipment	3.561	3.561
Miscellaneous	2.728	3.1
Subtotal	21.244	16.397
Natural Gas (kBtu/sf)		
Space Heating	0	0
Service Water Heating	1.636	1.629
Miscellaneous	0	0
Subtotal	1.636	1.629
Other (kBtu/sf)		
Miscellaneous	0	-0.002
Subtotal	0	-0.002
Total Energy Use Intensity (kBtu/sf)		
Total	74.118	57.574

Table EAp2-18. End Use Energy Percentage

	Baseline Case (%)	Proposed Case (%)	End Use Energy Savings (%)
Interior Lighting	30.47	25.79	46.77
Space Heating	0	0	0
Space Cooling	11.8	16.52	-4.6
Fans - Interior	26.57	15.39	65.46
Service Water Heating	2.21	2.83	0.04
Receptacle Equipment	16.39	21.1	0
Miscellaneous	12.56	18.37	-7.66

Select one of the following:

- ☒ The project used DOE2, eQuest or Visual DOE.
- ☐ The project used EnergyPlus.
- ☐ The project team used EnergyPro.
- ☐ The project team used HAP.
- ☐ The project team used Trace.
- ☐ The project team used other modeling software.

Upload EAp2-11. Provide the input summary and the BEPS, BEPU, and ES-D reports.

Upload

Files:

ADDITIONAL DETAILS

- ☐ Special circumstances preclude documentation of prerequisite compliance with the submittal requirements outlined in this form.
- ☐ The project team is using an alternative compliance approach in lieu of standard submittal paths.

SUMMARY

EA Prerequisite 2: Minimum Energy Performance Compliance Documented:

N

Check Compliance