EA PREREQUISITE 2: MINIMUM ENERGY PERFORMANCE

Project # 1000018852 Institute West

All fields and uploads are required unless otherwise noted.

THRESHOLD ATTEMPTED

Points Attempted: 0

ALL PROJECTS

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):				
CO_2-eq emissions:		metric tons/year		metric tons/year
CO_2-eq emissions reduction:		%		%

Upload EAp2-1. Provide the Target Finder Energy Performance Results for the project building (a screen capture or other documentation containing the same information). (Optional)

Upload *Files: 0*

☒ 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: 48,816 sf

The content highlighted in yellow above is linked to PIf2, PIf3, SSc2, EAp1, EAc1, EAc2, EAc6, MRc1.1 & MRc1.2.

Principal project building activity: Laboratory

The content highlighted in yellow above is linked to PIf3 & EAc1.

Select a compliance path:

- (●) **Option 1. Whole Building Energy Simulation.** The project team will document improvement in the proposed building performance rating as compared to the baseline building performance rating per ASHRAE/IESNA Standard 90.1-2007 or California Title 24-2005 Part 6.
- ( ) **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:	Electricity
Energy code used:	ASHRAE 90.1-2007

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

Zip/Postal Code:	92037

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

Weather file:	CZ07.BIN
Climate zone:	CA CZ7

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:	1,256
Cooling Degree Days:	5,223
HDD and CDD data source, if other than ASHRAE: (Optional)	
New construction gross square footage:	48,816
Existing, renovated gross square footage:	0
Existing, unrenovated gross square footage:	0
Total gross square footage:	48,816
New construction percent:	100 %
Existing renovation percent:	0 %
Existing unrenovated percent:	0 %

The content highlighted in yellow above is linked to PIf2, PIf3, SSc2, EAp1, EAc1, EAc2, EAc6, MRc1.1 & MRc1.2.

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

SECTION 1.1B - MANDATORY REQUIREMENTS

Signatory EAp2-1.

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), and the information provided regarding the proposed case energy model in Section 1.4 is consistent with the building design.

Select one of the following:

(●) **Signature.** Provide a digital signature affirming the signatory statement in gray directly above.

Initial here: LC

Lily Chiu; Architect; April 24, 2012

OR

( ) **Upload EAp2-S1.** Provide a document with the signatory statement, copied directly from the form, signed and dated on letterhead.

Signatory EAp2-2.

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), and the information provided regarding the proposed case energy model in Section 1.4 is consistent with the building design.

Select one of the following:

(●) **Signature.** Provide a digital signature affirming the signatory statement in gray directly above.

Initial here: LC

Larry Chu; MEP Engineer; April 24, 2012

OR

( ) **Upload EAp2-S2.** Provide a document with the signatory statement, copied directly from the form, signed and dated on letterhead.

Signatory EAp2-3.

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), and the information provided regarding the proposed case energy model in Section 1.4 is consistent with the building design.

Select one of the following:

(●) **Signature.** Provide a digital signature affirming the signatory statement in gray directly above.

Initial here: DM

Dave Maino; N/A; April 25, 2012

OR

( ) **Upload EAp2-S3.** Provide a document with the signatory statement, copied directly from the form, signed and dated on letterhead.

Provide the following Interactive Compliance Forms:

Upload EAp2-2. Building Envelope Compliance Documentation (Optional)	Upload	*Files: 1*
Upload EAp2-3. HVAC Compliance Documentation (Optional)	Upload	*Files: 0*
Upload EAp2-4. Lighting Compliance Documentation (Optional)	Upload	*Files: 1*
Upload EAp2-5. Service Water Heating Compliance (Optional)	Upload	*Files: 0*

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 in Operation (per week)		
Offices	Work	12,251	12,251	0	50	+	-
Interaction	Circulation	6,853	6,853	0	50	+	-
Laboratory	Research	10,178	10,178	0	50	+	-
Mech/Elec	Support	6,134	6,134	0	50	+	-
Conference	Meeting	3,474	3,474	0	50	+	-
Lobby	Lobby	1,574	1,574	0	50	+	-
Attic	Unoccupied	2,733	0	2,733	50	+	-
Storage	Active storage	765	765	0	50	+	-
Corridor	Circulation	645	645	0	50	+	-
Total		44,607	41,874	2,733			
Percentage of total (%)			93.87	6.13			

SECTION 1.3 - ADVISORY MESSAGES

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

Table EAp2-2. Advisory Messages

	Baseline Design (0° Rotation)	Proposed Design
Number of hours heating loads not met[1]	0	0
Number of hours cooling loads not met[1]	50	0
Total	50	0
Difference [2] (Proposed minus baseline)		-50
Number of warning messages	3	35
Number of error messages	0	0
Number of defaults overridden	0	0
Unmet load hours compliance	Y	

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 tables below.

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

Upload *Files: 1*

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 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	SDG&E	Commercial A-1	0.086	0.086	kWh	kW
Natural Gas						

+ -

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 and baseline rates vary by more than 10%)

Upload EAp2-8. Provide any documentation to support the proposed/ baseline rate variance narrative. (Optional)

Upload *Files: 0*

SECTION 1.6 - PERFORMANCE RATING METHOD COMPLIANCE REPORT

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.

Table EAp2-4. Baseline Performance - Performance Rating Method Compliance

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		Electricity	Energy Use	kWh	156,886	156,870	156,907	156,857	156,880
			Demand	kW	55.6	55.6	55.5	55.6	55.58
Exterior Lighting		Electricity	Energy Use	kWh	30,969	30,969	30,969	30,969	30,969
			Demand	kW	3.5	3.5	3.5	3.5	3.5
Space Heating		Electricity	Energy Use	kWh	530,328	495,689	488,654	485,409	500,020
			Demand	kW	211.6	212.2	211.8	215.5	212.77
Space Cooling		Electricity	Energy Use	kWh	239,872	255,784	264,402	267,859	256,979.25
			Demand	kW	122.6	140.4	128.9	128.6	130.13
Pumps		Electricity	Energy Use	kWh	139	139	139	139	139
			Demand	kW	0.2	0.2	0.2	0.2	0.2
Heat Rejection			Energy Use						
			Demand						
Fans-Interior		Electricity	Energy Use	kWh	146,413	158,472	162,411	174,677	160,493.25
			Demand	kW	25.3	30.6	30.7	34.4	30.25
Fans - Parking Garage	X		Energy Use						
			Demand						
Service Water Heating		Electricity	Energy Use	kWh	8,714	8,714	8,714	8,714	8,714
			Demand	kW	3.8	3.8	3.8	3.8	3.8
Receptacle Equipment	X	Electricity	Energy Use	kWh	323,693	323,693	323,693	323,693	323,693
			Demand	kW	51.2	51.2	51.2	51.2	51.2
Interior Lighting - Process	X		Energy Use						
			Demand						
Refrigeration Equipment	X		Energy Use						
			Demand						
Cooking	X		Energy Use						
			Demand						
Industrial Process	X		Energy Use						
			Demand						

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Elevators and Escalators	X		Energy Use						
			Demand						
			Energy Use						
			Demand						
BaselineTotal Energy Use (MMBtu/yr)					4,903.09	4,880.29	4,899.25	4,941.66	4,906.07
Baseline Annual Process Energy (MMBtu/yr)						1,104.44			
Process Energy Modeling Compliance [1]						N			

+ -

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. Process energy costs should be modeled to accurately reflect the proposed building.

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

Process energy has been determined using measured data from existing Venter Institute laboratories. The measured data was input as a w/sf for the new lab spaces. However, support energy uses (heating, cooling and ventilation) in the lab spaces for the baseline building are high due to the higher than normal ventilation requirements. This high support energy use has reduced the process energy as percent of the total energy cost.

Conversely, because of the reduced support energy use in the proposed case, process energy is 51% of the proposed building energy cost.

Upload EAp2-9. Provide any documentation to support the process energy noncompliance narrative. (Optional)

Upload *Files: 0*

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

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

End Use	Process	Baseline Building Units		Baseline Building Results	Proposed Design Energy Type	Units of Annual Energy & Peak Demand		Proposed Building Results	% Sav
Interior Lighting		Energy Use	kWh	156880	Electricity	Energy Use	kWh	84,675	46.03
		Demand	kW	55.58		Demand	kW	40.5	
Exterior Lighting		Energy Use	kWh	30969	Electricity	Energy Use	kWh	24,960	19.4
		Demand	kW	3.5		Demand	kW	2.8	
Space Heating		Energy Use	kWh	500020	Electricity	Energy Use	kWh	39,911	92.02
		Demand	kW	212.77		Demand	kW	34.5	
Space Cooling		Energy Use	kWh	256979.25	Electricity	Energy Use	kWh	45,169	82.42
		Demand	kW	130.13		Demand	kW	33.6	
Pumps		Energy Use	kWh	139	Electricity	Energy Use	kWh	14,404	-10262.59
		Demand	kW	0.2		Demand	kW	7.3	

Heat Rejection		Energy Use			Electricity	Energy Use	kWh	12,955	0
		Demand				Demand	kW	4.4	
Fans-Interior		Energy Use	kWh	160493.25	Electricity	Energy Use	kWh	87,650	45.39
		Demand	kW	30.25		Demand	kW	14.1	
Fans - Parking Garage	X	Energy Use				Energy Use			
		Demand				Demand			
Service Water Heating		Energy Use	kWh	8714	Electricity	Energy Use	kWh	4,354	50.03
		Demand	kW	3.8		Demand	kW	4.7	
Receptacle Equipment	X	Energy Use	kWh	323693	Electricity	Energy Use	kWh	323,693	0
		Demand	kW	51.2		Demand	kW	51.2	
Interior Lighting - Process	X	Energy Use				Energy Use			
		Demand				Demand			
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				Energy Use			
		Demand				Demand			
		Energy Use				Energy Use			
		Demand				Demand			
Total Energy Use (MMBtu/yr)				4,906.07				2176.07	
Process Energy (MMBtu/yr				1,104.44				1104.44	

Table EAp2-6. Section 1.6 Energy Use Summary

		Baseline		
Energy Type	Units	Process Subtotal	Total Energy Use	Proposed Energy Use
Electricity	kWh	323,693	1,437,887.5	637,771
Natural Gas		0	0	0
		0	0	0
Totals	MMBtu	1,104.44	4,906.07	2,176.07

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

		Baseline		
Energy Type	Units	Process Subtotal	Total Energy Cost	Proposed Energy Cost
Electricity	$	27,837.6	123,658.33	54,848.31
Natural Gas	$	0	0	0
	$	0	0	0
Total	$	27,837.6	123,658.33	54,848.31

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.

Table L-1. Renewable Energy Source Summary

Renewable Source	Renewable Energy Source Allocation	Renewable System Owner	Backup Energy Type[1]	Rated Capacity	Annual Energy Generated	Units	Annual Energy Cost ($) (Optional[2])
Photovoltaics	On-Site only	Building Owner	Electricity	481.3	845,429	kWh	72,706.89 + -
Energy savings - Electricity					845,429	kWh	72,706.89
Energy savings - Natural gas					0		0
Energy savings -					0		0
Total energy savings					2,884.6	MMBtu	72,706.89

Notes:
1 Per ASHRAE 90.1 G2.4 Exception, baseline performance shall be based on the energy source used as backup energy or on the use of electricity if no backup energy source is specified.
2 Annual energy cost is required to document credit compliance with EA Credit 2, if attempted.

The content highlighted in yellow above is linked to EAc2.

Table EAp2-13 Section 1.8 Energy Cost Savings Summary (Automatic)

Energy Type	Units	Proposed Renewable Energy Savings
Electricity	$	72,706.89
Natural Gas	$	0
	$	0
Total	$	72,706.89

Select one of the following:

- (●) **Automatic Cost Calculation:** Renewable energy cost savings will be based on the "virtual" energy rate defined in Section 1.5.
- ( ) **Manual Cost Input:** The project team will analyze the renewable energy cost for on-site renewable sources based on local utility rate structures. Costs will be input separately from the energy model.
- ( ) **Energy Model Includes Renewables:** On-site renewable energy is modeled directly in the energy model. Renewable Energy Cost is already credited in the proposed design energy model results (i.e. the energy model already reflects zero cost for on-site renewable energy, and this form will NOT subtract the Renewable Energy Cost a second time.

Note: The same method must be used for all the measures in this section. Energy cost savings are summarized in Section 1.9A Total Building Performance Summary. Calculated cost savings will be automatically subtracted from the proposed design energy model results when determining the Proposed Building Performance Rating UNLESS "Energy Model Includes Renewables" is selected.

SECTION 1.9A - TOTAL BUILDING PERFORMANCE SUMMARY

Table EAp2-15. Total Building Energy Use Performance

		Baseline		Proposed			
Energy Type	Units	Process Subtotal	Section 1.6 Total Energy Use	Section 1.6 Energy Use	Section 1.7 Energy Savings	Section 1.8 Renewable Energy Savings	Total Energy Use
Electricity	kWh	323,693	1,437,887.5	637,771	0	845,429	-207,658
Natural Gas		0	0	0	0	0	0
		0	0	0	0	0	0
Totals	MMBtu	1,104.44	4,906.07	2,176.07	0	2,884.6	-708.53
						Energy use savings (%)	114.44

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.

Table EAp2-16. Total Building Energy Cost Performance

Baseline	Proposed

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Energy Type	Units	Process Subtotal	Section 1.6 Total Energy Cost	Section 1.6 Energy Cost	Section 1.7 Energy Savings	Section 1.8 Renewable Energy Savings	Total Energy Cost
Electricity	$	27,837.6	123,658.33	54,848.31	0	72,706.89	-17,858.59
Natural Gas	$	0	0	0	0	0	0
	$	0	0	0	0	0	0
Totals	$	27,837.6	123,658.33	54,848.31	0	72,706.89	-17,858.59
Baseline process energy costs as percent of total energy costs (%)		22.51			Energy cost savings (%)		114.44
					EA Credit 1 points documented		19

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	3.214	1.735
Space Heating	10.243	0.818
Space Cooling	5.264	0.925
Fans - Interior	3.288	1.796
Service Water Heating	0.179	0.089
Receptacle Equipment	6.631	6.631
Miscellaneous	0.636	1.071
Subtotal	29.455	13.065
Natural Gas (kBtu/sf)		
Space Heating	0	0
Service Water Heating	0	0
Miscellaneous	0	0
Subtotal	0	0
Other (kBtu/sf)		
Miscellaneous	0.001	-0.001
Subtotal	0.001	-0.001
Total Energy Use Intensity (kBtu/sf)		
Total	100.501	44.577

Table EAp2-18. End Use Energy Percentage

	Baseline Case (%)	Proposed Case (%)	End Use Energy Savings (%)
Interior Lighting	10.91	13.28	9.02
Space Heating	34.77	6.26	57.5
Space Cooling	17.87	7.08	26.47
Fans - Interior	11.16	13.75	9.1
Service Water Heating	0.61	0.68	0.55
Receptacle Equipment	22.51	50.75	0
Miscellaneous	2.16	8.2	-2.65

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: 2*

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: Y Check Compliance