

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD
CF1R-PRF-01
Project Name: 1 Story Example PV+Battery

Calculation Date/Time: 11:27, Thu, Apr 11, 2019

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Calculation Description: 1 Story Example Rev 2

Input File Name: 1storyExample2.ribd19

GENERAL INFORMATION					
01	Project Name	1 Story Example PV+Battery			
02	Calculation Description	2100 ft2 with tile R19 roof deck			
03	Project Location	1516 Ninth St			
04	City	Sacramento, CA	05	Standards Version	Compliance 2020
06	Zip Code	95814	07	Compliance Manager Version	BEMCmpMgr 2019.0.11 Alpha (1288)
08	Climate Zone	CZ12	09	Software Version	CBECC-Res 2019.0.11 Alpha (1067)
10	Building Type	Single Family	11	Front Orientation (deg/Cardinal)	0
12	Project Scope	Newly Constructed	13	Number of Dwelling Units	1
14	Total Cond. Floor Area (ft ²)	2100	15	Number of Zones	1
16	Slab Area (ft ²)	2100	17	Number of Stories	1
18	Addition Cond. Floor Area(ft ²)	n/a	19	Gas Type	Natural Gas
20	Addition Slab Area (ft ²)	n/a	21	Glazing Percentage (%)	18.6%

COMPLIANCE RESULTS	
01	Building Complies with Computer Performance
02	This building incorporates features that require field testing and/or verification by a certified HERS rater under the supervision of a CEC-approved HERS provider.
03	This building incorporates one or more Special Features shown below

ENERGY USE SUMMARY				
Energy Use (kTDV/ft ² -yr)	Standard Design	Proposed Design	Compliance Margin	Percent Improvement
Space Heating	23.41	23.75	-0.34	-1.5%
Space Cooling	16.88	10.91	5.97	35.4%
IAQ Ventilation	2.61	2.61	0.00	0.0%
Water Heating	12.05	10.70	1.35	11.2%
Self Utilization Credit	--	0.00	0.00	--
Compliance Total	54.95	47.97	6.98	12.7%

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ENERGY DESIGN RATING				
	Energy Design Ratings		Compliance Margins	
	Efficiency ¹ (EDR)	Total ² (EDR)	Efficiency ¹ (EDR)	Total ² (EDR)
Standard Design	45.4	25.7		
Proposed Design	42.5	22.4	2.9	3.3
RESULT ³: COMPLIES				
¹ Efficiency measures include improvements like a better building envelope and more efficient equipment				
² Total EDR includes efficiency, photovoltaics and batteries				
³ Building complies when all efficiency and total margins are greater than or equal to zero				
<ul style="list-style-type: none"> Standard Design PV Capacity: 2.69 kW 				

REQUIRED PV SYSTEM - SIMPLIFIED								
DC System Size (kWdc)	Module Type	Array Type	CFI	Azimuth (deg)	Tilt Input	Tilt Angle (deg)	Tilt (x in 12)	Inverter Eff. (%)
2.00	Standard	Fixed (open rack)	<input checked="" type="checkbox"/>	n/a	n/a	n/a	n/a	n/a

ENERGY DESIGN RATING BATTERY INPUTS					
The battery model does not currently include energy consumption for cooling the battery during charging in environments above 77°F or to keep the battery from freezing in winter, if outdoors.					
		Charging		Discharging	
Control	Capacity (kWh)	Efficiency	Rate (kW)	Efficiency	Rate (kW)
Basic	5.00	0.95	n/a	0.95	n/a

REQUIRED SPECIAL FEATURES	
The following are features that must be installed as condition for meeting the modeled energy performance for this computer analysis.	
<ul style="list-style-type: none"> Whole house fan Cool roof Insulation below roof deck Window overhangs and/or fins PV System: 2 kWdc Battery System: 5 kWh 	

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HERS FEATURE SUMMARY						
The following is a summary of the features that must be field-verified by a certified HERS Rater as a condition for meeting the modeled energy performance for this computer analysis. Additional detail is provided in the building components tables below.						
Building-level Verifications: <ul style="list-style-type: none"> • High quality insulation installation (QII) • IAQ mechanical ventilation • Whole House Fan Airflow and Fan Efficacy Cooling System Verifications: <ul style="list-style-type: none"> • Minimum Airflow • Verified Refrigerant Charge • Fan Efficacy Watts/CFM HVAC Distribution System Verifications: <ul style="list-style-type: none"> • Duct Sealing Domestic Hot Water System Verifications: <ul style="list-style-type: none"> • -- None -- 						

BUILDING - FEATURES INFORMATION						
01	02	03	04	05	06	07
Project Name	Conditioned Floor Area (ft ²)	Number of Dwelling Units	Number of Bedrooms	Number of Zones	Number of Ventilation Cooling Systems	Number of Water Heating Systems
1 Story Example PV+Battery	2100	1	3	1	1	1

ZONE INFORMATION						
01	02	03	04	05	06	07
Zone Name	Zone Type	HVAC System Name	Zone Floor Area (ft ²)	Avg. Ceiling Height	Water Heating System 1	Water Heating System 2
Conditioned	Conditioned	HVAC System 1	2100	9	DHW System	n/a

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OPAQUE SURFACES							
01	02	03	04	05	06	07	08
Name	Zone	Construction	Azimuth	Orientation	Gross Area (ft ²)	Window & Door Area (ft ²)	Tilt (deg)
Front	Conditioned	R21 R5 Stucco Wall	0	Front	270	146.25	90
Left	Conditioned	R21 R5 Stucco Wall	90	Left	324	72	90
Back	Conditioned	R21 R5 Stucco Wall	180	Back	450	154.02	90
Right	Conditioned	R21 R5 Stucco Wall	270	Right	414	38	90
GarToHouse Front	Conditioned>>Garage	Gar House R21	n/a	n/a	180	20	n/a
GarToHouse Left	Conditioned>>Garage	Gar House R21	n/a	n/a	90	0	n/a
Ceiling (below attic) 1	Conditioned	R38 Ceiling below attic	n/a	n/a	2100	n/a	n/a
Gwall Front	Garage	Garage Wall R-0	0	Front	180	108	90
Gwall Left	Garage	Garage Wall R-0	90	Left	198	0	90
Gwall Right	Garage	Garage Wall R-0	270	Right	108	0	90
Gar Ceiling	Garage	R0 ClgBlwAttic Cons	n/a	n/a	440	n/a	n/a

ATTIC							
01	02	03	04	05	06	07	08
Name	Construction	Type	Roof Rise	Roof Reflectance	Roof Emittance	Radiant Barrier	Cool Roof
Gar Attic	Tile Roof	Ventilated	5	0.2	0.85	No	No
Attic	Tile R-19 below deck	Ventilated	5	0.2	0.85	No	Yes

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FENESTRATION / GLAZING									
01	02	03	04	05	06	07	08	09	10
Name	Type	Surface (Orientation-Azimuth)	Width (ft)	Height (ft)	Multiplier	Area (ft ²)	U-factor	SHGC	Exterior Shading
F-6060	Window	Front (Front-0)	6.0	6.0	1	36.0	0.30	0.23	Insect Screen (default)
F-4050 x3	Window	Front (Front-0)	4.0	5.0	3	60.0	0.30	0.23	Insect Screen (default)
F-1660 x2	Window	Front (Front-0)	1.5	6.0	2	18.0	0.30	0.23	Insect Screen (default)
F-3636	Window	Front (Front-0)	3.5	3.5	1	12.3	0.30	0.23	Insect Screen (default)
L-5040 x2	Window	Left (Left-90)	5.0	4.0	2	40.0	0.30	0.23	Insect Screen (default)
L-4040 x2	Window	Left (Left-90)	4.0	4.0	2	32.0	0.30	0.23	Insect Screen (default)
B1 SGD	Window	Back (Back-180)	6.0	6.7	1	40.0	0.30	0.23	Insect Screen (default)
B-6010	Window	Back (Back-180)	6.0	1.0	1	6.0	0.30	0.23	Insect Screen (default)
B-6040 x3	Window	Back (Back-180)	6.0	4.0	3	72.0	0.30	0.23	Insect Screen (default)
B-6050	Window	Back (Back-180)	6.0	5.0	1	30.0	0.30	0.23	Insect Screen (default)
B-3020	Window	Back (Back-180)	3.0	2.0	1	6.0	0.30	0.23	Insect Screen (default)
R-3030 x2	Window	Right (Right-270)	3.0	3.0	2	18.0	0.30	0.23	Insect Screen (default)
R-4050	Window	Right (Right-270)	4.0	5.0	1	20.0	0.30	0.23	Insect Screen (default)

OPAQUE DOORS			
01	02	03	04
Name	Side of Building	Area (ft ²)	U-factor
Front Dr	Front	20.0	0.20
GarToHouse Dr	GarToHouse Front	20.0	0.20
GDoor	Gwall Front	108.0	1.00

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OVERHANGS AND FINs													
01	02	03	04	05	06	07	08	09	10	11	12	13	14
	Overhang					Left Fin				Right Fin			
Window	Depth	Dist Up	Left Extent	Right Extent	Flap Ht.	Depth	Top Up	Dist L	Bot Up	Depth	Top Up	Dist R	Bot Up
F-6060	1	1.33	3	10	0	0	0	0	0	0	0	0	0
F-4050 x3	1	1.33	6	6	0	0	0	0	0	0	0	0	0
F-1660 x2	4	1.33	3	3	0	0	0	0	0	0	0	0	0
F-3636	1	1.33	10	10	0	0	0	0	0	0	0	0	0
B1 SGD	6	1.33	4	4	0	0	0	0	0	0	0	0	0
B-6010	1	0	4	4	0	0	0	0	0	0	0	0	0
B-6040 x3	1	1.33	23	23	0	0	0	0	0	0	0	0	0
B-6050	1	1.33	10	10	0	0	0	0	0	0	0	0	0
B-3020	1	1.33	10	10	0	0	0	0	0	0	0	0	0

Not useable for compliance

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OPAQUE SURFACE CONSTRUCTIONS						
01	02	03	04	05	06	07
Construction Name	Surface Type	Construction Type	Framing	Total Cavity R-value	Winter Design U-factor	Assembly Layers
Garage Wall R-0	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O.C.	none	0.347	<ul style="list-style-type: none"> Inside Finish: Gypsum Board Cavity / Frame: no insul. / 2x6 Exterior Finish: 3 Coat Stucco
R0 ClgBlwAttic Cons	Ceilings (below attic)	Wood Framed Ceiling	2x4 Bottom Chord of Truss @ 24 in. O.C.	none	0.481	<ul style="list-style-type: none"> Inside Finish: Gypsum Board Cavity / Frame: no insul. / 2x4 Btm Chrd
Gar House R21	Interior Walls	Wood Framed Wall	2x4 @ 16 in. O.C.	R 21	0.075	<ul style="list-style-type: none"> Inside Finish: Gypsum Board Cavity / Frame: R-21 / 2x4 Other Side Finish: Gypsum Board
Tile R-19 below deck	Attic Roofs	Wood Framed Ceiling	2x4 @ 24 in. O.C.	R 19	0.049	<ul style="list-style-type: none"> Under Roof Joists: R-6.0 insul. Cavity / Frame: R-13.0 / 2x4 Roof Deck: Wood Siding/sheathing/decking Tile Gap: present Roofing: 10 PSF (RoofTile)
Tile Roof	Attic Roofs	Wood Framed Ceiling	2x4 @ 24 in. O.C.	none	0.400	<ul style="list-style-type: none"> Cavity / Frame: no insul. / 2x4 Roof Deck: Wood Siding/sheathing/decking Tile Gap: present Roofing: 10 PSF (RoofTile)
R38 Ceiling below attic	Ceilings (below attic)	Wood Framed Ceiling	2x4 Bottom Chord of Truss @ 24 in. O.C.	R 38	0.025	<ul style="list-style-type: none"> Inside Finish: Gypsum Board Cavity / Frame: R-9.1 / 2x4 Btm Chrd Over Ceiling Joists: R-28.9 insul.
R21 R5 Stucco Wall	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O.C.	R 21	0.048	<ul style="list-style-type: none"> Inside Finish: Gypsum Board Cavity / Frame: R-21 / 2x6 Sheathing / Insulation: R5 Sheathing Exterior Finish: Synthetic Stucco

SLAB FLOORS

01	02	03	04	05	06	07
Name	Zone	Area (ft ²)	Perimeter (ft)	Edge Insul. R-value & Depth	Carpeted Fraction	Heated
Slab On Grade	Conditioned	2100	162	None	0.8	No
Gslab	Garage	440	44	None	0	No

BUILDING ENVELOPE - HERS VERIFICATION

01	02	03	04
Quality Insulation Installation (QII)	Quality Installation of Spray Foam Insulation	Building Envelope Air Leakage	CFM50
Required	Not Required	Not Required	n/a

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WATER HEATING SYSTEMS							
01	02	03	04	05	06	07	08
Name	System Type	Distribution Type	Water Heater	Number of Heaters	Solar Fraction (%)	Shower Drain Water Heat Recovery Efficiency	HERS Verification
DHW System	DHW	Standard	Small Instantaneous (1)	1	n/a	n/a	n/a

WATER HEATERS											
01	02	03	04	05	06	07	08	09	10	11	12
Name	Heater Element Type	Tank Type	Number of Units	Tank Volume (gal)	Uniform Energy Factor / Energy Factor / Efficiency	Input Rating / Pilot / Thermal Efficiency	Tank Insulation R-value (Int/Ext)	Standby Loss / Recovery Eff	First Hour Rating / Flow Rate	NEEA Heat Pump Brand / Model / Other	Tank Location or Ambient Condition
Small Instantaneous	Gas	Small Instantaneous	1	0	0.82 EF	<= 200 kBtu/hr	R-0/R-0	n/a	n/a	n/a	n/a

SPACE CONDITIONING SYSTEMS					
01	02	03	04	05	06
SC Sys Name	System Type	Heating Unit Name	Cooling Unit Name	Fan Name	Distribution Name
HVAC System 1	Other Heating and Cooling System	Furn 80	Split 14 11.7	HVAC Fan 1	Attic Default

HVAC - HEATING UNIT TYPES			
01	02	03	04
Name	System Type	Number of Units	Efficiency
Furn 80	CntrlFurnace	1	80 AFUE

HVAC - COOLING UNIT TYPES							
01	02	03	04	05	06	07	08
Name	System Type	Number of Units	Efficiency EER SEER		Zonally Controlled	Compressor Type	HERS Verification
Split 14 11.7	SplitAirCond	1	11.7	14	Not Zonal	Single Speed	Split 14 11.7-hers-cool

HVAC COOLING - HERS VERIFICATION					
01	02	03	04	05	06
Name	Verified Airflow	Airflow Target	Verified EER	Verified SEER	Verified Refrigerant Charge
Split 14 11.7-hers-cool	Required	350	Not Required	Not Required	Required

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HVAC - DISTRIBUTION SYSTEMS						
01	02	03	04	05	06	07
Name	Type	Duct Leakage	Insulation R-value	Duct Location	Bypass Duct	HERS Verification
Attic Default	DuctsAttic	Sealed and tested	8	Attic	None	Attic Default-hers-dist

HVAC DISTRIBUTION - HERS VERIFICATION							
01	02	03	04	05	06	07	08
Name	Duct Leakage Verification	Duct Leakage Target (%)	Verified Duct Location	Verified Duct Design	Buried Ducts	Deeply Buried Ducts	Low-leakage Air Handler
Attic Default-hers-dist	Required	5.0	Not Required	Not Required	Not Required	Not Required	n/a

HVAC - FAN SYSTEMS			
01	02	03	04
Name	Type	Fan Power (Watts/CFM)	HERS Verification
HVAC Fan 1	Single Speed PSC Furnace Fan	0.45	HVAC Fan 1-hers-fan

HVAC FAN SYSTEMS - HERS VERIFICATION		
01	02	03
Name	Verified Fan Watt Draw	Required Fan Efficiency (Watts/CFM)
HVAC Fan 1-hers-fan	Required	0.45

IAQ (Indoor Air Quality) FANS					
01	02	03	04	05	06
Dwelling Unit	IAQ CFM	IAQ Watts/CFM	IAQ Fan Type	IAQ Recovery Effectiveness(%)	HERS Verification
SFam IAQVentRpt	90	0.25	Default	0	Required

COOLING VENTILATION						
01	02	03	04	05	06	07
Name	Airflow Rate (CFM/ft2)	Cooling Vent CFM	Cooling Vent Watts/CFM	Total Watts	Number of Fans	HERS Verification
Whole House Fan	1.5	3150	0.14	441	1	Required

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DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Company:	Signature Date:
Address:	CEA/HERS Certification Identification (If applicable):
City/State/Zip:	Phone:
RESPONSIBLE PERSON'S DECLARATION STATEMENT	
I certify the following under penalty of perjury, under the laws of the State of California: 1. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design identified on this Certificate of Compliance. 2. I certify that the energy features and performance specifications identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations. 3. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.	
Responsible Designer Name:	Responsible Designer Signature:
Company:	Date Signed:
Address:	License:
City/State/Zip:	Phone:

Registration Number:

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