

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

Project Name: 2016 - Base w/ HPW @ 24" o.c.

Calculation Date/Time: 12:09, Tue, Jul 18, 2017

Calculation Description: 2016 CBECC Review

Input File Name: 2016_2-Story_CZ12_02.ribd16

| GENERAL INFORMATION | | | | |
|---------------------|--|-------------------------------|----|---|
| 01 | Project Name | 2016 - Base w/ HPW @ 24" o.c. | | |
| 02 | Calculation Description | CEC Prototype with tile roof | | |
| 03 | Project Location | 1516 Ninth St | | |
| 04 | City | Sacramento - CZ 12 | 05 | Standards Version |
| 06 | Zip Code | | 07 | Compliance Manager Version |
| 08 | Climate Zone | CZ12 | 09 | Software Version |
| 10 | Building Type | Single Family | 11 | Front Orientation (deg/Cardinal) |
| 12 | Project Scope | Newly Constructed | 13 | Number of Dwelling Units |
| 14 | Total Cond. Floor Area (ft²) | 2700 | 15 | Number of Zones |
| 16 | Slab Area (ft²) | 1250 | 17 | Number of Stories |
| 18 | Addition Cond. Floor Area | n/a | 19 | Natural Gas Available |
| 20 | Addition Slab Area (ft²) | n/a | 21 | Glazing Percentage (%) |

| 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 | | | | |
|---------------------------------------|-----------------|-----------------|-------------------|---------------------|
| 04 | 05 | 06 | 07 | 08 |
| Energy Use (kTDV/ft ² -yr) | Standard Design | Proposed Design | Compliance Margin | Percent Improvement |
| Space Heating | 19.36 | 16.87 | 2.49 | 12.9% |
| Space Cooling | 14.47 | 16.50 | -2.03 | -14.0% |
| IAQ Ventilation | 1.15 | 1.15 | 0.00 | 0.0% |
| Water Heating | 7.54 | 7.54 | 0.00 | 0.0% |
| Photovoltaic Offset | ---- | 0.00 | 0.00 | ---- |
| Compliance Energy Total | 42.52 | 42.06 | 0.46 | 1.1% |

| ENERGY DESIGN RATING | | | |
|--|---|--------------------------|------------------------------|
| <p>Energy Design Rating (EDR) is an alternate way to express the energy performance of a building using a scoring system where 100 represents the energy performance of the Residential Energy Services (RESNET) reference home characterization of the 2006 International Energy Conservation Code (IECC). A score of zero represents the energy performance of a building that combines high levels of energy efficiency with renewable generation to "zero out" its TDV energy. Because EDR includes consideration of components not regulated by Title 24, Part 6 (such as domestic appliances and consumer electronics), it is not used to show compliance with Part 6 but may instead be used by local jurisdictions pursuing local ordinances under Title 24, Part 11 (CALGreen).</p> <p>As a Standard Design building under the 2016 Building Energy Efficiency Standards is significantly more efficient than the baseline EDR building, the EDR of the Standard Design building is provided for Information. Similarly, the EDR score of the Proposed Design is provided separately from the EDR value of installed PV so that the effects of efficiency and renewable energy can both be seen</p> | | | |
| EDR of Standard Design | EDR of Proposed Design | EDR Value of Proposed PV | Final EDR of Proposed Design |
| 44.0 | 43.8 | 0.0 | 43.8 |
| <input type="checkbox"/> | Design meets Tier 1 requirement of 15% or greater code compliance margin (CALGreen A4.203.1.2.1) and QII verification prerequisite. | | |
| <input type="checkbox"/> | Design meets Tier 2 requirement of 30% or greater code compliance margin (CALGreen A4.203.1.2.2) and QII verification prerequisite. | | |
| <input type="checkbox"/> | Design meets Zero Net Energy (ZNE) Design Designation requirement for Single Family in climate zone CZ12 (Sacramento) (CALGreen A4.203.1.2.3) including on-site photovoltaic (PV) renewable energy generation sufficient to achieve a Final Energy Design Rating (EDR) of zero or less. The PV System must be verified. | | |

| 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"> • Insulation below roof deck • Window overhangs and/or fins | |

| 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. | |
| <p>Building-level Verifications:</p> <ul style="list-style-type: none"> • High quality insulation installation (QII) • IAQ mechanical ventilation <p>Cooling System Verifications:</p> <ul style="list-style-type: none"> • Minimum Airflow • Refrigerant Charge • Fan Efficacy Watts/CFM <p>HVAC Distribution System Verifications:</p> <ul style="list-style-type: none"> • Duct Sealing <p>Domestic Hot Water System Verifications:</p> <ul style="list-style-type: none"> • -- None -- | |

| BUILDING - FEATURES INFORMATION | | | | | | |
|---------------------------------|------------------------------|--------------------------|--------------------|-----------------|---------------------------------------|---------------------------------|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 |
| Project Name | Conditioned Floor Area (ft2) | Number of Dwelling Units | Number of Bedrooms | Number of Zones | Number of Ventilation Cooling Systems | Number of Water Heating Systems |
| 2016 - Base w/ HPW @ 24" o.c. | 2700 | 1 | 4 | 1 | 0 | 1 |

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

Project Name: 2016 - Base w/ HPW @ 24" o.c.

Calculation Date/Time: 12:09, Tue, Jul 18, 2017

Calculation Description: 2016 CBECC Review

Input File Name: 2016_2-Story_CZ12_02.ribd16

| 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 |
| House | Conditioned | HVACSystem | 2700 | 9 | DHWSystem | |

| 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 Wall (1-Coat) | House | R-19+R5 Walls | 90 | Front | 728 | 128 | 90 |
| Left Wall (1-Coat) | House | R-19+R5 Walls | 180 | Left | 551 | 135 | 90 |
| Back Wall (1-Coat) | House | R-19+R5 Walls | 270 | Back | 950 | 216 | 90 |
| Right Wall (1-Coat) | House | R-19+R5 Walls | 0 | Right | 461 | 81 | 90 |
| Int. Grg. Wall (Front) | House>>Garage | R-19 Garage Wall | | | 180 | 20 | |
| Int. Grg. Wall (Right) | House>>Garage | R-19 Garage Wall | | | 90 | 0 | |
| Kneewall (Grg.) | House>>Garage Attic - Roof Plane | R-19 Garage Wall | | | 42 | 0 | |
| Attic - Ceiling Plane | House | R-38 Ceiling | | | 1450 | | |
| Floor Above Garage | House>>Garage | R-19 Floor Above Garage | | | 200 | | |
| Ext. Grg. Wall (Front) | Garage | R-0+R5 Garage Ext Wall | 90 | Front | 180 | 128 | 90 |
| Ext. Grg. Wall (Left) | Garage | R-0+R5 Garage Ext Wall | 180 | Left | 108 | 0 | 90 |
| Ext. Grg. Wall (Right) | Garage | R-0+R5 Garage Ext Wall | 0 | Right | 198 | 0 | 90 |
| GarageToGarageAttic | Garage | R-0 Garage Ceiling | | | 240 | | |

| ATTIC | | | | | | | |
|---------------------------|------------------------------|------------|-----------|------------------|----------------|-----------------|-----------|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 |
| Name | Construction | Type | Roof Rise | Roof Reflectance | Roof Emittance | Radiant Barrier | Cool Roof |
| House Attic - Roof Plane | Tile Roof w/ R-13 BD & No RB | Ventilated | 5 | 0.1 | 0.85 | No | No |
| Garage Attic - Roof Plane | Tile Roof Garage w/o RB | Ventilated | 5 | 0.1 | 0.85 | No | No |

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

Project Name: 2016 - Base w/ HPW @ 24" o.c.

Calculation Date/Time: 12:09, Tue, Jul 18, 2017

Calculation Description: 2016 CBECC Review

Input File Name: 2016_2-Story_CZ12_02.ribd16

| 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 |
| F1 | Window | Front Wall (1-Coat) (Front-90) | 3.0 | 5.0 | 7.2 | 108.0 | 0.31 | 0.22 | Insect Screen (default) |
| L1 | Window | Left Wall (1-Coat) (Left-180) | 3.0 | 5.0 | 9 | 135.0 | 0.31 | 0.22 | Insect Screen (default) |
| B1 | Window | Back Wall (1-Coat) (Back-270) | 3.0 | 5.0 | 14.4 | 216.0 | 0.31 | 0.22 | Insect Screen (default) |
| R1 | Window | Right Wall (1-Coat) (Right-0) | 3.0 | 5.0 | 5.4 | 81.0 | 0.31 | 0.22 | Insect Screen (default) |

| OPAQUE DOORS | | | |
|--------------------|------------------------|-------------------------|----------|
| 01 | 02 | 03 | 04 |
| Name | Side of Building | Area (ft ²) | U-factor |
| Entry Dr. | Front Wall (1-Coat) | 20.0 | 0.50 |
| Entry Dr. @ Garage | Int. Grg. Wall (Front) | 20.0 | 0.50 |
| Garage Car Dr. | Ext. Grg. Wall (Front) | 128.0 | 1.00 |

| OVERHANGS AND FINS | | | | | | | | | | | | | |
|--------------------|----------|---------|-------------|--------------|----------|----------|--------|-------|--------|-----------|--------|--------|--------|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 |
| Window | Overhang | | | | | Left Fin | | | | Right Fin | | | |
| | Depth | Dist Up | Left Extent | Right Extent | Flap Ht. | Depth | Top Up | DistL | Bot Up | Depth | Top Up | Dist R | Bot Up |
| F1 | 1 | 1.33 | 3 | 3 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| L1 | 1 | 1.33 | 3 | 3 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| B1 | 1 | 1.33 | 3 | 3 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| R1 | 1 | 1.33 | 3 | 3 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

Project Name: 2016 - Base w/ HPW @ 24" o.c.

Calculation Date/Time: 12:09, Tue, Jul 18, 2017

Calculation Description: 2016 CBECC Review

Input File Name: 2016_2-Story_CZ12_02.ribd16

| OPAQUE SURFACE CONSTRUCTIONS | | | | | | |
|------------------------------|------------------------|---------------------|---|----------------------|-----------------------|---|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 |
| Construction Name | Surface Type | Construction Type | Framing | Total Cavity R-value | Winter Design U-value | Assembly Layers |
| R-19+R5 Walls | Exterior Walls | Wood Framed Wall | 2x6 @ 24 in. O.C. | R 19 | 0.049 | <ul style="list-style-type: none"> • Inside Finish: Gypsum Board • Cavity / Frame: R-19 / 2x6 • Sheathing / Insulation: R1 Sheathing • Exterior Finish: R4 Synthetic Stucco |
| R-38 Ceiling | 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. |
| Tile Roof w/ R-13 BD & No RB | Attic Roofs | Wood Framed Ceiling | 2x4 Top Chord of Roof Truss @ 24 in. O.C. | R 13 | 0.072 | <ul style="list-style-type: none"> • Under Roof Joists: R-0.0 insul. • Cavity / Frame: R-13.0 / 2x4 Top Chrd • Roof Deck: Wood Siding/sheathing/decking • Tile Gap: present • Roofing: 10 PSF (RoofTile) |
| Tile Roof Garage w/o RB | Attic Roofs | Wood Framed Ceiling | 2x4 Top Chord of Roof Truss @ 24 in. O.C. | none | 0.400 | <ul style="list-style-type: none"> • Cavity / Frame: no insul. / 2x4 Top Chrd • Roof Deck: Wood Siding/sheathing/decking • Tile Gap: present • Roofing: 10 PSF (RoofTile) |
| R-0+R5 Garage Ext Wall | Exterior Walls | Wood Framed Wall | 2x6 @ 24 in. O.C. | none | 0.126 | <ul style="list-style-type: none"> • Inside Finish: Gypsum Board • Cavity / Frame: no insul. / 2x6 • Sheathing / Insulation: R1 Sheathing • Exterior Finish: R4 Synthetic Stucco |
| R-0 Garage Ceiling | 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 |
| R-19 Floor Above Garage | Interior Floors | Wood Framed Floor | 2x6 @ 24 in. O.C. | R 19 | 0.046 | <ul style="list-style-type: none"> • Floor Surface: Carpeted • Floor Deck: Wood Siding/sheathing/decking • Cavity / Frame: R-19 / 2x6 • Ceiling Below Finish: Gypsum Board |
| R-19 Garage Wall | Interior Walls | Wood Framed Wall | 2x6 @ 24 in. O.C. | R 19 | 0.065 | <ul style="list-style-type: none"> • Inside Finish: Gypsum Board • Cavity / Frame: R-19 / 2x6 • Other Side Finish: Gypsum Board |

| SLAB FLOORS | | | | | | |
|----------------------|--------|-------------------------|----------------|-----------------------------|-------------------|--------|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 |
| Name | Zone | Area (ft ²) | Perimeter (ft) | Edge Insul. R-value & Depth | Carpeted Fraction | Heated |
| House Slab-on-Grade | House | 1250 | 128 | None | 0.8 | No |
| Garage Slab-on-Grade | Garage | 440 | 54 | None | 0 | No |

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

Project Name: 2016 - Base w/ HPW @ 24" o.c.

Calculation Date/Time: 12:09, Tue, Jul 18, 2017

Calculation Description: 2016 CBECC Review

Input File Name: 2016_2-Story_CZ12_02.ribd16

| 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 | --- |

| WATER HEATING SYSTEMS | | | | | |
|-----------------------|-------------|-------------------|------------------------|-------------------|--------------------|
| 01 | 02 | 03 | 04 | 05 | 06 |
| Name | System Type | Distribution Type | Water Heater | Number of Heaters | Solar Fraction (%) |
| DHWSystem | DHW | Standard | Tankless / 0.82 EF (1) | 1 | n/a |

| WATER HEATERS | | | | | | | | | | |
|--------------------|---------------------|---------------------|-----------------|-------------------|-----------------------------|--------------------|-----------------------------------|-----------------------------|---------------------|------------------------------------|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 |
| Name | Heater Element Type | Tank Type | Number of Units | Tank Volume (gal) | Energy Factor or Efficiency | Input Rating/Pilot | Tank Insulation R-value (Int/Ext) | Standby Loss / Recovery Eff | NEEA Heat Pump Type | Tank Location or Ambient Condition |
| Tankless / 0.82 EF | Gas | Small Instantaneous | 1 | 0 | 0.82 EF | 195,000 Btu/hr | R-0 | n/a | 0 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 |
| HVACSystem | Other Heating and Cooling System | 80% AFUE | 14 SEER / 11.7 EER / RC | HVACFan | R-8 Ducts |

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

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

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD

Project Name: 2016 - Base w/ HPW @ 24" o.c.

Calculation Date/Time: 12:09, Tue, Jul 18, 2017

Calculation Description: 2016 CBECC Review

Input File Name: 2016_2-Story_CZ12_02.ribd16

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

| HVAC - DISTRIBUTION SYSTEMS | | | | | | |
|-----------------------------|------------|-------------------|--------------------|---------------|-------------|---------------------|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 |
| Name | Type | Duct Leakage | Insulation R-value | Duct Location | Bypass Duct | HERS Verification |
| R-8 Ducts | DuctsAttic | Sealed and tested | 8 | Attic | None | R-8 Ducts-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 |
| R-8 Ducts-hers-dist | Required | 5.0 | Not Required | Not Required | Not Required | Not Required | --- |

| HVAC - FAN SYSTEMS | | | |
|--------------------|------------------------------|-----------------------|-------------------|
| 01 | 02 | 03 | 04 |
| Name | Type | Fan Power (Watts/CFM) | HERS Verification |
| HVACFan | Single Speed PSC Furnace Fan | 0.58 | HVACFan-hers-fan |

| HVAC FAN SYSTEMS - HERS VERIFICATION | | |
|--------------------------------------|------------------------|-------------------------------------|
| 01 | 02 | 03 |
| Name | Verified Fan Watt Draw | Required Fan Efficiency (Watts/CFM) |
| HVACFan-hers-fan | Required | 0.58 |

| 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 | 65 | 0.25 | Default | 0 | Required |

CERTIFICATE OF COMPLIANCE - RESIDENTIAL PERFORMANCE COMPLIANCE METHOD**Project Name:** 2016 - Base w/ HPW @ 24" o.c.**Calculation Date/Time:** 12:09, Tue, Jul 18, 2017**Calculation Description:** 2016 CBECC Review**Input File Name:** 2016_2-Story_CZ12_02.ribd16

| 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: | |
| <ol style="list-style-type: none"> 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. 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. 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: |