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Project Title:	2025 Energy Code Compliance Software, Manuals and Forms
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Document Title:	Travis Wade Comments - Peak Cooling Metric Revision
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Comment Received From: Travis Wade
Submitted On: 11/24/2025
Docket Number: 24-BSTD-03

Peak Cooling Metric Revision

Additional submitted attachment is included below.

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November 24, 2025

California Energy Commission
Efficiency Division – Residential Building Standards
715 P Street
Sacramento, CA 95814

Subject: Recommended Revisions to the Peak Cooling Metric in CBECC-Res 2025 v2.0

Dear Efficiency Division Team,

Executive Summary

With the release of CBECC-Res 2025 v2.0, our office has re-modeled multiple current and prior residential projects to evaluate the implications of the new Peak Cooling (PC) compliance metric. In several climate zones, projects that comply with existing performance metrics (including LSCe, LSCt, and Source Energy) fail Peak Cooling by material margins. This indicates that PC, as currently formulated, may not consistently represent coincident peak grid demand and may introduce unintended compliance barriers for common, code-aligned design strategies.

Most importantly, the PC metric does not currently recognize PV-charged battery storage as a peak-mitigation measure. Storage is one of the most direct and scalable tools for reducing grid draw during the 4pm–9pm system peak. We recommend that PC be revised to credit battery discharge during the peak window, alongside several targeted adjustments described below.

Recommended Revisions to Peak Cooling Compliance

We respectfully recommend the following updates to the PC metric and its implementation in CBECC-Res:

1. **Allow PV-charged battery storage to offset Peak Cooling**
2. **Reduce PC stringency or widen the allowable margin above Standard Design PC**
3. **Add a west-glazing shading exemption aligned with PV shading rules**
4. **Increase PV credit flexibility (or raise PV caps) for all-electric projects**

Background and Policy Intent

We understand the purpose of Peak Cooling to be reducing residential electricity draw during late-day system peak, broadly aligned with California's grid reliability and decarbonization goals. The 4pm–9pm period is when solar output sharply declines, wholesale generation costs and emissions tend to increase, and the grid faces its highest capacity stress. A metric designed to reduce coincident cooling demand during this window is directionally aligned with state policy and utility operational needs.

However, to function as intended, PC must reflect **actual coincident grid demand**, not only modeled cooling load drivers. Measures that shift or supply energy during peak—particularly PV-charged storage—should therefore be treated as first-class compliance tools.

Observed Modeling Results

Across a set of re-modeled projects, we observed a recurring pattern: homes that pass the primary performance metrics fail PC, often by margins large enough that compliance becomes impractical without major architectural redesign. This effect appears most pronounced for homes with normal or modest west-facing south glazing exposure. Even when we run a house with excess glazing, but every other trick in the book, all other margins are at nearly 0 or 50% of code, yet peak cooling still out by 8.5%.

ADU – 746 SF – Inputs:

- CZ 4
- 20% Glazing only 5% west
- All Electric with heat pumps
- Code compliant windows
- ERV
- No batteries or PV - Exempt

Compliance Summary

	Long Term System Cost (LSC)[1]		Source Energy Use	Peak Cooling**
	Efficiency[2] ($/ft²-yr)	Total[3] ($/ft²-yr)	Total[3] (kBtu/ft²-yr)	Electricity (kWh)
Standard Design	21.55	54.8	23.79	128.043
Proposed Design	19.64	52.93	13.83	159.777
Compliance Margins	1.91	1.87	9.96	-32
	Pass	Pass	Pass	Fail
RESULT*: Fails				

REQUIRED SPECIAL FEATURES

The following are features that must be installed as condition for meeting the modeled energy performance for this computer analysis.

- PV exception 2: No PV required when minimum PV size (Section 150.1(c)14) < 1.8 kWdc (0 kW)
- Indoor air quality, balanced fan
- IAQ Ventilation System: as low as 0.422222 W/CFM
- IAQ Ventilation System Heat Recovery: minimum 65 SRE and 68 ASRE
- IAQ Ventilation System: supply outside air inlet, filter, and H/ERV cores accessible per RACM Reference Manual
- IAQ Ventilation System: fault indicator display
- Insulation below roof deck

Single Family House – 2,700 SF – Inputs:

- CZ 4
- 46% Fenestration
- All Electric with heat pumps
- Better than code windows on SHGC
- ERV
- Whole House fan
- QII
- 8kW PV – 42 kWh batteries

Compliance Summary				
	Long Term System Cost (LSC)[1]		Source Energy Use	Peak Cooling**
	Efficiency[2] ($/ft^2-yr)	Total[3] ($/ft^2-yr)	Total[3] (kBtu/ft^2-yr)	Electricity (kWh)
Standard Design	15.17	19.22	8.92	199.237
Proposed Design	8.82	2.3	0.71	215.641
Compliance Margins	6.35	16.92	8.21	-17
	Pass	Pass	Pass	Fail
RESULT*: Fails				

REQUIRED SPECIAL FEATURES

The following are features that must be installed as condition for meeting the modeled energy performance for this computer analysis.

- Battery System: 42 kWh (Self Utilization Credit taken)
- Whole house fan
- Precooling Credit Taken
- Indoor air quality, balanced fan
- IAQ Ventilation System: as low as 0.4 W/CFM
- IAQ Ventilation System Heat Recovery: minimum 74 SRE and 78 ASRE
- IAQ Ventilation System: supply outside air inlet, filter, and H/ERV cores accessible per RACM Reference Manual
- IAQ Ventilation System: fault indicator display
- Cool roof
- Floor has high level of insulation
- Ducts in crawl space
- Northwest Energy Efficiency Alliance (NEEA) rated heat pump water heater; specific brand/model, or equivalent, must be installed

ECC FEATURE SUMMARY

The following is a summary of the features that must be field-verified by a certified ECC Rater as a condition for meeting the modeled energy performance for this computer analysis. Additional detail is provided in the building tables below. Registered CF2Rs and CF3Rs are required to be completed in the ECC Registry

- Quality insulation installation (QII)
- Indoor air quality ventilation
- Kitchen range hood
- Whole house fan airflow and fan efficacy
- Minimum Airflow
- Verified EER/EER2
- Verified SEER/SEER2
- Verified Refrigerant Charge
- Fan Efficacy Watts/CFM
- Verified HSPF2
- Verified heat pump rated heating capacity
- Duct leakage testing

Why PV-Charged Storage Should Offset Peak Cooling

The PC metric's stated policy objective is to reduce cooling-related electricity draw during the 4pm–9pm system peak. Yet the current formulation does not provide a compliance credit for load-shifting resources.

A home equipped with PV and appropriately sized storage can meet most or all 4pm–9pm cooling and household loads from on-site generation stored earlier in the day. In these cases, coincident peak grid demand can be near zero regardless of west-facing glazing or other cooling load drivers. Penalizing such projects under PC undermines the metric's grid-reduction intent and risks discouraging adoption of one of the most effective peak-mitigation strategies readily available to homeowners.

In short:

1. **PC intends to reduce coincident peak grid demand from cooling.**
2. **Battery storage shifts or eliminates grid draw during the peak window.**
3. **Therefore, PC should credit storage performance during 4pm–9pm.**

Recommended Revisions to Peak Cooling Compliance

We respectfully recommend the following updates to the PC metric and its implementation in CBECC-Res:

5. **Allow PV-charged battery storage to offset Peak Cooling**
    - Update PC compliance math to subtract modeled battery discharge during the 4pm–9pm window when storage is charged by on-site PV.
    - Use a standardized dispatch or conservative SOC assumption to ensure consistent and enforceable modeling.
6. **Reduce PC stringency or widen the allowable margin above Standard Design PC**
    - Our modeling indicates current pass/fail thresholds can be highly restrictive even for efficient projects.
    - Adjusting stringency would better match real-world design feasibility across climate zones while preserving the metric's intent.
7. **Add a west-glazing shading exemption aligned with PV shading rules**
    - Where a documented late-day solar exposure / shading analysis confirms minimal west solar gain, PC should recognize the reduced peak load contribution.
    - This would avoid penalizing homes for glazing orientation that is not materially driving peak cooling demand in practice.
8. **Increase PV credit flexibility (or raise PV caps) for all-electric projects**
    - Expanded PV credit enables right-sized PV+storage systems to meaningfully reduce peak grid reliance.
    - This is especially important as California transitions toward an all-electric building stock.

Addressing Implementation and Reliability Concerns

We recognize that any storage credit should be modeled conservatively and consistently. To avoid over-crediting:

- **Dispatch should be standardized** (e.g., prioritize discharge during 4pm–9pm).
- **State of charge at 4pm** could be assumed at a conservative level when PV is present and adequately sized.
- **Alternative safeguard:** require a minimum PV-to-storage ratio or a minimum available discharge capacity during peak.

We would be glad to share specific modeling assumptions that align with the CEC's calibration objectives.

Closing

We appreciate the CEC's work advancing performance-based compliance toward true grid outcomes. We believe the above revisions would strengthen the Peak Cooling metric by ensuring that it tracks coincident peak grid demand and rewards the most effective real-world strategies for reducing that demand.

Thank you for your consideration. Please feel free to contact me at **travis@wadeenergy.com or 925.203.5686 x 1.**

If helpful, we would be happy to provide additional project runs, tables, or detailed compliance scenarios. We are happy to support further calibration and refinement of this important metric.

Sincerely,

Thank you,

Travis Wade, M.Eng, CEA

Principal

GENERAL INFORMATION					
01	**Project Name**	New ADU			
02	**Run Title**	Title 24 Analysis			
03	**Project Location**	T24 Street			
04	**City**	Palo Alto	05	**Standards Version**	2025
06	**Zip code**	94952	07	**Software Version**	EnergyPro 10.0
08	**Climate Zone**	4	09	**Front Orientation (deg/ Cardinal)**	135
10	**Building Type**	Single family	11	**Number of Dwelling Units**	1
12	**Project Scope**	Newly Constructed	13	**Number of Bedrooms**	2
14	**Addition Cond. Floor Area (ft^2)**	0	15	**Number of Stories**	1
16	**Existing Cond. Floor Area (ft^2)**	n/a	17	**Fenestration Average U-factor**	0.34
18	**Total Cond. Floor Area (ft^2)**	746	19	**Glazing Percentage (%)**	20.38%
20	**ADU Bedroom Count**	n/a	21	**ADU Conditioned Floor Area**	n/a
22	**Fuel Type**	All electric	23	**No Dwelling Unit:**	No

COMPLIANCE RESULTS

Building Does Not Comply

This building incorporates features that require field testing and/or verification by a certified ECC rater under the supervision of a CEC-approved ECC provider.

This building incorporates one or more Special Features shown below

REQUIRED SPECIAL FEATURES

The following are features that must be installed as condition for meeting the modeled energy performance for this computer analysis.

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ECC FEATURE SUMMARY

The following is a summary of the features that must be field-verified by a certified ECC Rater as a condition for meeting the modeled energy performance for this computer analysis. Additional detail is provided in the building tables below. Registered CF2Rs and CF3Rs are required to be completed in the ECC Registry

- Indoor air quality ventilation
- Kitchen range hood
- Minimum Airflow
- Verified SEER/SEER2
- Fan Efficacy Watts/CFM
- Verified HSPF2
- Verified heat pump rated heating capacity
- Duct leakage testing

Compliance Summary

	Long Term System Cost (LSC)[1]		Source Energy Use	Peak Cooling**
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Proposed Design	19.64	52.93	13.83	159.777
Compliance Margins	1.91	1.87	9.96	-32
	Pass	Pass	Pass	Fail

RESULT*: Fails

[1]Long-term System Cost (LSC) is a 30-year present value cost to California's energy system. LSC is not a predicted utility bill.

[2]Efficiency measures include energy efficient improvements such as better building envelope and more efficient mechanical equipment

[3]Total includes the sum of efficiency measures, solar photovoltaic (PV) measures and battery storage measures

* Building complies when Proposed Design is equal to or less than Standard Design in all three compliance categories

** Peak cooling target represents 120% of the standard design building peak cooling energy use.

PV System(s) removed due to Reduced PV Requirement of 0 kWdc
Standard Design PV Capacity: 0.00 kWdc

LSC AND SOURCE ENERGY COMPLIANCE RESULTS FOR PERFORMANCE COMPONENTS

Energy Use	Standard Design Source Energy (kBtu/ft^2 -yr)	Standard Design LSC[1] ($/ft^2 -yr)	Proposed Design Source Energy (kBtu/ft^2 -yr)	Proposed Design LSC[1] ($/ft^2 -yr)	Compliance Margin Source (kBtu/ft^2 -yr)	Compliance Margin LSC[1] ($/ft^2 -yr)
Space Heating	2.86	6.48	2.26	5.55	0.6	0.93
Space Cooling	0.26	2.16	0.41	3.14	-0.15	-0.98
IAQ Ventilation	0.63	2.48	0.38	1.5	0.25	0.98
Water Heating	11.74	10.43	2.47	9.45	9.27	0.98
Self Utilization/Flexibility Credit	n/a	n/a	0	0	0	0
Efficiency Compliance Total	**15.49**	**21.55**	**5.52**	**19.64**	**9.97**	**1.91**
Photovoltaics And Battery	n/a	n/a	0	0	0	0
Flexibility	n/a	n/a	0	n/a	0	n/a
Indoor Lighting	0.64	2.27	0.64	2.27	0	0
Appl. & Cooking	3.41	14.95	3.42	14.99	-0.01	-0.04
Plug Loads	4.11	15.55	4.11	15.55	0	0
Outdoor Lighting	0.14	0.48	0.14	0.48	0	0
TOTAL COMPLIANCE	**23.79**	**54.8**	**13.83**	**52.93**	**9.96**	**1.87**

ENERGY USE INTENSITY

	Standard Design (kBtu/ft^2 - yr)	Proposed Design (kBtu/ft^2 - yr)	Margin (kBtu/ft^2 - yr)	Margin Percentage
Gross EUI[1]	26.93	26.24	0.69	2.56
Net EUI[2]	26.93	26.24	0.69	2.56

Notes
1. Gross EUI is Energy Use Total (not including PV) / Total Building Area.
2. Net EUI is Energy Use Total (including PV) / Total Building Area.

REQUIRED PV SYSTEMS

01	02	03	04	05	06	07	08	09	10	11	12
DC System Size (kWdc)	**Exception**	**Module Type**	**Array Type**	**Power Electronics**	**CFI**	**Azimuth (deg)**	**Tilt Input**	**Array Angle (deg)**	**Tilt: (x in 12)**	**Inverter Eff. (%)**	**Annual Solar Access (%)**
0	No PV - required PV less than 1.8kWdc	Standard (14-17%)	Fixed	none	true	n/a	n/a	n/a	n/a	n/a	

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**
New ADU	746	1	2	1	0	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**	**Status**
ADU	Conditioned	Ducted Heat Pump1	746	8	DHW Sys 1	New

OPAQUE SURFACES SUMMARY

01	02	03	04	05	06	07	08
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Gross Area (ft^2)**	**Window and Door Area (ft2)**	**Tilt (deg)**
N Wall	ADU	R-21 Wall	315	Back	288	37	90
E Wall	ADU	R-21 Wall	45	Right	219	12	90
S Wall (Front)	ADU	R-21 Wall	135	Front	288	80	90
W Wall	ADU	R-21 Wall	225	Left	219	43	90
Roof Attic	ADU	R-38 Roof Attic	n/a	n/a	746	n/a	n/a

ATTIC

01	02	03	04	05	06	07	08a
Name	**Construction**	**Type**	**Roof Rise (x in 12)**	**CRRC Rated Roof Reflectance**	**CRRC Rated Roof Emittance**	**Radiant Barrier**	**Above Roof Deck Air Gap**
Attic ADU	Attic RoofADU	Unventilated	8	0.1	0.85	No	No

FENESTRATION / GLAZING

01	02	03	04	05	06	07	08	09	10
Name	**Type**	**Surface**	**Orientation**	**Azimuth**	**Mult.**	**Area (ft^2)**	**U-factor**	**SHGC**	**Rating Source**
3020 Awning	Window	N Wall	Back	315	1	6	0.34	0.25	NFRC
3020 Awning 2	Window	N Wall	Back	315	1	6	0.34	0.25	NFRC
5050 Slider	Window	N Wall	Back	315	1	25	0.34	0.25	NFRC
3020 Awning 3	Window	E Wall	Right	45	1	6	0.34	0.25	NFRC
3020 Awning 4	Window	E Wall	Right	45	1	6	0.34	0.25	NFRC
6050 Slider	Window	S Wall (Front)	Front	135	1	30	0.34	0.25	NFRC
6050 Slider 2	Window	S Wall (Front)	Front	135	1	30	0.34	0.25	NFRC

FENESTRATION / GLAZING

01	02	03	04	05	06	07	08	09	10
Name	**Type**	**Surface**	**Orientation**	**Azimuth**	**Mult.**	**Area (ft^2)**	**U-factor**	**SHGC**	**Rating Source**
4046 Slider	Window	W Wall	Left	225	1	18	0.34	0.25	NFRC
5050 Slider 2	Window	W Wall	Left	225	1	25	0.34	0.25	NFRC
Total North Facing Fenestration						60			
Total East Facing Fenestration						12			
Total South Facing Fenestration						37			
Total West Facing Fenestration						43			

OPAQUE DOORS

01	02	03	04	05
Name	**Side of Building**	**Area (ft^2)**	**U-factor**	**NFRC Rating Req.**
3068 DR	S Wall (Front)	20	0.5	No

SLAB FLOORS

01	02	03	04	05	06	07
Name	**Zone**	**Area (ft^2)**	**Perimeter (ft)**	**Edge Insul. R-value**	**Edge Insul. Depth**	**Heated**
Slab-on-Grade	ADU	746	113	none	0	No

OPAQUE SURFACE CONSTRUCTIONS

01	02	03	04	05	06	07	08	09
Construction Name	**Surface Type**	**Construction Type**	**Framing**	**Total Cavity R-value**	**Interior / Exterior Continuous R-value**	**U-factor**	**Assembly Layers**	**Non-Std Spray Foam**
R-21 Wall	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O. C.	R-21	None / None	0.068	Inside Finish: Gypsum Board Cavity / Frame: R-21 / 2x6 Exterior Finish: All Other Siding	☐
Attic RoofADU	Attic Roofs	Wood Framed Ceiling	2x10 @ 24 in. O. C.	R-38	None / 0	0.028	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: R-34.4 / 2x10 Under Roof Joists: R-3.6 insul.	☐
R-38 Roof Attic	Ceilings (below attic)	Wood Framed Ceiling	2x10 @ 16 in. O. C.	R-0	None / None	0.462	Cavity / Frame: no insul. / 2x10 Inside Finish: Gypsum Board	☐

WATER HEATING SYSTEMS

01	02	03	04	05	06	07	08	09
Name	**System Type**	**Distribution Type**	**Water Heater Name**	**Number of Units**	**Solar Heating System**	**Compact Distribution**	**ECC Verification**	**Water Heater Name (#)**
DHW Sys 1	Domestic Hot Water (DHW)	Standard	DHW Heater 1	1	n/a	None	n/a	DHW Heater 1 (1)

WATER HEATERS

01	02	03	04	05	06	07	08	09	10	11	12	13
Name	Heating Element Type	Tank Type	# of Units	Tank Vol. (gal)	Heating Efficiency Type	Efficiency	Rated Input Type	Input Rating or Pilot	Tank Insulation R-value (Int/Ext)	Standby Loss or Recovery Eff	1st Hr. Rating or Flow Rate	Tank Location
DHW Heater 1	Heat Pump	NEEA Tier 3 heat pump water heater	1	40	UEF	2.7	n/a	n/a	n/a	n/a	n/a	Conditioned

WATER HEATERS - HEAT PUMP

01	02	03	04	05	06	07	08	09	10
Name	# of Units	Tank Vol. (gal)	NEEA Heat Pump Brand	NEEA Heat Pump Model	Tank Location	Duct Inlet Air Source	Duct Outlet Air Source	UEF	JA13 Compliant
DHW Heater 1	1	40	Generic	Tier 3, 40+ gal	Conditioned	Outside	Outside	2.7	☐

HVAC - HEAT PUMPS

01	02	03	04	05	06	06b	07	08	09	10	11	12	13
Name	System Type	Number of Units	Heating					Cooling			Airflow Target	Fan Power (Watts/CFM)	Variable Speed
			Heating Efficiency Type	HSPF/HSPF2/COP	Cap 47	Cap 17	Backup	Cooling Efficiency Type	SEER/SEER2	EER/EER2/CEER			
Heat Pump System 1	Central split HP	1	HSPF2	9.2	18000	12600	Electric	EER2/SEER2	18.8	11	0	0.45	☐

HVAC - DISTRIBUTION SYSTEMS

01	02	03	04	05	06	07
Name	**Type**	**Design Type**	**Duct Ins. R-value**		**Duct Location**	
			Supply/Return		**Supply**	**Return**
Air Distribution System 1	Unconditioned attic	Non-Verified	R-8		Attic	Attic

INDOOR AIR QUALITY (IAQ) FANS

01	02	03	04	05	06	07	08
Dwelling Unit	**Airflow (CFM)**	**Fan Efficacy (W/CFM)**	**IAQ Fan Type**	**Includes Heat/Energy Recovery?**	**IAQ Recovery Effectiveness - ASRE**	**Includes Fault Indicator Display?**	**Status**
SFam IAQVentRpt 1-1	45	0.422222	Balanced	Yes	65 / 68	Yes	

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name: Travis Wade	Documentation Author Signature:
Company: Wade Energy	Signature Date: 11/24/2025
Address: 1942 Linda Dr.	CEA/AEA/ECC Certification Identification (if applicable): NR19-16-30032
City/State/Zip: Pleasant Hill, CA 94523	Phone: (925) 203-5686 x 1

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. 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.
5. I understand that a registered copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building and shall be made available to the enforcement agency for all applicable inspections. I will take the necessary steps to fulfill this requirement.
6. I understand that a registered copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy. I will take the necessary steps to fulfill this requirement.

Responsible Designer Name:	Responsible Designer Signature:
Company:	Date Signed:
Address:	License:
City/State/Zip:	Phone:

GENERAL INFORMATION					
01	**Project Name**	New Residence			
02	**Run Title**	Title 24 Analysis			
03	**Project Location**	Heron Lane			
04	**City**	Los Gatos	05	**Standards Version**	2025
06	**Zip code**	95033	07	**Software Version**	EnergyPro 10.0
08	**Climate Zone**	4	09	**Front Orientation (deg/ Cardinal)**	33
10	**Building Type**	Single family	11	**Number of Dwelling Units**	1
12	**Project Scope**	Newly Constructed	13	**Number of Bedrooms**	1
14	**Addition Cond. Floor Area (ft^2)**	0	15	**Number of Stories**	2
16	**Existing Cond. Floor Area (ft^2)**	n/a	17	**Fenestration Average U-factor**	0.28
18	**Total Cond. Floor Area (ft^2)**	2751	19	**Glazing Percentage (%)**	46.45%
20	**ADU Bedroom Count**	n/a	21	**ADU Conditioned Floor Area**	n/a
22	**Fuel Type**	All electric	23	**No Dwelling Unit:**	No

COMPLIANCE RESULTS
Building Does Not Comply
This building incorporates features that require field testing and/or verification by a certified ECC rater under the supervision of a CEC-approved ECC provider.
This building incorporates one or more Special Features shown below

REQUIRED SPECIAL FEATURES

The following are features that must be installed as condition for meeting the modeled energy performance for this computer analysis.

- Battery System: 42 kWh (Self Utilization Credit taken)
- Whole house fan
- Precooling Credit Taken
- Indoor air quality, balanced fan
- IAQ Ventilation System: as low as 0.4 W/CFM
- IAQ Ventilation System Heat Recovery: minimum 74 SRE and 78 ASRE
- IAQ Ventilation System: supply outside air inlet, filter, and H/ERV cores accessible per RACM Reference Manual
- IAQ Ventilation System: fault indicator display
- Cool roof
- Floor has high level of insulation
- Ducts in crawl space
- Northwest Energy Efficiency Alliance (NEEA) rated heat pump water heater; specific brand/model, or equivalent, must be installed

ECC FEATURE SUMMARY

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- Verified HSPF2
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	Efficiency[2] ($/ft^2-yr)	Total[3] ($/ft^2-yr)	Total[3] (kBtu/ft^2-yr)	Electricity (kWh)
Standard Design	15.17	19.22	8.92	199.237
Proposed Design	8.82	2.3	0.71	215.641
Compliance Margins	6.35	16.92	8.21	-17
	Pass	Pass	Pass	Fail

RESULT*: Fails

[1]Long-term System Cost (LSC) is a 30-year present value cost to California's energy system. LSC is not a predicted utility bill.

[2]Efficiency measures include energy efficient improvements such as better building envelope and more efficient mechanical equipment

[3]Total includes the sum of efficiency measures, solar photovoltaic (PV) measures and battery storage measures

* Building complies when Proposed Design is equal to or less than Standard Design in all three compliance categories

** Peak cooling target represents 120% of the standard design building peak cooling energy use.

Standard Design PV Capacity: 2.82 kWdc

Proposed PV kWh output exceeds proposed electricity use by 79% which may violate NEM rules. Contact local utility.

LSC AND SOURCE ENERGY COMPLIANCE RESULTS FOR PERFORMANCE COMPONENTS

Energy Use	Standard Design Source Energy (kBtu/ft^2 -yr)	Standard Design LSC[1] ($/ft^2 -yr)	Proposed Design Source Energy (kBtu/ft^2 -yr)	Proposed Design LSC[1] ($/ft^2 -yr)	Compliance Margin Source (kBtu/ft^2 -yr)	Compliance Margin LSC[1] ($/ft^2 -yr)
Space Heating	3.78	9.55	2.65	6.5	1.13	3.05
Space Cooling	0.17	1.3	0.2	1.32	-0.03	-0.02
IAQ Ventilation	0.34	1.32	0.22	0.85	0.12	0.47
Water Heating	3.2	3	0.36	1.52	2.84	1.48
Self Utilization/Flexibility Credit	n/a	n/a	-1.09	-1.37	1.09	1.37
Efficiency Compliance Total	**7.49**	**15.17**	**2.34**	**8.82**	**5.15**	**6.35**
Photovoltaics And Battery	-0.86	-4.97	-3.91	-15.51	3.05	10.54
Flexibility	n/a	n/a	-0.01	-0.04	0.01	0.04
Indoor Lighting	0.44	1.56	0.44	1.56	0	0
Appl. & Cooking	0.84	3.69	0.84	3.7	0	-0.01
Plug Loads	0.89	3.35	0.89	3.35	0	0
Outdoor Lighting	0.12	0.42	0.12	0.42	0	0
TOTAL COMPLIANCE	**8.92**	**19.22**	**0.71**	**2.3**	**8.21**	**16.92**

ENERGY USE INTENSITY

	Standard Design (kBtu/ft^2 - yr)	Proposed Design (kBtu/ft^2 - yr)	Margin (kBtu/ft^2 - yr)	Margin Percentage
Gross EUI[1]	11.33	9.63	1.7	15
Net EUI[2]	5.5	-7.61	13.11	238.36

Notes
1. Gross EUI is Energy Use Total (not including PV) / Total Building Area.
2. Net EUI is Energy Use Total (including PV) / Total Building Area.

REQUIRED PV SYSTEMS

01	02	03	04	05	06	07	08	09	10	11	12
DC System Size (kWdc)	**Exception**	**Module Type**	**Array Type**	**Power Electronics**	**CFI**	**Azimuth (deg)**	**Tilt Input**	**Array Angle (deg)**	**Tilt: (x in 12)**	**Inverter Eff. (%)**	**Annual Solar Access (%)**
8	NA	Standard (14-17%)	Fixed	none	true	150-270	n/a	n/a	<=7:12	96	100

BATTERY SYSTEMS

01	02	03	04	05	06	07
Control	**Capacity (kWh)**	**Charging**		**Discharging**		**Round Trip Efficiency**
		Charging Efficiency	**Charging Rate (kW)**	**Discharging Efficiency**	**Discharging Rate (kW)**	
Basic	42	0.95	n/a	0.95	n/a	0.9

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**
New Residence	2751	1	1	2	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**	**Status**
2: Upper Level	Conditioned	Heat Pump1	499	9.5	DHW Sys 1	New
1: Lower Level	Conditioned	Heat Pump1	2252	8.67	DHW Sys 1	New

OPAQUE SURFACES SUMMARY

01	02	03	04	05	06	07	08
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Gross Area (ft^2)**	**Window and Door Area (ft2)**	**Tilt (deg)**
N Wall	2: Upper Level	R-21 FasWal (ICF Equival)	33	Front	314	127.8	90
E Wall	2: Upper Level	R-21 FasWal (ICF Equival)	123	Left	371	62	90
S Wall	2: Upper Level	R-21 FasWal (ICF Equival)	213	Back	314	130	90
W Wall	2: Upper Level	R-21 FasWal (ICF Equival)	303	Right	371	33	90
N Wall 2	1: Lower Level	R-21 FasWal (ICF Equival)	33	Front	785	221.5	90
E Wall 2	1: Lower Level	R-21 FasWal (ICF Equival)	123	Left	728	182.2	90
S Wall 2	1: Lower Level	R-21 FasWal (ICF Equival)	213	Back	757	333.2	90
SW Wall	1: Lower Level	R-21 FasWal (ICF Equival)	258	n/a	26	8	90
W Wall 2	1: Lower Level	R-21 FasWal (ICF Equival)	303	Right	720	155.2	90
Raised Floor	1: Lower Level	R-30 Floor Crawlspace	n/a	n/a	2252	n/a	n/a
Interior Floor	2: Upper Level	Interior R-0 Floor	n/a	n/a	499	n/a	n/a

OPAQUE SURFACES - CATHEDRAL CEILINGS

01	02	03	04	05	06	07	08	09	10
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Area (ft^2)**	**Skylight Area (ft^2)**	**Roof Rise (x in 12)**	**CRRC Rated Roof Reflectance**	**CRRC Rated Roof Emittance**
Roof Rafter	2: Upper Level	R-38 Roof No Attic	213	Back	499	0	3	0.63	0.85

OPAQUE SURFACES - CATHEDRAL CEILINGS

01	02	03	04	05	06	07	08	09	10
Name	**Zone**	**Construction**	**Azimuth**	**Orientation**	**Area (ft^2)**	**Skylight Area (ft^2)**	**Roof Rise (x in 12)**	**CRRC Rated Roof Reflectance**	**CRRC Rated Roof Emittance**
Roof Rafter 2	1: Lower Level	R-38 Roof No Attic	33	Front	1853	25	0	0.63	0.85

FENESTRATION / GLAZING

01	02	03	04	05	06	07	08	09	10
Name	**Type**	**Surface**	**Orientation**	**Azimuth**	**Mult.**	**Area (ft^2)**	**U-factor**	**SHGC**	**Rating Source**
32	Window	N Wall	Front	33	1	42.6	0.27	0.21	NFRC
33	Window	N Wall	Front	33	1	42.6	0.27	0.21	NFRC
34	Window	N Wall	Front	33	1	42.6	0.27	0.21	NFRC
35	Window	E Wall	Left	123	1	12	0.27	0.21	NFRC
Door H	Window	E Wall	Left	123	1	22	0.3	0.19	NFRC
18'	Window	E Wall	Left	123	1	14	0.27	0.21	NFRC
17'	Window	E Wall	Left	123	1	14	0.27	0.21	NFRC
36	Window	S Wall	Back	213	1	64	0.27	0.21	NFRC
37	Window	S Wall	Back	213	1	66	0.27	0.21	NFRC
38	Window	W Wall	Right	303	1	9	0.27	0.21	NFRC
Door I	Window	W Wall	Right	303	1	24	0.3	0.19	NFRC
29	Window	N Wall 2	Front	33	1	30.6	0.27	0.21	NFRC
30	Window	N Wall 2	Front	33	1	6	0.27	0.21	NFRC
31	Window	N Wall 2	Front	33	1	7.5	0.27	0.21	NFRC

FENESTRATION / GLAZING

01	02	03	04	05	06	07	08	09	10
Name	**Type**	**Surface**	**Orientation**	**Azimuth**	**Mult.**	**Area (ft^2)**	**U-factor**	**SHGC**	**Rating Source**
Door A	Window	N Wall 2	Front	33	1	28	0.3	0.19	NFRC
1	Window	N Wall 2	Front	33	1	7.5	0.27	0.21	NFRC
2	Window	N Wall 2	Front	33	1	30	0.27	0.21	NFRC
16	Window	N Wall 2	Front	33	1	37.3	0.27	0.21	NFRC
15	Window	N Wall 2	Front	33	1	37.3	0.27	0.21	NFRC
14	Window	N Wall 2	Front	33	1	37.3	0.27	0.21	NFRC
Door B	Window	E Wall 2	Left	123	1	24	0.3	0.19	NFRC
3	Window	E Wall 2	Left	123	1	26.7	0.27	0.21	NFRC
Door G	Window	E Wall 2	Left	123	1	22	0.3	0.19	NFRC
18	Window	E Wall 2	Left	123	1	14	0.27	0.21	NFRC
17	Window	E Wall 2	Left	123	1	14	0.27	0.21	NFRC
5	Window	E Wall 2	Left	123	1	5	0.27	0.21	NFRC
6	Window	E Wall 2	Left	123	1	5	0.27	0.21	NFRC
8	Window	E Wall 2	Left	123	1	16	0.27	0.21	NFRC
9	Window	E Wall 2	Left	123	1	17.5	0.27	0.21	NFRC
19	Window	E Wall 2	Left	123	1	38	0.27	0.21	NFRC
10	Window	S Wall 2	Back	213	1	54	0.27	0.21	NFRC
11	Window	S Wall 2	Back	213	1	37.3	0.27	0.21	NFRC
12	Window	S Wall 2	Back	213	1	37.3	0.27	0.21	NFRC

FENESTRATION / GLAZING

01	02	03	04	05	06	07	08	09	10
Name	**Type**	**Surface**	**Orientation**	**Azimuth**	**Mult.**	**Area (ft^2)**	**U-factor**	**SHGC**	**Rating Source**
13	Window	S Wall 2	Back	213	1	37.3	0.27	0.21	NFRC
Door D	Window	S Wall 2	Back	213	1	88	0.3	0.19	NFRC
20	Window	S Wall 2	Back	213	1	63.3	0.27	0.21	NFRC
22	Window	S Wall 2	Back	213	1	8	0.27	0.21	NFRC
23	Window	S Wall 2	Back	213	1	8	0.27	0.21	NFRC
24	Window	SW Wall		258	1	8	0.27	0.21	NFRC
7	Window	W Wall 2	Right	303	1	5	0.27	0.21	NFRC
Door C	Window	W Wall 2	Right	303	1	22	0.3	0.19	NFRC
21	Window	W Wall 2	Right	303	1	24	0.27	0.21	NFRC
Door E	Window	W Wall 2	Right	303	1	22	0.3	0.19	NFRC
25	Window	W Wall 2	Right	303	1	8	0.27	0.21	NFRC
26	Window	W Wall 2	Right	303	1	8	0.27	0.21	NFRC
27	Window	W Wall 2	Right	303	1	12	0.27	0.21	NFRC
Door F	Window	W Wall 2	Right	303	1	44	0.3	0.19	NFRC
28	Window	W Wall 2	Right	303	1	10.2	0.27	0.21	NFRC
Skylight	Skylight	Roof Rafter 2	Front	33	1	25	0.38	0.28	NFRC
Total North Facing Fenestration						374.3			
Total East Facing Fenestration						188.2			

FENESTRATION / GLAZING

01	02	03	04	05	06	07	08	09	10
Name	**Type**	**Surface**	**Orientation**	**Azimuth**	**Mult.**	**Area (ft^2)**	**U-factor**	**SHGC**	**Rating Source**
Total South Facing Fenestration						463.20000000000004			
Total West Facing Fenestration						244.2			

OPAQUE SURFACE CONSTRUCTIONS

01	02	03	04	05	06	07	08	09
Construction Name	**Surface Type**	**Construction Type**	**Framing**	**Total Cavity R-value**	**Interior / Exterior Continuous R-value**	**U-factor**	**Assembly Layers**	**Non-Std Spray Foam**
R-21 FasWal (ICF Equival)	Exterior Walls	Concrete / ICF / Brick	None	n/a	10.2041 / 10.2041	0.045	Inside Finish: Gypsum Board Insulation/Furring: R-10.2 / no furring Mass Layer: 6 in. Concrete Insulation/Furring: R-10.2 / no furring Exterior Finish: All Other Siding	☐
R-38 Roof No Attic	Cathedral Ceilings	Wood Framed Ceiling	2x8 @ 24 in. O. C.	R-38	None / None	0.031	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: R-38 / 2x8 Inside Finish: Gypsum Board	☐

OPAQUE SURFACE CONSTRUCTIONS

01	02	03	04	05	06	07	08	09
Construction Name	**Surface Type**	**Construction Type**	**Framing**	**Total Cavity R-value**	**Interior / Exterior Continuous R-value**	**U-factor**	**Assembly Layers**	**Non-Std Spray Foam**
R-30 Floor Crawlspace	Floors Over Crawlspace	Wood Framed Floor	2x10 @ 16 in. O. C.	R-30	None / None	0.034	Floor Surface: Carpeted Floor Deck: Wood Siding/sheathing/decking Cavity / Frame: R-30 / 2x10	☐
Interior R-0 Floor	Interior Floors	Wood Framed Floor	2x12 @ 16 in. O. C.	R-0	None / None	0.196	Floor Surface: Carpeted Floor Deck: Wood Siding/sheathing/decking Cavity / Frame: no insul. / 2x12 Ceiling Below Finish: Gypsum Board	☐

WATER HEATING SYSTEMS

01	02	03	04	05	06	07	08	09
Name	**System Type**	**Distribution Type**	**Water Heater Name**	**Number of Units**	**Solar Heating System**	**Compact Distribution**	**ECC Verification**	**Water Heater Name (#)**
DHW Sys 1	Domestic Hot Water (DHW)	Standard	DHW Heater 1	1	n/a	None	n/a	DHW Heater 1 (1)

WATER HEATERS - HEAT PUMP

01	02	03	04	05	06	07	08	09	10
Name	# of Units	Tank Vol. (gal)	NEEA Heat Pump Brand	NEEA Heat Pump Model	Tank Location	Duct Inlet Air Source	Duct Outlet Air Source	UEF	JA13 Compliant
DHW Heater 1	1	80	A. O. Smith	AOSmithHPTA80 2xx	CrawlSpace	Crawl Space	Crawl Space	n/a	☐

HVAC - HEAT PUMPS

01	02	03	04	05	06	06b	07	08	09	10	11	12	13
Name	System Type	Number of Units	Heating					Cooling			Airflow Target	Fan Power (Watts/CFM)	Variable Speed
			Heating Efficiency Type	HSPF/HSPF2/COP	Cap 47	Cap 17	Backup	Cooling Efficiency Type	SEER/SEER2	EER/EER2/CEER			
Heat Pump System 1	Central split HP	1	HSPF2	9.5	48000	39000	Electric	EER2/SEER2	23	12.5	0	0.4	☐

HVAC - DISTRIBUTION SYSTEMS

01	02	03	04	05	06	07
Name	Type	Design Type	Duct Ins. R-value		Duct Location	
			Supply/Return		Supply	Return
Air Distribution System 1	Unconditioned crawl space	Non-Verified	R-8		Crawl Space	Crawl Space

INDOOR AIR QUALITY (IAQ) FANS

01	02	03	04	05	06	07	08
Dwelling Unit	Airflow (CFM)	Fan Efficacy (W/CFM)	IAQ Fan Type	Includes Heat/Energy Recovery?	IAQ Recovery Effectiveness - ASRE	Includes Fault Indicator Display?	Status
SFam IAQVentRpt 1-1	100	0.4	Balanced	Yes	74 / 78	Yes	

COOLING VENTILATION								
01	02	03	04	05	06	07	08	09
Name	Airflow Rate (CFM/ft2)	Cooling Vent CFM	Cooling Vent Watts/CFM	Total Watts	Number of Fans	CFVCS Type	Exhausts to	ECC Verification
WH Fan 1	1.87	4200	0.119	500	1	Not a CFVCS	Outside	Required

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name: Travis Wade	Documentation Author Signature:
Company: Wade Energy	Signature Date: 11/24/2025
Address: 1942 Linda Dr.	CEA/AEA/ECC Certification Identification (if applicable): NR19-16-30032
City/State/Zip: Pleasant Hill, CA 94523	Phone: (925) 203-5686 x 1

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. 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.
5. I understand that a registered copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building and shall be made available to the enforcement agency for all applicable inspections. I will take the necessary steps to fulfill this requirement.
6. I understand that a registered copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy. I will take the necessary steps to fulfill this requirement.

Responsible Designer Name:	Responsible Designer Signature:
Company:	Date Signed:
Address:	License:
City/State/Zip:	Phone: