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Calculation Description: Title 24 Analysis

Calculation Date/Time: 2023-06-27T14:40:56-07:00

Input File Name: 2306-22-0336 Chula-Vista ADU -- 749 L-Shape -- Standard 1BR

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GENER	AL INFORMATION										
01	Project Name	2306-22-0336 Chula-Vista ADU 749 L-Shape	6-22-0336 Chula-Vista ADU 749 L-Shape Standard 1BR RF								
02	Run Title	Title 24 Analysis	e 24 Analysis								
03	Project Location	276 4th Avenue									
04	City	Chula Vista	05	Standards Version	2022						
06	Zip code	91910	07	Software Version	EnergyPro 9.1						
08	Climate Zone	10	09	Front Orientation (deg/ Cardinal)	All orientations						
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	1						
16	Existing Cond. Floor Area (ft ²)	n/a	17	Fenestration Average U-factor	0.3						
18	Total Cond. Floor Area (ft ²)	749	19	Glazing Percentage (%)	14.22%						
20	ADU Bedroom Count	n/a									
			- 4								

COMPLIANCE RI	ESULTS
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

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		Energy Design Ratings			Compliance Margins						
	Source Energy (EDR1)	Efficiency ¹ EDR (EDR2efficiency)	Total ² EDR (EDR2total)	Source Energy (EDR1)	Efficiency ¹ EDR (EDR2efficiency)	Total ² EDR (EDR2total)					
Standard Design	36	40	28.9								
Proposed Design											
North Facing	33.8	35.1	26.3	2.2	4.9	2.6					
East Facing	34.5	37.3	27.5	1.5	2.7	1.4					
South Facing	South Facing 33.9 West Facing 34.1		26	2.1	5.5	2.9					
West Facing			27.1	1.9	3.4	1.8					

RESULT³: PASS

- Standard Design PV Capacity: 1.83 kWdc
- Proposed PV Capacity Scaling: North (1.83 kWdc) East (1.83 kWdc) South (1.83 kWdc) West (1.83 kWdc)

¹Efficiency EDR includes improvements like a better building envelope and more efficient equipment

²Total EDR includes efficiency and demand response measures such as photovoltaic (PV) system and batteries

³Building complies when source energy, efficiency and total compliance margins are greater than or equal to zero and unmet load hour limits are not exceeded

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ENERGY USE SUMMARY						
Energy Use	Standard Design Source Energy (EDR1) (kBtu/ft ² -yr)	Standard Design TDV Energy (EDR2) (kTDV/ft ² -yr)	Proposed Design Source Energy (EDR1) (kBtu/ft ² -yr)	Proposed Design TDV Energy (EDR2) (kTDV/ft ² -yr)	Compliance Margin (EDR1)	Compliance Margin (EDR2)
Space Heating	0.86	3.86	1.37	10.02	-0.51	-6.16
Space Cooling	1.84	37.31	1.34	30.08	0.5	7.23
IAQ Ventilation	0.38	4.02	0.38	4.02	0	0
Water Heating	2.53	25.75	1.61	18.16	0.92	7.59
Self Utilization/Flexibility Credit				0		0
North Facing Efficiency Compliance Total	5.61	70.94	4.7	62.28	0.91	8.66
Space Heating	0.86	3.86	1.57	11.48	-0.71	-7.62
Space Cooling	1.84	37.31	1.44	32.48	0.4	4.83
IAQ Ventilation	0.38	4.02	0.38	4.02	0	0
Water Heating	2.53	25.75	1.62	18.2	0.91	7.55
Self Utilization/Flexibility Credit				0		0
East Facing Efficiency Compliance Total	5.61	70.94	5.01	66.18	0.6	4.76

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ENERGY USE SUMMARY			RF.ribd22x			
Energy Use	Standard Design Source Energy (EDR1) (kBtu/ft ² -yr)	Standard Design TDV Energy (EDR2) (kTDV/ft ² -yr)	Proposed Design Source Energy (EDR1) (kBtu/ft ² -yr)	Proposed Design TDV Energy (EDR2) (kTDV/ft ² -yr)	Compliance Margin (EDR1)	Compliance Margin (EDR2)
Space Heating	0.86	3.86	1.46	10.51	-0.6	-6.65
Space Cooling	1.84	37.31	1.29	28.51	0.55	8.8
IAQ Ventilation	0.38	4.02	0.38	4.02	0	0
Water Heating	2.53	25.75	1.62	18.19	0.91	7.56
Self Utilization/Flexibility Credit				0		0
South Facing Efficiency Compliance Total	5.61	70.94	4.75	61.23	0.86	9.71
Space Heating	0.86	3.86	1.4	10.05	-0.54	-6.19
Space Cooling	1.84	37.31	1.45	32.74	0.39	4.57
IAQ Ventilation	0.38	4.02	0.38	4.02	0	0
Water Heating	2.53	25.75	1.61	18.14	0.92	7.61
Self Utilization/Flexibility Credit		CIT		0		0
West Facing Efficiency Compliance Total	5.61	70.94	4.84	64.95	0.77	5.99

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ENERGY USE INTENSITY											
	Standard Design (kBtu/ft ² - yr)	Proposed Design (kBtu/ft ² - yr)	Compliance Margin (kBtu/ft ² - yr)	Margin Percentage							
North Facing											
Gross EUI ¹	23.28	21.55	1.73	7.43							
Net EUI ²	9.08	7.34	1.74	19.16							
East Facing											
Gross EUI ¹	23.28	22.01	1.27	5.46							
Net EUI ²	9.08	7.8	1.28	14.1							
South Facing											
Gross EUI ¹	23.28	21.56	1.72	7.39							
Net EUI ²	9.08	7.35	1.73	19.05							
West Facing											
Gross EUI ¹ 23.28		21.94	1.34	5.76							
Net EUI ²	9.08	7.73	1.35	14.87							

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^{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.

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REQUIRED PV SYS	REQUIRED PV SYSTEMS													
01	01 02 03 04		05	06	07	08	09	10	11	12				
DC System Size (kWdc)	Exception	Module Type	Array Type	e Power Electronics		Azimuth (deg)	Tilt Input	Array Angle (deg)	Tilt: (x in 12)	Inverter Eff. (%)	Annual Solar Access (%)			
1.83	NA	Standard (14-17%)	Fixed	none	true	150-270	n/a	n/a	<=7:12	96	98			

REQUIRED SPECIAL FEATURES

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

- Insulation below roof deck
- Northwest Energy Efficiency Alliance (NEEA) rated heat pump water heater; specific brand/model, or equivalent, must be installed

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 tables below. Registered CF2Rs and CF3Rs are required to be completed in the HERS Registry

- Quality insulation installation (QII)
- Indoor air quality ventilation
- Kitchen range hood
- Verified heat pump rated heating capacity

BUILDING - FEATURES INFORMA	UILDING - 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						
2306-22-0336 Chula-Vista ADU 749 L-Shape Standard 1BR RF		1	1	1	0	1						

ZONE INFORMATION											
01	02	03	04	06	07						
Zone Name Zone Type		HVAC System Name Zone Floor Area (ft ²)		Avg. Ceiling Height	Water Heating System 1	Status					
New ADU	Conditioned	New HVAC1	749	8	DHW Sys 1	New					

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OPAQUE SURFACES							
01	01 02 03 Name Zone Construction		04	05	06	07	08
Name			Azimuth	Orientation	Gross Area (ft ²)	Window and Door Area (ft2)	Tilt (deg)
New Front Wall	New ADU	R-21 w/R-5 Wall	0	Front	244	54.5	90
New Left Wall	New ADU	R-21 w/R-5 Wall	90	Left	256	0	90
New Back Wall	New ADU	R-21 w/R-5 Wall	180	Back	244	48	90
New Right Wall	New ADU	R-21 w/R-5 Wall	270	Right	259	24	90
New Roof Attic	New ADU	R-38 w/R-19 B.R.D.	n/a	n/a	749	n/a	n/a
New Raised Floor	New ADU	R-19 Floor Crawlspace	n/a	n/a	749	n/a	n/a

ATTIC	ATTIC											
01	01 02 03		04 05		06	07	08					
Name	Construction	Туре	Roof Rise (x in 12)	Roof Reflectance	Roof Emittance	Radiant Barrier	Cool Roof					
Attic New ADU	Attic RoofNew ADU	Ventilated	4.5	0.1	0.85	No	No					

FENESTRATION /	FENESTRATION / GLAZING												
01	02	03	04	05	06	07	08	09	10	11	12	13	14
Name	Туре	Surface	Orientation	Azimuth	Width (ft)	Height (ft)	Mult.	Area (ft ²)	U-factor	U-factor Source	SHGC	SHGC Source	Exterior Shading
Window W9	Window	New Front Wall	Front	0			1	24	0.3	NFRC	0.23	NFRC	Bug Screen
Window W8	Window	New Front Wall	Front	0			1	10.5	0.3	NFRC	0.23	NFRC	Bug Screen
Window W4	Window	New Back Wall	Back	180			1	24	0.3	NFRC	0.23	NFRC	Bug Screen
Window W3	Window	New Back Wall	Back	180			1	24	0.3	NFRC	0.23	NFRC	Bug Screen
Window W2	Window	New Right Wall	Right	270			1	12	0.3	NFRC	0.23	NFRC	Bug Screen
Window W1	Window	New Right Wall	Right	270			1	12	0.3	NFRC	0.23	NFRC	Bug Screen

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OPAQUE DOORS			
01	02	03	04
Name	Side of Building	Area (ft ²)	U-factor
Front Door D1	New Front Wall	20	0.2

OPAQUE SURFACE CONSTR			0.0	05	0.5		
01	02	03	04	05	06	07	08
Construction Name	Surface Type	Construction Type	Framing	Total Cavity R-value	Interior / Exterior Continuous R-value	U-factor	Assembly Layers
R-21 w/R-5 Wall	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O. C.	R-21	None / 5	0.048	Inside Finish: Gypsum Board Cavity / Frame: R-21 / 2x6 Sheathing / Insulation: R-5 Sheathing Exterior Finish: 3 Coat Stucco
Attic RoofNew ADU	Attic Roofs	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-19	None / 0	0.059	Roofing: Light Roof (Asphalt Shingle) Roof Deck: Wood Siding/sheathing/decking Cavity / Frame: R-13.0 / 2x4 Around Roof Joists: R-6.0 insul.
R-19 Floor Crawlspace	Floors Over Crawlspace	Wood Framed Floor	2x10 @ 16 in. O. C.	R-19	None / None	0.046	Floor Surface: Carpeted Floor Deck: Wood Siding/sheathing/decking Cavity / Frame: R-19 / 2x10
R-38 w/R-19 B.R.D.	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 24 in. O. C.	R-38	None / None	0.025	Over Ceiling Joists: R-28.9 insul. Cavity / Frame: R-9.1 / 2x4 Inside Finish: Gypsum Board

BUILDING ENVELOPE - HERS VERIFICATION							
01	02	03	04	05			
Quality Insulation Installation (QII)	High R-value Spray Foam Insulation	Building Envelope Air Leakage	CFM50	CFM50			
Required	Not Required	N/A	n/a	n/a			

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WATER HEATING S	YSTEMS							
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	HERS 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 - NEEA	HEAT PUMP		# 41 H		4		
01	02	03	04	05	06	07	08
Name	# of Units	Tank Vol. (gal)	NEEA Heat Pump Brand	NEEA Heat Pump Model	Tank Location	Duct Inlet Air Source	Duct Outlet Air Source
DHW Heater 1	1	50	AOSmith	AOSmithHPTU50	Outside	New ADU	New ADU

WATER HEATING - HERS VE	RIFICATION					
01	02	03	04	05	06	07
Name	Pipe Insulation	Parallel Piping	Compact Distribution	Compact Distribution Type	Recirculation Control	Shower Drain Water Heat Recovery
DHW Sys 1 - 1/1	Not Required	Not Required	Not Required	None	Not Required	Not Required

SPACE CONDITIONIN	NG SYSTEMS							
01	02	03	04	05	06	07	08	09
Name	System Type	Heating Unit Name	Heating Equipment Count	Cooling Unit Name	Cooling Equipment Count	Fan Name	Distribution Name	Required Thermostat Type
New HVAC1	Heat pump heating cooling	Heat Pump System 1	1	Heat Pump System	1	n/a	n/a	Setback

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Name System Type Number of Units Efficiency Type Type Cop Cop Type Cop Type Cap 47 Cap 17 Cap 17 Cap 17 Cap Ca	13
Name System Type Number of Units Efficiency HSPF / HSPF / HSPF / Cap 47 Cap 17 Type SFFR 2 EER / SFFR 2 EER / Controlled Type HERS Type	
Name System Type Units Efficiency HSPF2 / Cap 47 Cap 17 Efficiency SEER / EER / Controlled Type HERS	
	Verification
	ump System rs-htpump

HVAC HEAT PUMPS -	HERS VERIFICATION							
01	02	03	04	05	06	07	08	09
Name	Verified Airflow	Airflow Target	Verified EER/EER2	Verified SEER/SEER2	Verified Refrigerant Charge	Verified HSPF/HSPF2	Verified Heating Cap 47	Verified Heating Cap 17
Heat Pump System 1-hers-htpump	Not Required	0	Not Required	Not Required	No	No	Yes	Yes

INDOOR AIR QUALITY	Y (IAQ) FANS							
01	02	03	04	05	06	07	08	09
Dwelling Unit	Airflow (CFM)	Fan Efficacy (W/CFM)	IAQ Fan Type	Includes Heat/Energy Recovery?	IAQ Recovery Effectiveness - SRE	Includes Fault Indicator Display?	HERS Verification	Status
SFam IAQVentRpt	37	0.35	Exhaust	No	n/a	No	Yes	

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DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	THE TOTAL CONTRACTOR OF THE TOTAL CONTRACTOR OT THE TOTAL CONTRACTOR OF THE TOTAL CONTRACTOR OT THE TOTAL CONTRACTOR OF THE TO			
1. I certify that this Certificate of Compliance documentation is accurate and complete.				
Documentation Author Name: Kenneth Ponce	Documentation Author Signature: Kenneth Ponce			
Company: So Cal Title 24	Signature Date: 06/27/2023			
Address: 8659 Red Oak Street, Suite I	CEA/ HERS Certification Identification (If applicable):			
City/State/Zip: Rancho Cucamonga, CA 91730	Phone: 909-257-7547			
RESPONSIBLE PERSON'S DECLARATION STATEMENT				
, , ,	ficate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations. ompliance are consistent with the information provided on other applicable compliance documents, worksheets,			
Responsible Designer Name: Mike Moore	Responsible Designer Signature: Mike Moore			
Company: Snap ADU	Date Signed: 06/27/2023			
Address: PO Box 2685	License:			
City/State/Zip: Carlsbad, CA 92018	Phone: (760) 259-1985			

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