BUILDING ENERGY ANALYSIS REPORT

PROJECT:

ZNE Example
7188 Pleasant Way
Los Angeles, CA 90000

Project Designer:

Bernard Parker & Assoc.
573 Oak Drive
Sacramento, CA 95000
(415) 256-5555

Report Prepared by:

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Job Number:

M52000

Date:

10/25/2016

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2016 Building Energy Efficiency Standards.

This program developed by EnergySoft Software – www.energysoft.com.

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GENERAL INFORMATION					
01	Project Name	ZNE Example			
02	Calculation Description	Title 24 Analysis			
03	Project Location	7188 Pleasant Way			
04	City	Los Angeles	05	Standards Version	Compliance 2017
06	Zip Code	90000	07	Compliance Manager Version	BEMCmpMgr 2016.2.1 (695)
08	Climate Zone	CZ9	09	Software Version	EnergyPro 7.1
10	Building Type	Single Family	11	Front Orientation (deg/Cardinal)	90
12	Project Scope	Newly Constructed	13	Number of Dwelling Units	1
14	Total Cond. Floor Area (ft^2)	2000	15	Number of Zones	2
16	Slab Area (ft^2)	1200	17	Number of Stories	2
18	Addition Cond. Floor Area	n/a	19	Natural Gas Available	Yes
20	Addition Slab Area (ft^2)	n/a	21	Glazing Percentage (%)	19.5%

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	5.63	4.21	1.42	25.2%
Space Cooling	21.36	18.41	2.95	13.8%
IAQ Ventilation	1.15	1.15	0.00	0.0%
Water Heating	8.52	10.31	-1.79	-21.0%
Photovoltaic Offset	----	-9.24	9.24	----
Compliance Energy Total	**36.66**	**24.84**	**11.82**	**32.2%**

ENERGY DESIGN RATING

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).

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

EDR of Standard Design	EDR of Proposed Design	EDR Value of Proposed PV	Final EDR of Proposed Design
49.0	50.8	57.6	-6.8

☒	**Design meets Tier 1 requirement of 15% or greater code compliance margin (CALGreen A4.203.1.2.1) and QII verification prerequisite.**
☒	**Design meets Tier 2 requirement of 30% or greater code compliance margin (CALGreen A4.203.1.2.2) and QII verification prerequisite.**
☒	**Design meets Zero Net Energy (ZNE) Design Designation requirement for Single Family in climate zone CZ9 (Burbank) (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.**

ENERGY DESIGN RATING PV SYSTEM INPUTS - DETAILED

DC System Size (kW)	Module Type	CFI	Azimuth (deg)	Tilt Input	Array Angle (deg)	Tilt: (x in 12)	Inverter Eff. (%)
2	Standard	☒	n/a	n/a	n/a	n/a	96
1	Standard	☒	n/a	n/a	n/a	n/a	96
2	Standard	☒	n/a	n/a	n/a	n/a	96

REQUIRED SPECIAL FEATURES

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

- **PV System: 5.0 kWdc**
- **Whole house fan**
- **Non-standard duct location (any location other than attic)**

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:
- **Insulation Inspection**
- **IAQ mechanical ventilation**

Cooling System Verifications:
- **Minimum Airflow**
- **Verified SEER**
- **Refrigerant Charge**
- **Fan Efficacy Watts/CFM**

HVAC Distribution System Verifications:
- **Duct Sealing**
- **Ducts located entirely in conditioned space confirmed by duct leakage testing**

Domestic Hot Water System Verifications:
- **-- 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**
ZNE Example	2000	1	3	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**	**Water Heating System 2**
1st Floor Zone	Conditioned	Res HVAC1	1200	8	DHW Sys 1	
2nd Floor Zone	Conditioned	Res HVAC1	800	8	DHW Sys 1	

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	1st Floor Zone	R-19 Wall w/1 XPS	0	Right	320	81	90
Left Wall	1st Floor Zone	R-19 Wall w/1 XPS	90	Front	240	40	90
Back Wall	1st Floor Zone	R-19 Wall w/1 XPS	180	Left	320	88.7	90
Right Wall	1st Floor Zone	R-19 Wall w/1 XPS	270	Back	240	32	90
Wall to Garage	1st Floor Zone>>__Garage__	R-13 Wall			100	20	
R-38 Roof	1st Floor Zone	R-38+13 HP Attic			500		
Front Wall 2	2nd Floor Zone	R-19 Wall w/1 XPS	0	Right	320	60	90
Left Wall 2	2nd Floor Zone	R-19 Wall w/1 XPS	90	Front	240	24	90
BackWall	2nd Floor Zone	R-19 Wall w/1 XPS	180	Left	320	70	90
Right Wall 2	2nd Floor Zone	R-19 Wall w/1 XPS	270	Back	240	32	90
R-38 Roof 2	2nd Floor Zone	R-38+13 HP Attic			800		
Floor over Garage	2nd Floor Zone>>__Garage__	R-19 Floor No Crawlspace			100		
GarageWallFront	__Garage__	Garage Ext Wall	0	Right	180	128	90
GarageWallLeft	__Garage__	Garage Ext Wall	90	Front	198	0	90
GarageWallRight	__Garage__	Garage Ext Wall	270	Back	108	0	90
GarageRoof	__Garage__	R-30 Roof Attic			340		

ATTIC

01	02	03	04	05	06	07	08
Name	**Construction**	**Type**	**Roof Rise**	**Roof Reflectance**	**Roof Emittance**	**Radiant Barrier**	**Cool Roof**
Attic __Garage__	Attic Garage Roof Cons	Ventilated	4	0.1	0.85	No	No
Attic 1st Floor Zone	Attic Roof1st Floor Zone	Ventilated	4	0.1	0.85	Yes	No
Attic 2nd Floor Zone	Attic Roof2nd Floor Zone	Ventilated	4	0.1	0.85	Yes	No

WINDOWS

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
Front Windows	Window	Front Wall (Right-0)	----	----	1	60.0	0.32	0.25	Insect Screen (default)
Left Windows	Window	Left Wall (Front-90)	----	----	1	40.0	0.32	0.25	Insect Screen (default)
Back Windows	Window	Back Wall (Left-180)	----	----	1	72.0	0.32	0.25	Insect Screen (default)
Right Windows	Window	Right Wall (Back-270)	----	----	1	32.0	0.32	0.25	Insect Screen (default)
Front Windows 2	Window	Front Wall 2 (Right-0)	----	----	1	60.0	0.32	0.25	Insect Screen (default)
Left Windows 2	Window	Left Wall 2 (Front-90)	----	----	1	24.0	0.32	0.25	Insect Screen (default)
Back Windows 2	Window	BackWall (Left-180)	----	----	1	70.0	0.32	0.25	Insect Screen (default)
Right Windows 2	Window	Right Wall 2 (Back-270)	----	----	1	32.0	0.32	0.25	Insect Screen (default)

DOORS

01	02	03	04
Name	Side of Building	Area (ft^2)	U-factor
Entry Door	Front Wall	21.0	0.50
Back Door	Back Wall	16.7	0.50
Door	Wall to Garage	20.0	0.50
GarageCarDoorFront	GarageWallFront	128.0	0.70

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**
Garage Ext Wall	Exterior Walls	Wood Framed Wall	2x4 @ 16 in. O.C.	none	0.361	• *Inside Finish: Gypsum Board* • *Cavity / Frame: no insul. / 2x4* • *Exterior Finish: 3 Coat Stucco*
R-30 Roof Attic	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 24 in. O.C.	R 30	0.032	• *Inside Finish: Gypsum Board* • *Cavity / Frame: R-9.1 / 2x4* • *Over Ceiling Joists: R-20.9 insul.*
Attic Garage Roof Cons	Attic Roofs	Wood Framed Ceiling	2x4 Top Chord of Roof Truss @ 24 in. O.C.	none	0.644	• *Cavity / Frame: no insul. / 2x4 Top Chrd* • *Roof Deck: Wood Siding/sheathing/decking* • *Roofing: Light Roof (Asphalt Shingle)*
Attic Roof1st Floor Zone	Attic Roofs	Wood Framed Ceiling	2x4 Top Chord of Roof Truss @ 24 in. O.C.	R 13	0.078	• *Under Roof Joists: R-0.0 insul.* • *Cavity / Frame: R-13.0 / 2x4 Top Chrd* • *Roof Deck: Wood Siding/sheathing/decking* • *Roofing: Light Roof (Asphalt Shingle)*
R-38+13 HP Attic	Ceilings (below attic)	Wood Framed Ceiling	2x4 @ 24 in. O.C.	R 38	0.025	• *Inside Finish: Gypsum Board* • *Cavity / Frame: R-9.1 / 2x4* • *Over Ceiling Joists: R-28.9 insul.*
R-19 Wall w/1 XPS	Exterior Walls	Wood Framed Wall	2x6 @ 16 in. O.C.	R 19	0.050	• *Inside Finish: Gypsum Board* • *Cavity / Frame: R-19 / 2x6* • *Sheathing / Insulation: R5 Sheathing* • *Exterior Finish: 3 Coat Stucco*
R-13 Wall	Interior Walls	Wood Framed Wall	2x4 @ 16 in. O.C.	R 13	0.092	• *Inside Finish: Gypsum Board* • *Cavity / Frame: R-13 / 2x4* • *Other Side Finish: Gypsum Board*
Attic Roof2nd Floor Zone	Attic Roofs	Wood Framed Ceiling	2x4 Top Chord of Roof Truss @ 24 in. O.C.	R 13	0.078	• *Under Roof Joists: R-0.0 insul.* • *Cavity / Frame: R-13.0 / 2x4 Top Chrd* • *Roof Deck: Wood Siding/sheathing/decking* • *Roofing: Light Roof (Asphalt Shingle)*
R-0 Floor No Crawlspace	Interior Floors	Wood Framed Floor	2x12 @ 16 in. O.C.	none	0.196	• *Floor Surface: Carpeted* • *Floor Deck: Wood Siding/sheathing/decking* • *Cavity / Frame: no insul. / 2x12* • *Ceiling Below Finish: Gypsum Board*
R-19 Floor No Crawlspace	Interior Floors	Wood Framed Floor	2x6 @ 16 in. O.C.	R 19	0.048	• *Floor Surface: Carpeted* • *Floor Deck: Wood Siding/sheathing/decking* • *Cavity / Frame: R-19 / 2x6* • *Ceiling Below 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**
Covered Slab	1st Floor Zone	1200	90	None	0.8	No
GarageSlab	__Garage__	440	54	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	---

WATER HEATING SYSTEMS

01	02	03	04	05	06
Name	**System Type**	**Distribution Type**	**Water Heater**	**Number of Heaters**	**Solar Fraction (%)**
DHW Sys 1	Standard	Standard	DHW Heater 1 (1)	1	.0%

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**
DHW Heater 1	Heat Pump	Small Storage	1	n/a	n/a	n/a	n/a	n/a	AO Smith PHPT 60	__Garage__

SPACE CONDITIONING SYSTEMS

01	02	03	04	05	06
SC Sys Name	**System Type**	**Heating Unit Name**	**Cooling Unit Name**	**Fan Name**	**Distribution Name**
Res HVAC1	Heat Pump Heating and Cooling System	Heat Pump System 1	Heat Pump System 1	HVAC Fan 1	Air Distribution System 1

HVAC - HEAT PUMPS

01	02	03	04	05	06	07	08	09	10	11
	System	**Number of**	**Heating**			**Cooling**		**Zonally**	**Compressor**	**HERS**
Name	**Type**	**Units**	**HSPF/COP**	**Cap 47**	**Cap 17**	**SEER**	**EER**	**Controlled**	**Type**	**Verification**
Heat Pump System 1	SplitHeatPump	1	9	47500	40000	15	11.6	Not Zonal	Single Speed	Heat Pump System 1-hers-cool

HVAC COOLING - HERS VERIFICATION

01	02	03	04	05	06
Name	**Verified Airflow**	**Airflow Target**	**Verified EER**	**Verified SEER**	**Verified Refrigerant Charge**
Heat Pump System 1-hers-cool	Required	350	Not Required	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**
Air Distribution System 1	DuctsInAll	Sealed and tested	8	Conditioned zone	None	Air Distribution System 1-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**
Air Distribution System 1-hers-dist	Required	5.0	Required	Not Required	Not Required	Not Required	---

HVAC - FAN SYSTEMS

01	02	03	04
Name	Type	Fan Power (Watts/CFM)	HERS Verification
HVAC Fan 1	Single Speed PSC Furnace Fan	0.58	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	0.58

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	50	0.25	Default	0	Required

COOLING VENTILATION				
01	02	03	04	05
Name	Cooling Vent CFM	Cooling Vent Watts/CFM	Total Watts	Number of Fans
WH Fan 1	3500	0.0857143	300	1

PROJECT NOTES
This home was evaluated with QII and a significant solar system included as well as most features needed to comply with the 2016 Title 24 code requirements.

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Compliance documentation is accurate and complete.	
Documentation Author Name: Martyn C. Dodd	Documentation Author Signature: 
Company: EnergySoft, LLC	Signature Date: 10/25/2016
Address: 1025 5th St. Suite A	CEA/HERS Certification Identification (If applicable):
City/State/Zip: Novato, CA 94945	Phone: (415) 897-6400

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: Rob Parker	Responsible Designer Signature:
Company: Bernard Parker & Assoc.	Date Signed:
Address: 573 Oak Drive	License:
City/State/Zip: Sacramento, CA 95000	Phone: (415) 256-5555

Project Summary

7188 Pleasant Way

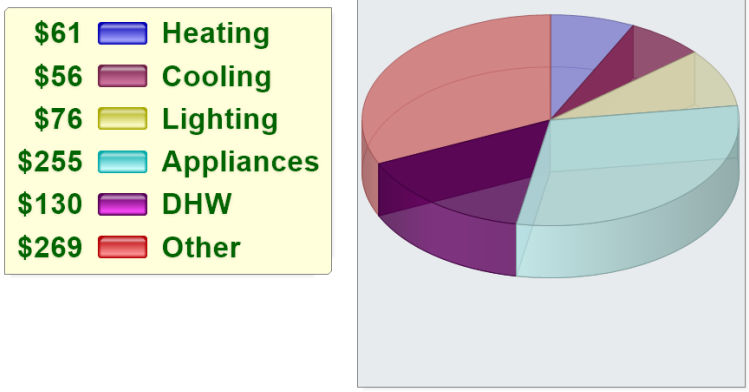
Los Angeles, CA 90000

This home was evaluated with QII and a significant solar system included as well as most features needed to comply with the 2016 Title 24 code requirements.

Date of Audit:	*1/1/0001*
Conditioned Floor Area:	*2,000*
Number of Stories:	*1*
Number of Bedrooms:	*3*

House Type:	*Single Family*
Foundation Type:	*Slab-on-Grade*
California Climate Zone:	*9*
Weather Data:	*CZ09_wy3.bin*

WHERE THE ENERGY IS USED



This pie chart estimates the energy cost for the various types of end uses in the home. Data has been calculated using software that uses typical profiles of usage to estimate end use cost. Your costs may vary from these numbers depending upon how the home is operated.

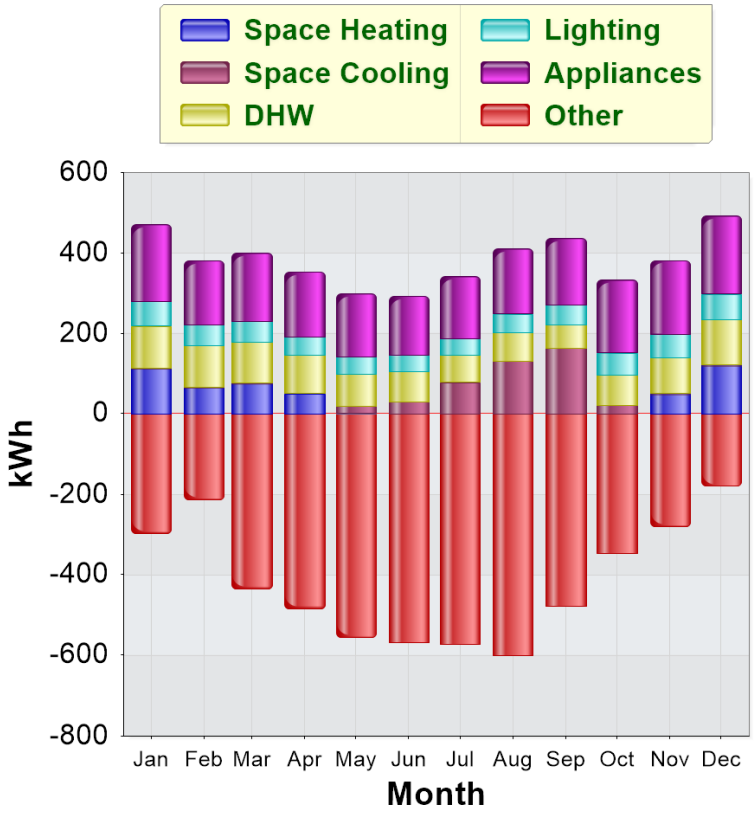
Energy Use Summary

7188 Pleasant Way
Los Angeles, CA 90000

The tables and graphs below summarize the major energy uses in the home for both electricity and fossil fuels. Ancillary uses include swimming pools and spas.

ELECTRICITY

End Use	kWh/yr
Space Heating	*485*
Space Cooling	*445*
Fans	*110*
Pumps	*0*
Domestic Hot Water	*1,031*
Indoor Lighting	*487*
Outdoor Lighting	*114*
Plug Loads	*2,026*
Appliances/Ancillary	*2,026*
Renewables	*-8,169*
TOTAL	***-1,445***



FOSSIL FUEL

End Use	Therms/yr
Space Heating	*0*
Domestic Hot Water	*0*
Appliances	*0*
Ancillary	*0*
TOTAL	***0***