



energydocshpc@gmail.com

GOALS Comfort, Energy Efficiency

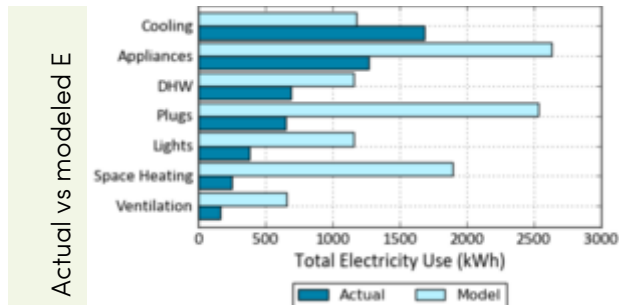
SOLUTIONS Air Seal, Insulation, Ventilation,



E Doc D, Redding, CA 96003



5.3 kW Solar PV



Zero E How close? Within **100%**



2372 ft² CFA
YR Built 2017
SFR detached

Author AjO: Little Role: HP Consultant

★ The existence of a feature does not guarantee optimum performance. Design, install, operations; each are essential.

See details of this project and others @ AjO.earth
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CODE

HP

11,208 kWh
\$1,750
110K Gal WATER

-2,943 kWh
126% SAVINGS
\$-336
30K Gal WATER



ENERGY COSTS

Annual

Annual Energy Cost \$ 1,750
\$ Saved \$ 2,086
Improvement 119 %
Energy Cost Source Measured
Heating Fuel Type Electric
Total Therms 0 therms
Total kWh 5,089 kWh
Total converted kWh Site 5,089 kWh
Energy Use Intensity 7.32 kBTUs/ft²
kWh/Occ 1696
Solar PV Production 8032 kWh
Net kWh with Renewables -2943 kWh
Utility Rate per kWh \$ 0.16
Total (net) Energy Costs \$ -336
\$ Saved \$ 2086
Improvement 119 %
Within % of attaining Zero Energy (approx) 100 %

Water

Type Total
Water Use 110000 gal
Water Savings 30000 gal



RENEWABLE ENERGY

Ownership Owned
Documentation Yes
Solar PV system size 5.32 kW
System PV annual production 8032 kWh
Ann Prod Source Actual
Ann Prod Source Detail Online Monitor
Documentation Yes
Production as % required/year 140 %
Number Panels 19
Grid Integration Grid Tied
Panels - Yr Installed 2017
Inverter Yr Installed 2017
Array Orientation SW
Location Roof
Cost New: Gross \$ 21280
Present Value \$ 17600
Present Value Date 07/22/2018
Present Value Calc Source PVValue.com
Solar Installer Name Energy Docs
Solar Installer Email energydocshpc@gmail.com

Notes

Production is actually 140% of demand (1st yr). Net cost after rebates \$13,264



ENCLOSURE

Air Leakage

CFM50 1800
Air Tightness Improved 90 %
Air Changes/Hour @50 5.06
Tight/Leaky Visual Check Average

Air Seal

Attic Yes
Walls Yes
Floors Yes
Mech System Yes
Elect System Yes
Soil Gasses Yes

Insulation

Attic Flr R Val 38
Attic Flr Type 60
Walls R Val 15
Walls Type Cellulose dense pck

Insulation Exterior

Walls R Val 4
Walls Type 13
Foundation Perimeter R Val 8
Foundation Perimeter Type XPS
Other 8
Yes Other Yes

Quality Insulation Inspection

Walls Construction Type 2 x 4 Wood

Wall Thickness

Attic 1 Type

Attic 1 Area

Attic 2 Type

Advanced Framing/OVE
8 in Vented Attic
1802
Other
Continue to page 2

<p>Attic 2 Area</p> <p>1st Foundation Type 1st Foundation Area Foundation Thermal Boundary Enclosure REL Notes Foundation walls exterior insulation type: Rockwool 2" Framing factor 11.7% is superior (less wood) to typical code at 25%</p>	<p>75 yrs</p>	<p>570 Slab 2372 Slab perimeter 100 yrs</p>
WEATHER BARRIER		
<p>Cladding</p> <p>Rain Screen Furring strips Cladding Type</p>		<p>Yes Yes Fiber-cement</p>
<p>Roof 1</p> <p>Roof Material Radiant Barrier Color</p>		<p>Comp Shingles Yes Dark</p>
<p>Vapor Barrier</p> <p>Installed Foundation Sealed</p>		<p>Yes Yes</p>
<p>Bulk Water</p> <p>Drain, site strategies</p>		<p>Yes</p>
<p>Windows</p> <p>U-Factor Solar HGC Low E Frame # glass layers</p>	<p>.32 .25</p>	<p>.23 .20 Yes PVC/Vinyl Double-pane</p>
HVAC		
<p>Heating</p> <p>Manual J Primary heat system Heat Pump type Year Installed Efficiency Size (rated input capacity) Fuel No Combustion Primary Heating Location Fraction Heat Load Heating Mfr REL Htg</p>	<p>Furnace 80 AFUE Natural Gas Unconditioned attic 20 yrs</p>	<p>Yes Heat Pump Mini-Split 2017 4.14 COP 12000 BTU/h Electric Yes Conditioned attic 100 % Fujitsu 25 yrs</p>
<p>Cooling</p> <p>Manual J Primary System Type Year Installed Fraction Cool Lead Efficiency Capacity Cooling System Mfr REL Cooling</p>	<p>Central Air 14 SEER 20 yrs</p>	<p>Yes Heat Pump 2017 100 % 21.5 SEER 9000 Btu/h Fujitsu 25 yrs</p>
<p>Distribution</p> <p>Duct Leakage Visual Inspect Duct insul Man D Location % Ducts Located Here</p>		<p>Sealed w/ Mastic R 8 Yes Conditioned space 100 %</p>
<p>Ventilation</p> <p>Type Whole Bldg vent Exhaust Locations Supply Locations REL Ventilation</p>	<p>Exhaust Kitchen, Bath 20 yrs</p>	<p>HRV Yes Kitchen, Bath, Bath 2, Laundry Liv Rm, Bdrm 25 yrs</p>
<p>HVAC Tests</p> <p>Total External Static Pressure Rated Input Heating (size) #BTUs per 1000 ft² CFA Rated Input Cooling (size)</p>	<p>≥ 12,000 BTUs</p>	<p>.2 iwc 12000 BTU/h < 12,000 BTUs 9000 BTU/h</p>
<p>1 Hour Temp Stratification</p> <p>Max Temp rm/rm</p>		<p>< 3° F</p>
<p>Duct Leakage Test-Out</p> <p>Total Duct Leakage to Outside Duct Leakage to Outside (%) Targets</p>	<p>6 %</p>	<p>0 CFM 0 % Ideal</p>
<p>Other</p> <p>Thermostat: Programmable Energy Monitor</p>		<p>Yes Yes</p>
<p>Notes</p> <p>Ducts are compact design with short runs.</p>		
WATER		
<p>Fuel Type</p>	<p>Tank</p>	<p>Electricity Heat Pump - Tank Continue to page 3</p>

Year Installed	15 yrs	2017
REL	60 %	25 yrs
Rated Efficiency		3.09 %
Location		conditioned space
Hot Water Distribution		
Type	Trunk & Branch	Trunk & Twig
# Cups to deliver hot	12	3
# Seconds to deliver hot		6
WATER EFFICIENCY		
Efficient Fixtures		
Kitch faucet	≤ 2.0 GPM	≤ 1.5 GPM
Dishwasher		≤ 4.25 GPC
Showers	≤ 2.0 GPM	≤ 1.5 GPM
Toilets	≤ 1.28 GPF	≤ 1.10 GPF
Exterior		
Climate approp. Indscpg		Yes
Irrigation: low-water		Yes
Turf ≤ 25%		Yes
Water Consumption annual		
Water Consumption Total	Estimated 110,000 gal	Estimated 30,000 gal
Water Savings		80,000 gal
Water Savings		73 %
INDOOR AIR QUALITY		
Interior Air is Filtered at		
Interior Air: Filtered		Return
Filter Type		Pleated
Filter Thickness		2 in
Filter Size (inches)		20 X 30
Moisture Control		
Vapor Retarder installed		Yes
Capillary Break installed		Yes
Other Moisture Cntrl Strategies		Yes
Materials		
Low Formaldehyde wood		Yes
Low/No VOC paints/finishes		Yes
Low/No VOC Sealants		Yes
No Carpet		Yes
LIGHTING		
≥ 90% Energy Efficient		Yes
Appliances		
Refrigerator Energy Star CEE Tier		4+
Washer Energy Star CEE Tier		4+
Dryer Energy Star CEE Tier		4+
IF SOLD		
Project Budget		
Energy Efficiency		\$ 40358
Total \$		\$ 40358
VALUATION		
Cost Approach:		
Remaining Effective Life		
REL Enclosure	75 yrs	100 yrs
REL Heat	20 yrs	25 yrs
REL Cool	20 yrs	25 yrs
REL Ventilation	20 yrs	25 yrs
REL Water Htr	15 yrs	25 yrs
REL Mech Systems Total	20 yrs	25 yrs
Income Approach: Present Val		
PV Enclosure		\$ 33325
PV Mech Systems		\$ 2250
PV Solar		\$ 17600
Present Value Total		\$ 53175
PV of Energy Savings Inputs		
Solar calcs: PVValue pdf		Yes
Notes		
\$ savings from energy efficiency measured in first year \$980/yr. This amount will increase relatively as energy costs rise.		
GREEN CERT		
3rd Party Inspected		
Status		Passed
Entity		HERS
Date		05/01/2017

PRE



House front

POST



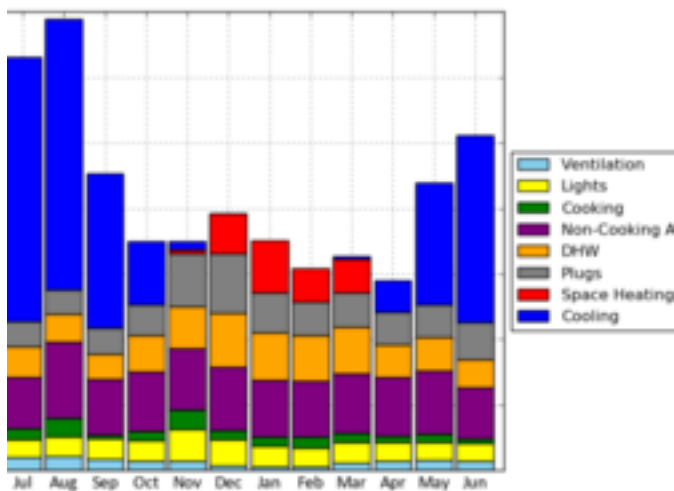
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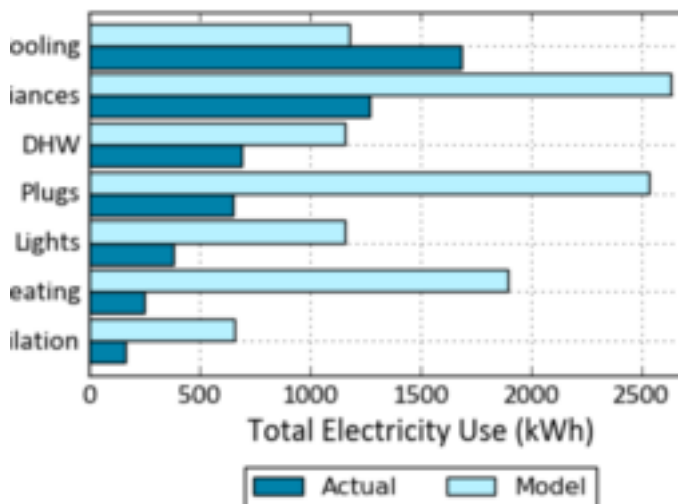
Advanced framing, less wood



Fujitsu 3/4 ton mini-split heat pump: heating & cooling



Monthly energy - end uses. Measured



Actual compared to modeled