

Energy Upgrade **COMPLETED** 03/01/2014



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**GOALS** Energy Efficiency, Water Efficiency  
**SOLUTIONS** Air Seal, Insulation, Ventilation,



135 Van Ness, Santa Cruz, CA 95060



House front PRE



Rear POST, Solar

**Zero E** How close? Within **15%**  
**Green Cert** PHI

1574 ft<sup>2</sup> CFA  
YR Built 1922  
SFR detached  
Walkscore 85

**PHOTOS** <https://app.ajohp.org/l/5jlei> **VIDEO** <https://app.ajohp.org/l/smt3a>

Author AjO: Kawahara Role: Owner

★ 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](https://www.ajoearth.com)  
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**PRE**

**POST**

21,939 kWh

2,869 kWh

**87% SAVINGS**

\$1,498

\$492

110K Gal WATER

29K Gal WATER



**ENERGY COSTS**  
Annual



**RENEWABLE ENERGY**



**ENCLOSURE**

Air Changes/Hour @50 24.37  
Air Tightness Improved 98 %

**Air Seal**

Attic Yes  
Walls Yes  
Floors Yes

**Insulation**

Attic Flr R Val 0 80  
Attic Flr Type Cellulose loose  
Floor R Val 28  
Floor Type EPS  
Walls R Val 0 14  
Walls Type Cellulose loose

**Insulation Exterior**

Walls R Val 0 13  
REL 10 yrs 150 yrs

**Enclosure Cladding**

New Yes  
Rain Screen Yes

**Roof**

New Yes

**Vapor Barrier**

Installed Crawl Yes  
Sealed Yes

**Bulk Water**

Drain, site strategies Yes

**Windows**

% New 100 %  
Frame Fiberglass  
# glass layers Wood Triple-pane

**Doors**

# New 4  
R Val 4



**HVAC**

**Heating**

Primary heat system Furnace  
Fuel Natural Gas  
No Combustion Hydronic Air Handler  
Electric  
Yes

**Distribution**

New Yes  
Duct Leakage Visual Inspect Sealed w/ Mastic  
Duct insul R 80  
Location Conditioned space  
Condition Sealed w/ Mastic

**Ventilation**

Type None  
Whole Bldg vent Yes  
Natural Cross Vent Yes  
REL Ventilation 0 yrs 30 yrs

**HVAC Test-Out**

Max Temp rm/rm < 3° F  
Thermostat: Programmable Yes



**WATER EFFICIENCY**

**Water Pipes Insulation**

Fuel Nat Gas  
Type Tank  
Year Installed 2012

**Efficient Fixtures**

% total hot 0 % 100 %  
Kitch faucet ≤ 1.5 GPM  
Dishwasher ≤ 5.5 GPC  
Showers ≤ 1.5 GPM  
Toilets ≤ 1.10 GPF

**Exterior**

Climate approp. Indscpg Yes  
Irrigation: low-water Yes  
Turf < 25% Yes  
Rain water reuse Yes



**INDOOR AIR QUALITY**

Sealed combustion

Solar Thermal

0.59  
98 %

Yes  
Yes  
Yes

80  
Cellulose loose  
28  
EPS  
14  
Cellulose loose

13  
150 yrs

Yes  
Yes

Yes

Yes  
Yes

Yes

100 %  
Fiberglass  
Triple-pane

4  
4

Hydronic Air Handler  
Electric  
Yes

Yes  
Sealed w/ Mastic  
R 80  
Conditioned space  
Sealed w/ Mastic

HRV  
Yes  
Yes  
30 yrs

< 3° F  
Yes

Electricity  
Boiler-Tankless  
2012

100 %  
≤ 1.5 GPM  
≤ 5.5 GPC  
≤ 1.5 GPM  
≤ 1.10 GPF

Yes  
Yes  
Yes  
Yes

DHW, Furnace  
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Garage separated: living area  
Interior Air: Filtered  
**Moisture Control**  
Vapor Retarder installed  
**Materials**  
Low/No VOC paints/finishes  
Low/No VOC Sealants  
No Carpet



**LIGHTING**

≥ 90% Energy Efficient

Detached  
HRV

Yes

Yes

Yes

Yes

Yes

PRE



House front Pre

POST



House front Post



Exterior walls moisture damage



Exterior walls, sealed & insulated



Attic: knob & tube, no insulation



Attic: R 80