2 ENGINEERING

U.S. Department of Energy Solar Decathlon 2020

TEAM Net Zero

WEBER STATE UNIVERSITY

02. ENGINEERING

Students from Weber State University Department of Construction & Building Sciences made up the senior project team representing departments:

- Building Design & Construction
- Interior Design
- Construction Management

Our team constructed the all-electric home they designed, in collaboration with Ogden City, on the corner of 28th street and Quincy Avenue.

The 2,540 total square foot home (1270 on main and 1270 full finished basement) incorporates portable battery backup technology to allow the home to maintain critical loads for up to 72 hours if the electrical grid were to be down in a natural disaster or emergency. Not only will the Solar Array generate enough energy to offset the energy usage of the home annually, it will also generate enough electricity to charge an electric vehicle to travel 20 miles per day.

02. ENGINEERING

The lot was donated by Ogden City to show their commitment to revitalizing neighborhoods and breathing new life into historic districts.

This particular lot sat empty for nearly 10 years after a dilapidated 4-plex was torn down. The Craftsman Architectural Style home was intentionally designed to nestle in nicely with other homes on this historical avenue and showcase how a period style home can provide a net-zero energy lifestyle.

Students worked with city planners to design a home that would fit on the narrow deep lot. The home was 24' wide x 58' deep with a detached garage. Students were provided a set of plans that the city planners had designed that they were open to allowing us to alter to be part of the Solar Decathlon competition.

The design was dictated by the setback of the lot. It was a very difficult lot to build on because of it being a corner lot and having 20' setbacks from the back side of the existing sidewalks. A 6' setback on the west side required that windows be strategically placed so they didn't look directly into windows of the neighbors.

We discovered that the "free" lot that was donated by the city had a long list of issues. The debris from the old four plex had been buried on site and we spent an additional $20,000 hauling it away along with some dead trees and substantial root networks that required removal. An underground aquafer that ran through the site just a few inches below our footings which necessitated the installation of a perimeter and partial French drain that cost an additional $2,500.

We were required to replace all of the exiting sidewalk, curb, gutter, and existing driveway approaches left over from the four plex which cost an additional $25,000. The sewer lateral was only 4' below grade even though we were told it was deep enough to allow a gravity fed plumbing connection and therefore had to install an ejector pump to the cost of nearly $3,500. We were required to install new sewer and water laterals across the adjacent street which cost nearly $18,000.

02. ENGINEERING

From the street, other than the solar panels, there is no distinct differentiation that this home is a net positive all electric home capable of producing all of its own energy annually, maintaining all of its critical loads in excess of a week, as well as charging an electric car to drive up to 20 miles per day in the detached garage. This was on purpose! We wanted to prove that you can build a net zero home without it sticking out so it would appeal to a larger audience.

We designed large overhangs to nearly eliminate solar heat gain in the summer due to shade angles. We maximized the windows on the East side to allow solar heat gain in the winter, but limited the west facing windows and eliminated all windows on the south to minimize solar heat gain during the summer.

The view of the picturesque Rocky Mountains are to the East. All of the living space was intentionally placed on the East side of the home in conjunction with large windows to allow ample daylight and stunning sunrises and sunsets.

The home is long and narrow, therefore long site lines were designed to allow the feeling of a more open floor plan. All upstairs hallways were eliminated to open up the spacious feel of the floor plan and to accommodate for ADA accessibility.

All potential buyers who walked through the home commented on how much bigger it felt than it appeared from the exterior. We knew we were successful when the sub-contractors who were working on the build started asking if they could buy the home.

02. ENGINEERING

The home is designed to make the "True Cost of Ownership" affordable to occupants of the east bench sector of Ogden by nearly eliminating all energy bills. It is estimated that the energy costs to operate the home will be just over $100 annually or around $9 per month to be connected to the electrical grid. The electrical grid essentially acts like a battery.

Excess energy not being used by the home during the day or on sunny day is put back on the grid for other neighbors and businesses to use, then the reverse is true when the home requires more energy than the solar array is producing, such as in the evening or on shady days. The net result of energy export and import is net-zero annually.

The home showcases technology such as Variable Refrigerant Flow HVAC, Air Source Heat Pump Water Heating, and Energy Recovery Ventilation to keep the super insulated and airtight home continuously sourced with fresh pre-conditioned air.

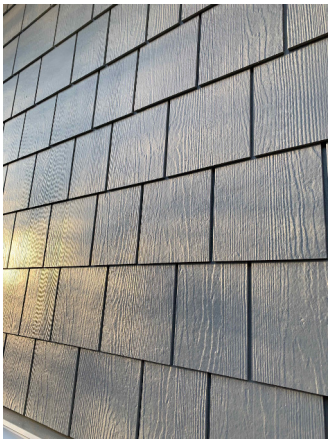
The building envelope of the home showcases off-the-shelf solutions that requires the super-efficient HVAC to only heat or cool the air within the home less than once an hour where most new homes today require the air to be conditioned 4-7 times per hour.

The foundation is built with Insulated Concrete Forms (ICFs) that have an effective R-Value of 45-55 and the main floor walls are panelized Structural Insulated Panels (SIPs) that have an effective R-Value of 27-29.

The roof utilizes Raised Heel Energy Trusses to allow the full depth R-49 insulation in the attic to be extended all the way out to the edge of the exterior walls. This helps to maintain conditioned air inside the home as well as prevent the leading cause of ice dams on homes in Utah.

Goodbye, thermal bridges.

We insulated and sealed the home to Passive House standards. None of this is evident to the untrained eye, nor was it significantly more expensive than traditional building practices. In fact, students assisted sub-contractors in assembling the foundation ICF blocks, shoring the walls up and pouring the concrete foundation walls. Students also assisted the setting of the SIPS and trusses. The trades who completed the exterior Hardi board siding didn't even know the difference.



The exterior envelope of the home uses Insulated Concrete Forms (ICFs) for the foundation that has an effective R-value of R49. The exterior walls are made of Structural Insulated Panels (SIPs)with an R-value of R29.

The roof trusses have a raised heal of 16" to allow full depth blown in fiberglass insulation to achieve an R60. The windows are triple low e coated glass filled with Argon gas and have a U factor of .27 or lower.

Home Energy Rating System

are the guidelines used by the Department of Energy's Net-Zero Ready Homes Certification Checklist. To ensure our home met specific energy efficient design criteria we implemented this rating system on our project.

The Home Energy Rating System (HERS) Index is the industry standard by which a home's energy efficiency is measured. It's also the nationally recognized system for inspecting and calculating a home's energy performance.

A certified RESNET Home Energy Rater assesses the energy efficiency of a home, assigning it a relative performance score (the HERS Index Score). The lower the number, the more energy efficient the home. The U.S. Department of Energy has determined that a typical resale home scores 130 on the HERS Index while a home built to the 2006 International Energy Conservation Code is awarded a rating of 100.

The WSU Solar Decathlon home scored between 40-42 in the energy modeling phase depending on how much of the basement is finished which means it is 60% more efficient than homes built in Utah before March 2016.

The WSU team loves to use the phrase "Build it Tight, Ventilate it Right". Their secret weapon is a new product they refer to as "magic fairy dust", or Aerobarrier, that will allow them to seal the home much tighter than is required by current energy code.

The home was air sealed using Aerobarrier to .6 ACH at 50 pascals of pressure.

All appliances are Energy Star and water sense certified coupled with 100% LED, the home is extremely energy efficient.

An all-electric variable refrigerant flow HVAC system using mini-split technology takes the home to a whole new level of energy efficiency as energy can be displaced to other areas of the home that are calling for that energy in the form of heat or cooling. The HVAC system is designed to run in tandem with an Energy Recovery Ventilator (ERV) that eliminated all bathroom/laundry exhaust fans.

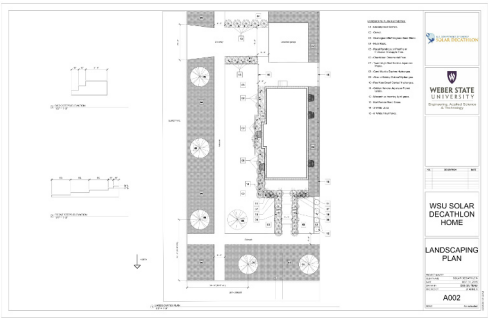
Traditional bathroom exhaust fans are replaced with exhaust air registers that are pulling 50 CFM of air out of the bathrooms/laundry constantly. The energy in this conditioned air is bypassed through a coil that transfers that energy into fresh air being pulled through the ERV and distributed into the common areas of the home.

The yard was originally designed to be xeriscaped due to Utah being the 2nd driest state in the United States. However, this proved to be more expensive than estimated and didn't fit our affordability criteria for the project.

Drought tolerant sod was installed along with a digitally controlled, low flow, irrigation system. This particular sod is a "warm weather fescue grass mix", and requires 70% less water than traditional Kentucky bluegrass sod, often found in the Intermountain West as the only choice for landscapes. We sourced this turf grass from a family farm 130 miles North of Ogden.

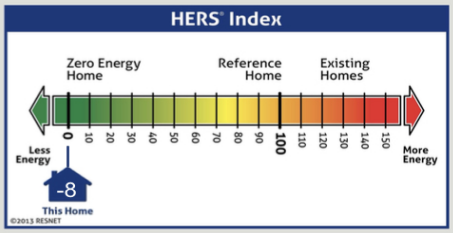
Gravel and bark were placed on the west and south ends of the home and garage to reduce irrigation requirements.

All planter areas use drought tolerant, native plants and are irrigated with a drip system. Bark was placed over the top to help retain moisture and minimize evaporation.



ENERGY STAR® CERTIFIED NEW CONSTRUCTION

Builder/Developer Name: Wadman Construction
Permit Date/Number:
Home/Unit Address: 2807 Quincy Ave.
Ogden, UT 84403
Rating Company: Provident Energy, INC
Rater Identification Number: 0359372
Rating Date: 2020-09-14
ENERGY STAR Program/Version Number: 3.0



This value is not intended to be used for code compliance.

Standard Features of ENERGY STAR Certified New Homes and Apartments

Your ENERGY STAR certified new home or apartment has been designed, constructed, and independently verified to meet rigorous requirements for energy efficiency set by the U.S. Environmental Protection Agency (EPA), including:

Thermal Enclosure System

A complete thermal enclosure system that includes comprehensive air sealing, quality-installed insulation, and high-performing windows to deliver improved comfort and lower utility bills.

Air Infiltration Test: **Htg: 2.30 Clg: 2.30 ACH50**

Primary Insulation Levels:
Ceiling: R-60.0 **FndWall: R-22.0** **Slab: R-0.0, R-0.0**
AGWall: R*-25.9

Primary Window Efficiency:
U-Value: 0.270, SHGC: 0.250

Water Management System

A comprehensive water management system to protect roofs, walls, and foundations.

Flashing, a drainage plane, and site grading to move water from the roof to the ground and then away from the home or building.

Water-resistant materials on below-grade walls and underneath slabs to reduce the potential for water entering the home or building.

Management of moisture levels in building materials during construction.

Heating, Cooling, and Ventilation System

A high-efficiency heating, cooling, and ventilation system that is designed and installed for optimal performance.

Total Duct Leakage: **47.00 CFM25**
Duct Leakage to Outdoors: **32.00 CFM25**

Primary Heating (System Type • Fuel Type • Efficiency):
Electric, Htg: 11.3 HSPF. Clg: 19.1 SEER.

Primary Cooling (System Type • Fuel Type • Efficiency):
Electric, Htg: 11.3 HSPF. Clg: 19.1 SEER.

Energy Efficient Lighting and Appliances

Energy efficient products to help reduce utility bills, while providing high-quality performance.

Energy Efficient Lighting: 100%

ENERGY STAR Certified Appliances and Fans:
Refrigerators: 1 **Dishwashers: 1**
Ceiling Fans: 0 **Exhaust Fans: 3**

Primary Water Heater (System Type • Fuel Type • Efficiency):
Heat pump, Electric, 2.45 EF, 50.0 Gal.

About this certificate
The certificate provides a summary of the major energy efficiency and other construction features that contribute to this home or apartment earning the ENERGY STAR, as determined through independent inspection and verification performed by a trained professional. The Energy Rating Index or HERS index for this home, if reported, is calculated in accordance with ANSI/RESNET/ICC Standard 301, with any exceptions approved by EPA. Because the version of Standard 301 used to calculate this index may not align with the version referenced by code, this value is not intended to be used to demonstrate compliance with code.

Note that when a home or apartment contains multiple performance levels for a particular feature (e.g., window efficiency or insulation levels), the predominant value is shown. Also, homes and apartments may be certified to earn the ENERGY STAR using a sampling protocol, whereby one home or apartment is randomly selected from a set for representative inspections and testing. In such cases, the features found in each home or apartment within the set are intended to meet or exceed the values presented on this certificate. The actual values for your home or apartment may differ, but offer equivalent or better performance.

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For comprehensive documentation produced by ResNet for our HERS rating and Energy Star Certification, click here.

Home Energy Rating Certificate

Property
Weber State University
2807 Quincy Ave.
Ogden, UT 84403

HERS
Rating Type: Confirmed
Rating Date: 2020-09-14
Registry ID: 050808825

Certified Energy Rater: Steve Thon
Rating Number:

HERS Index: -8

General Information

Conditioned Area	2696 sq. ft.	House Type	Single-family detached
Conditioned Volume	23343 cubic ft.	Foundation	Conditioned basement
Bedrooms	6		

Mechanical Systems Features

Air-source heat pump:	Electric, Htg: 11.3 HSPF. Clg: 19.1 SEER.
Water Heating:	Heat pump, Electric, 2.45 EF, 50.0 Gal.
Duct Leakage to Outside	32.00 CFM25
Ventilation System	Balanced: HRV, 92 cfm, 30.0 watts.
Programmable Thermostat	Heat=Yes; Cool=Yes

Building Shell Features

Ceiling Flat	R-60.0	Slab	R-0.0 Edge, R-0.0 Under
Sealed Attic	NA	Exposed Floor	NA
Vaulted Ceiling	NA	Window Type	U-Value: 0.270, SHGC: 0.250
Above Grade Walls	R*-25.9(assembly)	Infiltration Rate	Htg: 2.30 Clg: 2.30 ACH50
Foundation Walls	R-22.0	Method	Blower door

Lights and Appliance Features

Interior Fluor Lighting (%)	0.0	Range/Oven Fuel	Electric
Interior LED Lighting (%)	100.0	Clothes Dryer Fuel	Electric
Refrigerator (kWh/yr)	566	Clothes Dryer CEF	2.62
Dishwasher (kWh/yr)	225	Ceiling Fan (cfm/Watt)	0.00

Estimated Annual Energy Cost

Use	MMBtu	Cost	Percent
Heating	17.4	$398	-251%
Cooling	2.5	$61	-39%
Hot Water	4.3	$102	-64%
Lights/Appliances	21.4	$503	-317%
Photovoltaics	-53.6	$-1263	797%
Service Charges		$40	-25%
Total	**-8.0**	**$-159**	**100%**

Criteria

This home meets or exceeds the minimum criteria for the following:

TITLE
Company
Address
City, State, Zip
Phone #
Fax #

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The Home Energy Rating Standard Disclosure for this home is available from the rating provider.

Building Summary

Property
Weber State University
2807 Quincy Ave.
Ogden, UT 84403

Weather:Ogden, UT
OCAN Net-Zero Housing
OCAN Home Model - wBasement
16.0.4-RMP 2400 SF-UPLOADED

Organization
Provident Energy, INC
801-668-7910
Steve Thon

Builder
Wadman Construction

HERS
Confirmed
2020-09-14
Rater ID:0359372

Property/Builder Information

Building Name	OCAN Net-Zero Housing
Owner's Name	Weber State University
Property Address	2807 Quincy Ave.
City, St, Zip	Ogden, UT 84403
Phone Number	801-626-6000
Builder's Name	Wadman Construction
Phone Number	801-391-7613
Email Address	
Plan/Model Name	
Community/Development	
Identifier/Other	

Organization Information

Organization Name	Provident Energy, INC
Address	523 W. 4300 N.
City, St, Zip	Pleasant View, UT 84414
Phone Number	801-668-7910
Website	www.provident-energy.com

Rating/RESNET Information

Provider ID	1998-004
Sample Set ID	00000000
Registry ID	650320419
Registry Date Registered	10/07/2020
Rater's Name	Steve Thon
Rater's ID	0359372
Rater's Email	gordon@provident-energy.com
Last Field Insp	2020-09-14
Rating Type	Confirmed
Reason for Rating	New Home
Rating Number	
Rating Permit Date	12/18/2019

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Builder
Wadman Construction

General Building Information

Area of Conditioned. Space(sq ft)	2400
Volume of Conditioned. Space	19200
Year Built	2020
Housing Type	Single-family detached
Level Type(Apartments Only)	None
Floors on or Above-Grade	1
Number of Bedrooms	6
Foundation Type	Conditioned basement
Foundation is w/in Infiltration Volume:	N/A
Enclosed Crawl Space Type	N/A
Number of Stories Including Conditioned Basement	1
Thermal Boundary Location	N/A

Foundation Wall Information

Name	Library Entry	Location	Length(ft)	Total Height(ft)	Depth Below Grade(ft)	Height Above Grade(ft)	Uo Value Combo*	Uo Value (wall only)
ICF WSU	WSU IVF R-22******	Cond->ambient/gr	145.30	8.00	7.00	1.00	0.033	0.044

* Uo Value Combo combines wall, airfilm, and soil path

Foundation Wall Library List

Foundation Wall: WSU IVF R-22******

Type	Solid concrete or stone
Thickness(in)	8.0
Studs	None
Interior Insulation	
Continuous R-Value	22.0
Frame Cavity R-Value	0.0
Cavity Insulation Grade	1
Ins top	0.00 ft from top of wall
Ins Bottom	0.00 ft from bottom of wall
Exterior Insulation	
R-Value	0.0

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Foundation Wall Library List

Ins top	0.00 ft from top of wall
Ins bottom	0.00 ft below grade
Note	

Slab Floor Information

Name	Library Entry	Area(sq ft)	Depth Below Grade(ft)	Full Perimeter(ft)	Exposed Perimeter(ft)	On-Grade Perimeter(ft)
slab floor	Uninsulated	1280	7.00	145	145	0

Slab Floor Library List

Slab Floor: Uninsulated

Slab Covering	Carpet
Perimeter Insulation (R-Value)	0.0
Perimeter Insulation Depth (ft)	0.0
Under-Slab Insulation (R-Value)	0.0
Under-Slab Insulation Width (ft)	0.0
Slab Insulation Grade	1
Radiant Slab	No
Note	

Rim and Band Joist Information

Name	Location	Area(sq ft)	Continuous Ins	Framed Cavity Ins	Cavity Ins Thk(in)	Joist Spacing	Insulation Grade	Uo Value
R30	Cond -> ambient	145.30	0.0	30.0	5.5	16.0	1	0.038

Above-Grade Wall

Name	Library Entry	Location	Exterior Color	Area(sq ft)	Uo Value
WSU SIP	SIP 5-5/8" WSU*	Cond -> ambient	Medium	1234.95	0.050

Above-Grade Wall Library List

Above-Grade Wall: SIP 5-5/8" WSU*

Information From Quick Fill Screen

Wall Construction Type	Standard Wood Frame

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Above-Grade Wall Library List

Continuous Insulation (R-Value)	0.0
Frame Cavity Insulation (R-Value)	29.0
Frame Cavity Insulation Thickness (in)	5.5
Frame Cavity Insulation Grade	1
Stud Size (w x d, in)	1.5 x 5.5
Stud Spacing (in o.c.)	16.0
Framing Factor - (default)	0.2300
Gypsum Thickness (in)	0.5
Note	

Window Information

						Overhang			Interior		Adjacent	
Name	Wall Assignment	Orient	U-Value	SHGC	Area (sqft)	Depth (ft)	To Top (ft)	To Btm (ft)	Winter Shading	Summer Shading	Winter Shading	Summer Shading
	AGWall 1	North	0.270	0.250	50.00	2.5	1.0	6.0	0.50	0.80	None	None
	AGWall 1	West	0.270	0.250	104.00	2.5	1.0	6.0	0.50	0.80	Most	Most
	FndWall 1	West	0.270	0.250	80.00	2.5	1.0	6.0	0.50	0.80	Most	Most
	AGWall 1	East	0.270	0.250	49.50	4.0	1.0	6.0	0.50	0.80	None	None
	FndWall 1	East	0.270	0.250	60.00	4.0	1.0	6.0	0.50	0.80	None	None

Door Information

Name	Library Entry	Wall Assignment	Opaque Area(sq ft)	Uo Value	R-Value of Opaque Area	Storm Door
	Steel-urth w/brk	AGWall 1	21.0	0.187	4.4	No
	Steel-urth w/brk	AGWall 1	21.0	0.187	4.4	No

Roof Information

Name	Library Entry	Ceiling Area(sq ft)	Roof Area(sq ft)	Exterior Color	Radiant Barrier	Type	Uo Value	Cement or Clay Tiles	Roof Tile Ventilation
	R-60 Blown, Attic*******	1280.00	1600.00	Dark	No	Attic	0.033	No	No

Roof Library List

Ceiling: R-60 Blown, Attic*****

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Roof Library List

Information From Quick Fill Screen	
Continous Insulation (R-Value)	0.0
Cavity Insulation (R-Value)	60.0
Cavity Insulation Thickness (in)	12.0
Cavity Insulation Grade	1
Gypsum Thickness (in)	0.500
Insulated Framing Size(w x h, in)	1.5 x 3.5
Insulated Framing Spacing (in o.c.)	24.0
Framing Factor - (default)	0.1100
Ceiling Type	Attic
Note	

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Wadman Construction

Mechanical Equipment	
Number of Mechanical Systems	2
Heating SetPoint(F)	68.0
Heating Setback Thermostat	Present
Cooling SetPoint(F)	78.0
Cooling Setup Thermostat	Present
DHW SetPoint(F)	125.0

ASHP: 4k 19.1seer11.3hspf******	
Fuel Type	Electric
Heating Seasonal Efficiency	11.30 HSPF
Compressor Heating Output Capacity at 17F (kBtuh)	34.0
Compressor Heating Output Capacity at 47F (kBtuh)	45.0
Electric Resistance Backup Capacity (kW)	10
Cooling Output Capacity (kBtuh)	48.0
Cooling Seasonal Efficiency	19.10 SEER
Desuperheater	No
Note	
Number Of Units	1
Location	Conditioned area
Performance Adjustment	100
Percent Heating Load Served	100
Percent Cooling Load Served	100

DHW: WSU HPWH******	
Water Heater Type	Heat pump
Fuel Type	Electric
Energy Factor	2.45
Recovery Efficiency	0.00
Water Tank Size (gallons)	50
Extra Tank Insulation (R-Value)	0.0
Note	
Number Of Units	1
Location	Conditioned area

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Mechanical Equipment

Performance Adjustment	100
Percent Load Served	100

DHW Efficiencies

All bath faucets & showers <= 2gpm	true
All DHW pipes fully insulated >= R-3	true
Recirculation type	None (standard system)
Farthest fixture to DHW heater	15
TOTAL Pipelength for longest DHW run	25
DWHR unit present?	false
DHW Diagnostics	
dhwGpd	58.99
peRatio	0.23
dishwasherGpd	2.39
clothesWasherHotWaterGPD	0.87
EDeff	0.88
ewaste	12.20
tmains	57.20
dwhrWhInletTempAdj	0.00
pumpConsKwh	0.00
pumpConsMmbtu	0.00

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Duct Systems

Name	**bedrooms up (2)**
Conditioned Floor Area(sq ft)	198.0
# of Returns	1
Heating System	4k 19.1seer11.3hspf******
Cooling System	4k 19.1seer11.3hspf******
Supply Duct Surface Area(sq ft)	40.1
Return Duct Surface Area(sq ft)	7.4
No bldg cavities used as ducts	TRUE

Type	Location	Percent Location	R-Value
Supply	Attic, under insulation	100.0	0.0
Return	Attic, under insulation	100.0	0.0

Test Exemptions	
IECC	FALSE
RESNET 2019	FALSE
ENERGY STAR LtO	FALSE

Duct Leakage	
Input Type	Measured
Test Type	Both Tested
Duct Test Stage	Postconstruction Test

	LtO (Leakage to Outside)	Total Duct Leakage
Supply & Return	32.00 CFM @ 25 Pascals	47.00 CFM @ 25 Pascals
Supply Only	Not Applicable	
Return Only	Not Applicable	

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Building Summary

Property	Organization	HERS
Weber State University 2807 Quincy Ave. Ogden, UT 84403	Provident Energy, INC 801-668-7910 Steve Thon	Confirmed 2020-09-14 Rater ID:0359372
Weather:Ogden, UT OCAN Net-Zero Housing OCAN Home Model - wBasement 16.0.4-RMP 2400 SF-UPLOADED	**Builder** Wadman Construction	

Infiltration and Mechanical Ventilation

Whole Dwelling Infiltration	
Input Type	Blower door
Heating Season Infiltration Value	2.30 ACH @ 50 Pascals
Cooling Season Infiltration Value	2.30 ACH @ 50 Pascals
Shelter Class	4
Code Verification	Tested
Mechanical Ventilation for IAQ	
Type	Balanced
Unable to Measure Mechanical Ventilation	FALSE
Rate(cfm)	92
Adjusted Sensible Recovery Efficiency(%)	0.70
Adjusted Total Recovery Efficiency(%)	0.70
Hours per Day	24.0
Fan Power (watts)	30.00
ECM Fan Motor	true
Ventilation Strategy for Cooling	
Cooling Season Ventilation	Natural Ventilation
Good Air Exchange for Multi-Family	NA

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Building Summary

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Weber State University 2807 Quincy Ave. Ogden, UT 84403	Provident Energy, INC 801-668-7910 Steve Thon	Confirmed 2020-09-14 Rater ID:0359372

Weather:Ogden, UT
OCAN Net-Zero Housing
OCAN Home Model - wBasement
16.0.4-RMP 2400 SF-UPLOADED

Builder
Wadman Construction

Lights and Appliances

Rating/RESNET audit	
Ceiling Fan CFM / Watt	0.00
Refrigerator kWh/yr	566
Refrigerator Location	Conditioned
Range/Oven Fuel Type	Electric
Induction Range	No
Convection Oven	No
Dishwasher	
Energy Factor	0.00
Dishwasher kWh/yr	225
Place Setting Capacity	12
Clothes Dryer	
Fuel Type	Electric
Location	Conditioned
Moisture Sensing	Yes
CEF	2.62
Clothes Washer	
Location	Conditioned
LER (kWh/yr)	86
IMEF	2.155
Capacity (CU.Ft)	2.500
Electricity Rate	0.11
Gas Rate	0.00
Annual Gas Cost	0.00
Qualifying Light Fixtures	
Interior Lights %	0.0
Exterior Lights %	0.0
Garage Lights %	0.0
Interior LEDs %	100.0
Exterior LEDs %	100.0
Garage LEDs %	100.0

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Building Summary

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Weather:Ogden, UT
OCAN Net-Zero Housing
OCAN Home Model - wBasement
16.0.4-RMP 2400 SF-UPLOADED

Builder
Wadman Construction

Mandatory Requirements

IECC Requirements	
Verified IECC 06	true
Verified IECC 09	true
Verified IECC 12	true
Verified IECC 15	true
Verified IECC 18	true
Verified NY-ECCC 2020	false
Verified IECC MI	false
Verified IECC NC 2018	false
EPA Requirements	
Rater certifies that the home complies with the following requirements for:	ENERGY STAR v3.0
Rater Design Review Checklist	
Rater Field Checklist	
HVAC Design Report	
HVAC Commissioning Checklist (optional)	
ENERGY STAR Version 3 Appliances	Amount
Refrigerators	1
Ceiling Fans	0
Exhaust Fans	3
Dishwashers	1
ENERGY STAR Multi-Family Checks	
Clothes washer is in a category with no ENERGY STAR options.	NA
Clothes dryer is in a category with no ENERGY STAR options.	NA
Apt or Townhome uses 'Class AW' Windows.	NA
ENERGY STAR Version 3 Basements	
Basement Wall Area 50% Below Grad:	false
Basement Floor Area	0.00
Slab Insulation Exemption:	false
Indoor airPlus Verification Checklist	false
EPA Field App ID	

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Building Summary

Property	Organization	HERS
Weber State University 2807 Quincy Ave. Ogden, UT 84403	Provident Energy, INC 801-668-7910 Steve Thon	Confirmed 2020-09-14 Rater ID:0359372

Weather:Ogden, UT
OCAN Net-Zero Housing
OCAN Home Model - wBasement
16.0.4-RMP 2400 SF-UPLOADED

Builder
Wadman Construction

DOE Zero Energy Ready Home

Home Builder ID Number

Mandatory Requirements	
Verified Fenestration	false
Verified Insulation	false
Verified Duct Location	false
Verified Appliance	false
Verified Lighting	false
Verified Fan Efficiency	false
Verified Water Efficiency	false
Verified EPA Indoor airPLUS	false
Verified Renewable Energy Ready Solar Electric	false
Optional Home Builder Commitments for Recognition	
Certified under the EPA WaterSense for New Homes Program	No
Certified under the IBHS fortified for Safer Living Program	No
Followed the DOE Zero Energy Ready Home Quality Management Guidelines	No
The buyer of this home signed a waiver giving DOE Zero Energy Ready Home access to utility bill data for one year.	No

Active Solar

System Type	None
Collector Loop Type	None
Collector Type	None
Collector Orientation	None
Area(sq ft)	0.0
Tilt(degrees)	0.0
Volume(cu ft/gal)	0.0

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Emissions

Property
Weber State University
2807 Quincy Ave.
Ogden, UT 84403

Weather:Ogden, UT
OCAN Net-Zero Housing
OCAN Home Model - wBasement
16.0.4-RMP 2400 SF-UPLOADED

Organization
Provident Energy, INC
801-668-7910
Steve Thon

Builder
Wadman Construction

HERS
Confirmed
2020-09-14
Rater ID:0359372

Emissions By End-Use

Carbon Dioxide (CO2) - tons/year

Heating	5.0
Cooling	0.6
WaterHeating	1.2
LightsAppliances	5.5
Photovoltaics	0.0
Total	**12.2**

Sulfur Dioxide (SO2) - lbs/year

Heating	6.2
Cooling	0.7
WaterHeating	1.5
LightsAppliances	6.8
Photovoltaics	0.0
Total	**15.1**

Nitrogen Oxide (NOx) - lbs/year

Heating	15.9
Cooling	1.8
WaterHeating	3.7
LightsAppliances	17.3
Photovoltaics	0.0
Total	**38.8**

Site-to-source energy multipliers and air emission data were taken from the US EPA eGRID2012 database.

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Fuel Summary

Property	Organization	HERS
Weber State University 2807 Quincy Ave. Ogden, UT 84403	Provident Energy, INC 801-668-7910 Steve Thon	Confirmed 2020-09-14 Rater ID:0359372

Weather:Ogden, UT
OCAN Net-Zero Housing
OCAN Home Model - wBasement
16.0.4-RMP 2400 SF-UPLOADED

Builder
Wadman Construction

Annual Energy Cost	$/yr
Electric	1046

Annual End-Use Cost	$/yr
Heating	420
Cooling	52
Water Heating	102
Lights & Appliances	472
Photovoltaics	-0
Service Charge	40
Total	1086

Annual End-Use Consumption	
Heating (kWh)	5392
Cooling (kWh)	624
Water Heating (kWh)	1272
Lights & Appliances (kWh)	5891
Total (kWh)	13178

Annual Energy Demands	kW
Heating	6.5
Cooling	1.0
Water Heating (Winter Peak)	0.2
Water Heating (Summer Peak)	0.2
Lights & Appliances (Winter Peak)	0.5
Lights & Appliances (Summer Peak)	1.1
Total Winter Peak	7.2
Total Summer Peak	2.3

Utility Rates	
Electricity	Rocky Mountain Power*

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Lights and Appliances

Property
Weber State University
2807 Quincy Ave.
Ogden, UT 84403

Organization
Provident Energy, INC
801-668-7910
Steve Thon

HERS
Confirmed
2020-09-14
Rater ID:0359372

Weather:Ogden, UT
OCAN Net-Zero Housing
OCAN Home Model - wBasement
16.0.4-RMP 2400 SF-UPLOADED

Builder
Wadman Construction

Electric Consumption	kWh/yr
Interior Lighting	622.6
Exterior Lighting	36.7
Garage Lighting	0.0
Refrigerator	566.0
Freezer	0.0
Dishwasher	188.7
Oven/Range	565.0
Clothes Washer	0.0
Clothes Dryer	637.9
Mechanical Ventilation Fan	262.8
Ceiling Fan	0.0
Plug Loads	3011.0
Total	**5890.7**

Annual Energy Cost	$/yr
Interior Lighting	50
Exterior Lighting	3
Garage Lighting	0
Refrigerator	45
Freezer	0
Dishwasher	15
Oven/Range	45
Clothes Washer	0
Clothes Dryer	51
Mechanical Ventilation Fan	21
Ceiling Fan	0
Plug Loads	241
Total	**472**

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Performance Report

Property
Weber State University
2807 Quincy Ave.
Ogden, UT 84403

Organization
Provident Energy, INC
801-668-7910
Steve Thon

HERS
Confirmed
2020-09-14
Rater ID:0359372

Weather:Ogden, UT
OCAN Net-Zero Housing
OCAN Home Model - wBasement
16.0.4-RMP 2400 SF-UPLOADED

Builder
Wadman Construction

Annual Load	MMBtu/yr
Heating	43.0
Cooling	9.9
Water Heating	13.1
Water Heating w/out Tank Loss	12.2

Annual Consumption	MMBtu/yr
Heating	18.4
Cooling	2.1
Water Heating	4.3
Lights & Appliances	20.1
Photovoltaics	-0.0
Total	**45.0**

Annual Energy Cost	$/yr
Heating	420
Cooling	52
Water Heating	102
Lights & Appliances	472
Photovoltaics	-0
Service Charges	40
Total	**1086**

Design Loads	kBtu/hr
Space Heating	24.7
Space Cooling	14.8

Utility Rates

Electricity Rocky Mountain Power*

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Performance Report

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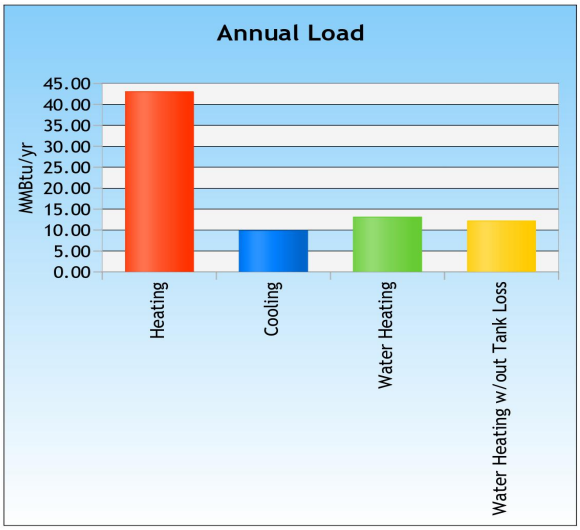
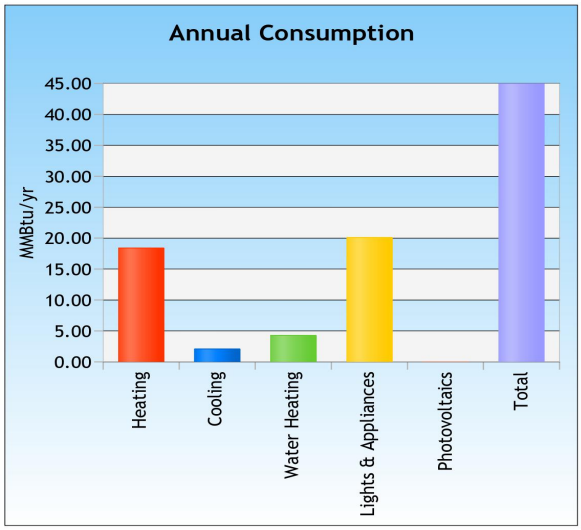
Weather:Ogden, UT
OCAN Net-Zero Housing
OCAN Home Model - wBasement
16.0.4-RMP 2400 SF-UPLOADED

Builder
Wadman Construction





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Performance Report

Property
Weber State University
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Organization
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HERS
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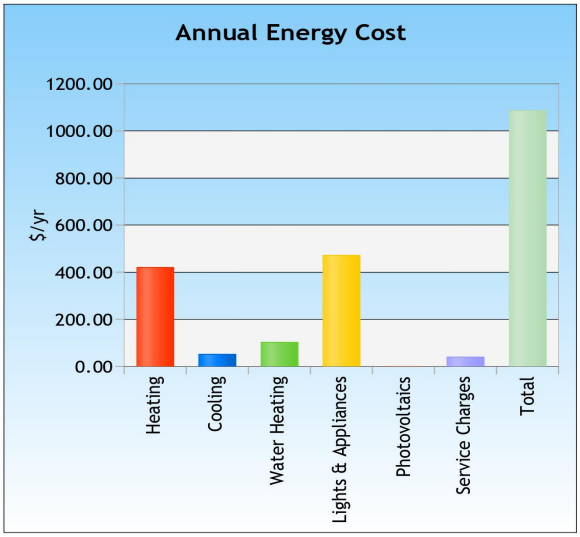
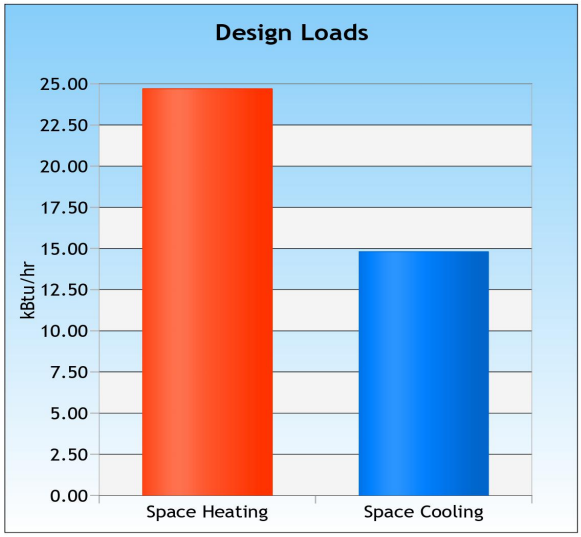
2020-09-14
Rater ID:0359372

Weather:Ogden, UT
OCAN Net-Zero Housing
OCAN Home Model - wBasement
16.0.4-RMP 2400 SF-UPLOADED

Builder
Wadman Construction





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Source Energy & Emissions

Property
Weber State University
2807 Quincy Ave.
Ogden, UT 84403

Weather:Ogden, UT
OCAN Net-Zero Housing
OCAN Home Model - wBasement
16.0.4-RMP 2400 SF-UPLOADED

Organization
Provident Energy, INC
801-668-7910
Steve Thon

Builder
Wadman Construction

HERS
Confirmed
2020-09-14
Rater ID:0359372

Source Energy Consumption (MMBtu/year)

	HERS Reference Home	As Designed	Difference	% Difference
Heating	95.5	63.0	-32.4	-34.0%
Cooling	25.5	8.6	-16.9	-66.3%
WaterHeating	62.5	15.2	-47.3	-75.7%
LightsAppliances	114.6	70.7	-43.9	-38.3%
Photovoltaics	0.0	0.0		
Total	**298.0**	**157.4**	**-140.6**	**-47.2%**

Total Emissions

Type of Emissions	HERS Reference Home	As Designed	Difference	% Difference
Carbon Dioxide (CO2) - tons/year	23.1	12.2	-10.9	-47.2%
Sulfur Dioxide (SO2) - lbs/year	28.6	15.1	-13.5	-47.2%
Nitrogen Oxides (NOx) - lbs/year	73.4	38.8	-34.6	-47.2%

Emissions By End-Use

(HERS Reference Home versus As Designed)

	CO2-tons/yr		SO2-lbs/yr		NOx-lbs/yr	
	Reference	Design	Reference	Design	Reference	Design
Heating	7.4	4.9	9.2	6.0	23.5	15.5
Cooling	2.0	0.7	2.4	0.8	6.3	2.1
WaterHeating	4.9	1.2	6.0	1.5	15.4	3.7
LightsAppliances	8.9	5.5	11.0	6.8	28.2	17.4
Photovoltaics	0.0	0.0	0.0	0.0	0.0	0.0

The energy and emission values are calculated by comparing the Rated Home to the HERS Referece Home as defined in the ANSI/RESNET/ICC Std 301. Site-to-source multipliers and air emission data were taken from the US EPA eGRID2012 database.

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ENERGY STAR v3.0 Home Report

Property
Weber State University
2807 Quincy Ave.
Ogden, UT 84403

Weather:Ogden, UT
OCAN Net-Zero Housing
OCAN Home Model - wBasement
16.0.4-RMP 2400 SF-UPLOADED

Organization
Provident Energy, INC
801-668-7910
Steve Thon

Builder
Wadman Construction

HERS
Confirmed
2020-09-14
Rater ID:0359372

Normalized, Modified End-Use Loads (MMBtu/yr)

	ENERGY STAR	As Designed
Heating	23.3	27.6
Cooling	12.1	6.8
Water Heating	16.6	4.1
Lights and Appliances	25.5	20.2
Total	77.5	58.7

HERS Index of Reference Design Home	**69**	**49**	**HERS Index w/o PV**
HERS Index Target (SAF Adjusted)	**69**	**49**	**HERS Index**
Size Adjustment Factor	**1.00**		

HERS Index w/o PV <= HERS Index of Reference Design Home AND HERS Index <= HERS Index Target to comply.

ENERGY STAR v3.0 Mandatory Requirements

X	Duct leakage at post construction better than or equal to ENERGY STAR v3/3.1 requirements.
X	Envelope insulation levels meet or exceed ENERGY STAR v3/3.1 requirements.
X	Slab on Grade Insulation must be > R-5, and at IECC 2009 Depth for Climate Zones 4 and above.
X	Envelope insulation achieves RESNET Grade I installation, or Grade II with insulated sheathing.
X	Windows meet the 2009 IECC Requirements - Table 402.1.1.
X	Duct insulation meets the EPA minimum requirements of R-6.
X	Mechanical ventilation system has been measured in the home.
X	ENERGY STAR Checklists fully verified and complete.

This home MEETS or EXCEEDS the energy efficiency requirements for designation as an EPA ENERGY STAR Version 3 Certified Home.

Pollution Prevented

Type of Emissions	*Reduction*
Carbon Dioxide (CO2) - tons/yr	10.9
Sulfur Dioxide (SO2) - lbs/yr	13.5
Nitrogen Oxides (NOx) - lbs/yr	34.6

Energy Cost Savings

	$/yr
Heating	212
Cooling	149
Water Heating	349
Lights & Appliances	352
Total	1062

The energy savings and pollution prevented are calculated by comparing the Rated Home to the Reference Home as defined in the Mortgage Industry National Home Energy Rating Systems Standards as promulgated by the Residential Energy Services Network (RESNET) . In accordance with these guidelines, building inputs affecting setpoints, infiltration rates, window shading and the existence of mechanical systems may have been changed prior to calculating loads.

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ENERGY STAR v3.0 Home Verification Summary

Property
Weber State University
2807 Quincy Ave.
Ogden, UT 84403

Organization
Provident Energy, INC
801-668-7910
Steve Thon

HERS
Confirmed
2020-09-14
Rater ID:0359372

Weather:Ogden, UT
OCAN Net-Zero Housing
OCAN Home Model - wBasement
16.0.4-RMP 2400 SF-UPLOADED

Builder
Wadman Construction

Building Information

Conditioned Area (sq ft)	2400
Conditioned Volume (cubic ft)	19200
Insulated Shell Area (sq ft)	5103
Number of Bedrooms	6
Housing Type	Single-family detached
Foundation Type	Conditioned basement

Rating

HERS Index	49
HERS Index w/o PV	49
HERS Index Target (SAF Adjusted)	69
HERS Index of Reference Design Home	69
Size Adjustment Factor	1.00

HERS Index w/o PV <= HERS Index of Reference Design Home AND HERS Index <= HERS Index Target to comply.

ENERGY STAR

This home MEETS or EXCEEDS the energy efficiency requirements for designation as an EPA ENERGY STAR Version 3 Certified Home.

Building Shell

Ceiling w/Attic	R-60 Blown, Attic******* U=0.033
Sealed Attic	None
Vaulted Ceiling	None
Above Grade Walls	SIP 5-5/8" WSU* U=0.050
Found. Walls(Cond)	WSU IVF R-22****** R=22.0
Found. Walls(Uncond)	None
Floors	None
Slab Floors	Uninsulated U=0.365

Window Type	Dbl/LoE/Arg - Vinyl*****0*
Window	U-Value: 0.270, SHGC: 0.250
Window/Wall Ratio	0.28
Infiltration Type	Blower door
Infiltration	Htg: 2.30 Clg: 2.30 ACH50
Duct Leakage to Outside	32.00 CFM @ 25 Pascals
Total Duct Leakage	47.00 CFM @ 25 Pascals

Mechanical Systems

ASHP	Htg: 79.1 kBtuh, 11.3 HSPF. Clg: 48.0 kBtuh, 19.1 SEER.
Water Heating	Heat pump, Elec, 2.45 EF.
Programmable Thermostat	Heat=Yes; Cool=Yes
Ventilation System	Balanced: HRV, 92 cfm, 30.0 watts.

Lights and Appliances

Interior LED Lighting (%)	100.00
Refrigerator (kWh/yr)	566.00
Dishwasher (kWh/yr)	225
Ceiling Fan (cfm/Watt)	0.00
Range/Oven Fuel	Electric

Clothes Dryer Fuel	Electric
Clothes Dryer CEF	2.62
Clothes Washer LER	86.00
Clothes Washer Capacity	2.50

Note: Where feature level varies in home, the dominant value is shown.

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ENERGY STAR® CERTIFIED NEW CONSTRUCTION

Builder/Developer Name: Wadman Construction

Permit Date/Number:

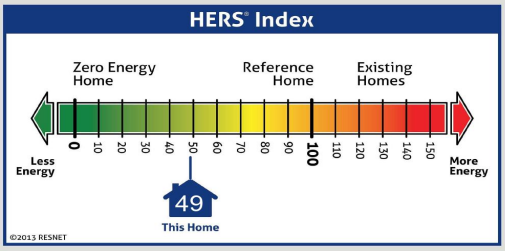
Home/Unit Address: 2807 Quincy Ave.
Ogden, UT 84403

Rating Company: Provident Energy, INC

Rater Identification Number: 0359372

Rating Date: 2020-09-14

ENERGY STAR Program/Version Number: 3.0



This value is not intended to be used for code compliance.

Standard Features of ENERGY STAR Certified New Homes and Apartments

Your ENERGY STAR certified new home or apartment has been designed, constructed, and independently verified to meet rigorous requirements for energy efficiency set by the U.S. Environmental Protection Agency (EPA), including:

Thermal Enclosure System

A complete thermal enclosure system that includes comprehensive air sealing, quality-installed insulation, and high-performing windows to deliver improved comfort and lower utility bills.

Air Infiltration Test: **Htg: 2.30 Clg: 2.30 ACH50**

Primary Insulation Levels:
Ceiling: R-60.0 **FndWall: R-22.0** **Slab: R-0.0, R-0.0**
AGWall: R-29.0

Primary Window Efficiency:
U-Value: 0.270, SHGC: 0.250

Water Management System

A comprehensive water management system to protect roofs, walls, and foundations.

Flashing, a drainage plane, and site grading to move water from the roof to the ground and then away from the home or building.

Water-resistant materials on below-grade walls and underneath slabs to reduce the potential for water entering the home or building.

Management of moisture levels in building materials during construction.

Heating, Cooling, and Ventilation System

A high-efficiency heating, cooling, and ventilation system that is designed and installed for optimal performance.

Total Duct Leakage: **47.00 CFM25**

Duct Leakage to Outdoors: **32.00 CFM25**

Primary Heating (System Type • Fuel Type • Efficiency):
Electric, Htg: 11.3 HSPF. Clg: 19.1 SEER.

Primary Cooling (System Type • Fuel Type • Efficiency):
Electric, Htg: 11.3 HSPF. Clg: 19.1 SEER.

Energy Efficient Lighting and Appliances

Energy efficient products to help reduce utility bills, while providing high-quality performance.

Energy Efficient Lighting: **100%**

ENERGY STAR Certified Appliances and Fans:
Refrigerators: 1 **Dishwashers: 1**
Ceiling Fans: 0 **Exhaust Fans: 3**

Primary Water Heater (System Type • Fuel Type • Efficiency):
Heat pump, Electric, 2.45 EF, 50.0 Gal.

About this certificate
The certificate provides a summary of the major energy efficiency and other construction features that contribute to this home or apartment earning the ENERGY STAR, as determined through independent inspection and verification performed by a trained professional. The Energy Rating Index or HERS index for this home, if reported, is calculated in accordance with ANSI/RESNET/ICC Standard 301, with any exceptions approved by EPA. Because the version of Standard 301 used to calculate this index may not align with the version referenced by code, this value is not intended to be used to demonstrate compliance with code.

Note that when a home or apartment contains multiple performance levels for a particular feature (e.g., window efficiency or insulation levels), the predominant value is shown. Also, homes and apartments may be certified to earn the ENERGY STAR using a sampling protocol, whereby one home or apartment is randomly selected from a set for representative inspections and testing. In such cases, the features found in each home or apartment within the set are intended to meet or exceed the values presented on this certificate. The actual values for your home or apartment may differ, but offer equivalent or better performance.

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ENERGY STAR

CERTIFIED HOME

Independently verified to meet EPA's strict guidelines for energy efficiency.

Address:

2807 Quincy Ave.
Ogden, UT

Built by:

Wadman Construction

Verified by:

Steve Thon

Date:

2020-09-14

Program/Version number:

Version 3.0

Optional information:

HERS Index: 49

Learn more at energystar.gov

2018 IECC Building UA Compliance

Property
Weber State University
2807 Quincy Ave.
Ogden, UT 84403

Organization
Provident Energy, INC
801-668-7910
Steve Thon

HERS
Confirmed
2020-09-14
Rater ID:0359372

Weather:Ogden, UT
OCAN Net-Zero Housing
OCAN Home Model - wBasement
16.0.4-RMP 2400 SF-UPLOADED

Builder
Wadman Construction

Elements

	Insulation Levels	
	2018 IECC	As Designed
Shell UA Check		
Ceilings:	33.3	41.8
Above-Grade Walls:	68.1	54.9
Windows and Doors:	115.7	100.6
Basement Walls:	51.1	34.0
Overall UA (Design must be equal or lower):	268.1	231.3

Mandatory Requirements

The following Mandatory Requirements Fail:

The IECC 2018 requires duct leakage testing for ducts and/or air handlers located beyond the thermal boundary. At least one system in this home is not exempt from testing or tested above the duct leakage requirements in the IECC.

This home DOES NOT MEET the overall thermal performance requirements and verifications of the International Energy Conservation Code based on a climate zone of 5B. (Section 402, International Energy Conservation Code, 2018 edition.)

Name	Steve Thon	Signature	
Organization	Provident Energy, INC	Date	17 February 2021

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2018 IECC Energy Cost Compliance

Property	Organization	HERS
Weber State University 2807 Quincy Ave. Ogden, UT 84403	Provident Energy, INC 801-668-7910 Steve Thon	Confirmed 2020-09-14 Rater ID:0359372

Weather:Ogden, UT
OCAN Net-Zero Housing
OCAN Home Model - wBasement

Builder
Wadman Construction

Annual Energy Cost

	$/yr	
	2018 IECC	**As Designed**
Heating	408	437
Cooling	125	95
Water Heating	176	175
Mechanical Ventilation Fan	46	21
SubTotal - Used to Determine Compliance	**755**	**728**
Lights & Appliances (minus MechVent)	494	456
Photovoltaics	-0	-0
Service Charge	40	40
Total	**1289**	**1224**

Mandatory Requirements

Annual Energy Cost Check	PASSES
Duct Insulation R-Value Check (per Section 405.2)	PASSES
Window U-Value and SHGC Check (per Section 402.5)	PASSES
Home Infiltration (Section 402.4.1)	PASSES
Duct Testing (Section 403.3.3)	PASSES
Mechanical Ventilation (Section 403.6)	PASSES
Mechanical Ventilation Fan Efficacy (Section 403.6.1)	PASSES
Mandatory Requirements Check Box (2018 IECC)	PASSES

This home MEETS the annual energy cost requirements of Section 405 of the 2018 International Energy Conservation Code based on a climate zone of 5B. In fact, this home surpasses the requirements by 3.6%.

Name	Steve Thon	Signature	
Organization	Provident Energy, INC	Date	17 February 2021

In accordance with IECC, building inputs, such as setpoints, infiltration rates, and window shading may have been changed prior to calculating annual energy cost. Furthermore, the standard reference design HVAC system efficiencies are set equal to those in the design home as specified in the 2018 IECC. These standards are subject to change, and software updates should be obtained periodically to ensure the compliance calculations reflect current federal minimum standards.

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HOME CERTIFIED TO MEET THE PROVISIONS OF THE 2018 INTERNATIONAL ENERGY CONSERVATION CODE

This home built at
2807 Quincy Ave., Ogden, UT
by Wadman Construction
exceeds the minimum requirements

Building Features

Ceiling Flat	R-60.0	Duct	NA
Sealed Attic:	NA	Duct Leakage to Outside:	32.00 CFM @ 25 Pascals
Vaulted Ceiling	NA	Total Duct Leakage:	47.00 CFM @ 25 Pascals
Above Grade Walls	R-29.0	Infiltration:	Htg: 2.30 Clg: 2.30 ACH50
Foundation Walls	R-22.0	Window	U-Value: 0.270, SHGC: 0.250
Exposed Floor	NA	Air-Source HP	Electric, Htg: 11.3 HSPF. Clg: 19.1 SEER.
Slab	R-0.0 Edge, R-0.0 Under	Water Heating	Heat pump, Electric, 2.45 EF, 50.0 Gal.

The organization below certifies that the proposed building design described herein is consistent with the building plans, specifications, and other calculations submitted with the permit application. The proposed building has been designed to meet the 2018 IECC requirements in compliance with Chapter 4 based on Climate Zone 5B and with all mandatory requirements.

Name	Steve Thon	Signature	
Organization	Provident Energy, INC	Date	17 February 2021

The 2018 International Energy Conservation Code is a registered trademark of the International Code Council, Inc. (“ICC”).
No version of this software has been reviewed or approved by ICC or its affiliates.
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2018 IECC Certificate

2807 Quincy Ave., Ogden, UT 84403

Building Envelope Insulation		
Ceiling	R-60.0	
Above Grade Walls	R-29.0	
Foundation Walls	R-22.0	
Exposed Floor	NA	
Slab	R-0.0 Edge, R-0.0 Under	
Infiltration	Htg: 2.30 Clg: 2.30 ACH50	
Duct	NA	
Total Duct Leakage	47.00 CFM @ 25 Pascals	
Window Data	**U-Factor**	**SHGC**
Window	0.270	0.250
Mechanical Equipment		
ASHP: Electric, Htg: 11.3 HSPF. Clg: 19.1 SEER.		
DHW: Heat pump, Electric, 2.45 EF, 50.0 Gal.		
Builder or Design Professional		
Signature _____		

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IECC 2018 Energy Rating Index Report

Property	Organization	ERI
Weber State University 2807 Quincy Ave. Ogden, UT 84403	Provident Energy, INC 801-668-7910 Steve Thon	Final

Annual Energy Consumption

	Rated Home Calculated Energy Use (MBTU)	Rated Home Cost ($/yr)
Heating	17.8	405
Cooling	2.5	62
Water Heating	4.3	102
Lights & Appliances	21.5	507
Photovoltaics	-0.0	-0
Total	**46.1**	**1117**

Annual Estimates

Electric(kWh):	13521	C02 Emissions(Tons):	13
		Energy Savings ($)**:	949

*Based on standard operating conditions
**Based on the 2018 IECC Energy Rating Index Reference Design Home

TARGET ERI: 61 **2018 ERI: 57** **PASS**

This home MEETS the 2018 Energy Rating Index requirements of Sections 406.3 and 406.4 of the 2018 IECC for climate zone 5B. This 2018 ERI is calculated per ANSI/RESNET/ICC Standard 301-2014, as published January 2016 with Addenda A & B.

Name	Steve Thon	Signature	
Organization	Provident Energy, INC	Date	17 February 2021

Mandatory Requirements

2018 ERI Target	PASS	Duct Insulation (Ducts outside R-6, inside is R-0)	PASS
2009 IECC UA	PASS	Maximum Fenestration U-factor/SHGC (R402.5)	PASS
Duct Testing (2015)	PASS	Air Leakage (5 ACH50 for CZ1-2, 3 ACH50 for CZ3-8)	PASS
Mechanical Ventilation	PASS	High efficacy lights installed (90%)	PASS
Hot water pipe insulated to R-3	PASS	Mandatory Requirements Checkbox (2018 IECC)	PASS
Mechanical Ventilation Efficacy	PASS		

Emissions Data		Provider Data and Seal
Pollution Prevented		Rater
Carbon Dioxide (CO2) - tons/year	9.6	Provident Energy, INC
Sulfur Dioxide (SO2) - lbs/year	11.9	523 W. 4300 N.
Nitrogen Oxides (NOx) - lbs/year	30.4	Pleasant View, Utah 84414
		801-668-7910

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Home Energy Rating Certificate

Property	HERS			
Weber State University	Rating Type:	Confirmed	Certified Energy Rater:	Steve Thon
2807 Quincy Ave.	Rating Date:	2020-09-14	Rating Number:	
Ogden, UT 84403	Registry ID:	650320419		

HERS Index: 49

General Information

Conditioned Area	2400 sq. ft.	House Type	Single-family detached
Conditioned Volume	19200 cubic ft.	Foundation	Conditioned basement
Bedrooms	6		

Mechanical Systems Features

Air-source heat pump:	Electric, Htg: 11.3 HSPF. Clg: 19.1 SEER.
Water Heating:	Heat pump, Electric, 2.45 EF, 50.0 Gal.
Duct Leakage to Outside	32.00 CFM25
Ventilation System	Balanced: HRV, 92 cfm, 30.0 watts.
Programmable Thermostat	Heat=Yes; Cool=Yes

Building Shell Features

Ceiling Flat	R-60.0	Slab	R-0.0 Edge, R-0.0 Under
Sealed Attic	NA	Exposed Floor	NA
Vaulted Ceiling	NA	Window Type	U-Value: 0.270, SHGC: 0.250
Above Grade Walls	R-29.0	Infiltration Rate	Htg: 2.30 Clg: 2.30 ACH50
Foundation Walls	R-22.0	Method	Blower door

Lights and Appliance Features

Interior Fluor Lighting (%)	0.0	Range/Oven Fuel	Electric
Interior LED Lighting (%)	100.0	Clothes Dryer Fuel	Electric
Refrigerator (kWh/yr)	566	Clothes Dryer CEF	2.62
Dishwasher (kWh/yr)	225	Ceiling Fan (cfm/Watt)	0.00

Estimated Annual Energy Cost

Use	MMBtu	Cost	Percent
Heating	18.0	$411	38%
Cooling	2.4	$60	6%
Hot Water	4.3	$102	9%
Lights/Appliances	20.2	$475	44%
Photovoltaics	-0.0	$-0	-0%
Service Charges		$40	4%
Total	**45.0**	**$1087**	**100%**

Criteria

This home meets or exceeds the minimum criteria for the following:

ENERGY STAR Version 3 Home
2006 International Energy Conservation Code
2015 IECC Performance Path
2015 IECC HERS ERI
2015 IECC ERI
2018 IECC Performance Path
2018 IECC ERI

Rater
Provident Energy, INC
523 W. 4300 N.
Pleasant View, Utah 84414
801-668-7910
Fax #

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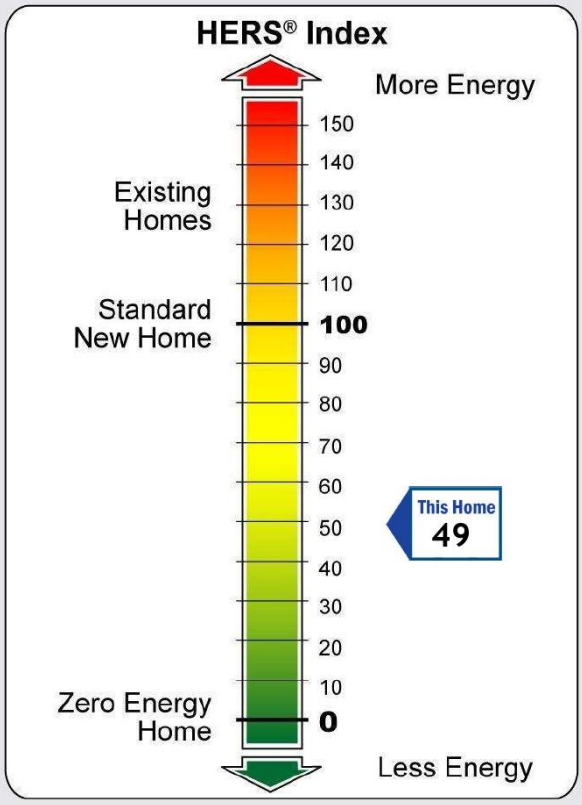
The Home Energy Rating Standard Disclosure for this home is available from the rating provider.

RESNET HERS Index Certificate



2807 Quincy Ave.
Ogden, UT 84403
Rater: Steve Thon
Registry ID: 650320419

Annual Estimates*:
Elec(kWh): 13180
C02 emissions(Tons): 12
Energy Savings ($)**: 1695
*Based on standard operating conditions
**Based on U.S. DOE designation of a HERS Index of 130 as the 'Typical Existing Home'

Rater
Provident Energy, INC
523 W. 4300 N.
Pleasant View, Utah 84414
801-668-7910

This home has been inspected and performance tested in accordance with Chapter 3 of the RESNET standards.

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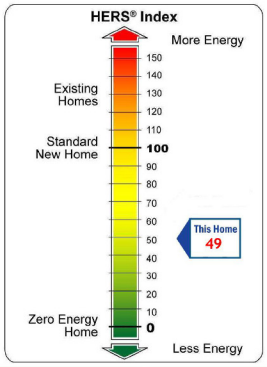
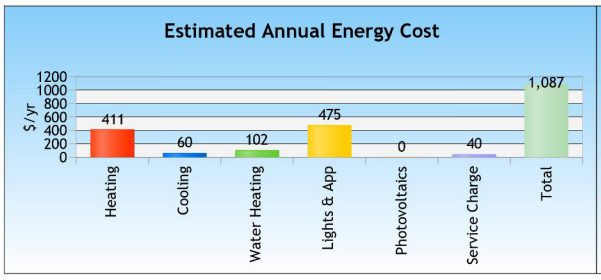
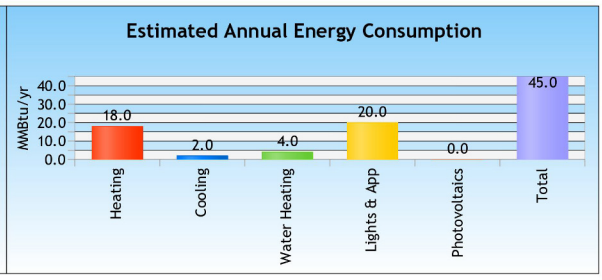
HERS PERFORMANCE



ENERGY RATING CERTIFICATE





Address	2807 Quincy Ave.	Annual Estimates*	Rater
	Ogden, UT 84403	Electric(kWh): 13180	Provident Energy, INC
House Type	Single-family detached	C02 emissions(Tons): 12	523 W. 4300 N.
Cond. Area	2400 sq. ft.	Annual Savings**: $1695	Certified Rater Steve Thon
Rating No.		* Based on standard operating conditions	Rater ID 0359372
Issue Date	February 17, 2021	** Based on a HERS 130 Index Home	Registry ID 650320419
Certification	Inspected and Tested		Rating Date 2020-09-14

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The Home Energy Rating Standard Disclosure for this home is available from the rating provider.