

Achs Net-Zero Home

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Detailed Home Features

1. [Passive solar design](#)

~Faces directly south

~Max windows south, min windows north, east, west

~Special windows in prow for max solar gain in winter, 6' overhang for no solar gain in summer.

2. [Exceptionally insulated](#)

~Structural Insulated Panels (SIPs)

*12 inch SIP ceiling/roof (R-55.56)

*6 inch SIP Walls (R-29.41)

~Thermomass concrete foundation (R-10)

~Additional insulation inside basement walls (R-11). Total wall R-21

~Insulation under basement slab (R-20)

~Insulated basement slab edge (R-5)

3. Super sealed

4. High efficient HVAC

5. Use of solar panels

Comments

You do not have permission to add comments.

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ACHS NET-ZERO INITIAL ENERGY RATING

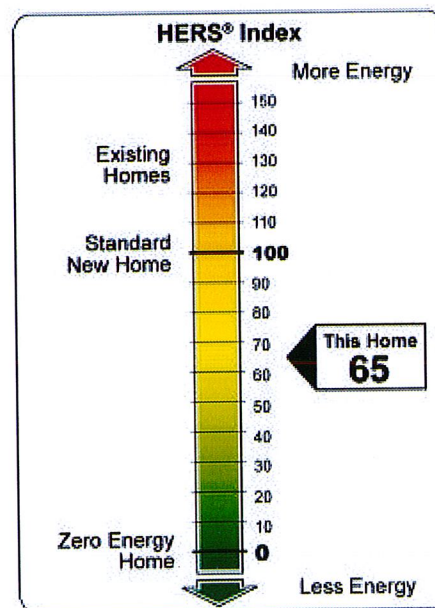
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Achs Net-Zero Initial Energy Rating



Current
HERS
Rating: 15
(new)
Current
HERS
Rating
w/o PV:
34 (new)

As modeled by John Steil, President of Midwestern Energy Solutions. See below and attached documentation.

Note: New numbers (see above) were generated based on switching from GSHP to ASHP for heating, cooling, and domestic hot water.

What is the HERS Index?

Energy Cost and Features

Property
ACHS RESIDENCE
PORT BYRON, IL

Organization
MIDWESTERN ENERGY SOLUTIONS
563.542.2626
JOHN STEIL

HERS
Projected Rating
3/11/2013
Rater ID:1833218

Weather:Moline, IL
ACHS RESIDENCE
Jack Achs Final Modeling.blg

Builder
EVERGREEN CONSTRUCITON, LLC

Annual Energy Costs	\$/yr
Heating	169
Cooling	76
Water Heating	345
Lights & Appliances	701
Photovoltaics	-732
Service Charges	222
Total	780
Average Monthly(\$/Month)	65

Energy Features

Ceiling w/Attic	None
Sealed Attic	None
Vaulted Ceiling	12" SIP0***** U=0.018
Above Grade Wall	SIP 5-5/8" U=0.034
Foundation Walls (Cond)	R-150***** R=15.0
Foundation Walls (Uncond)	None
Doors	Steel-urth w/brk0***** U=0.187
Windows	NFRC .17/.21***** U=0.270
Frame Floors	None
Slab Floors	R-15/R-15***** U=0.032
Infiltration	Htg: 600 Clg: 600 CFM50
Infiltration Measure	Blower door test
Mechanical Ventilation	Balanced: ERV, 92 cfm, 53.0 watts.
Interior Mass	None
Mechanical Equipment 1	GSHP: Htg: 63.3 kBtuh, 4.4 COP. Clg: 39.9 kBtuh, 20.3 EER, with Desuperheater.
Mechanical Equipment 2	Water Heating: Conventional, Elec, 0.98 EF, R-7 wrap.
Programmable Thermostat	Heat=Yes; Cool=Yes
Ducts	Uninsulated Conditioned basement
Duct Leakage to Outside	0.00 CFM @ 25 Pascals
Total Duct Leakage	47.00 CFM @ 25 Pascals
Lights/Appliances	Defaults
Active Solar	None

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

REM/Rate - Residential Energy Analysis and Rating Software v14.3

This information does not constitute any warranty of energy cost or savings.

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Fuel Summary

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Annual Energy Cost	\$/yr
Natural gas	24
Electric	534

Annual End-Use Cost	\$/yr
Heating	169
Cooling	76
Water Heating	345
Lights & Appliances	701
Photovoltaics	-732
Service Charge	222
Total	780

Annual End-Use Consumption	
Heating (kWh)	2213
Cooling (kWh)	929
Water Heating (kWh)	4407
Lights & Appliances (Therms)	34
Lights & Appliances (kWh)	8609
Photovoltaics (kWh)	-9304
Total (Therms)	34
Total (kWh)	6854

Annual Energy Demands	kW
Heating	6.7
Cooling	1.1
Water Heating (Winter Peak)	1.0
Water Heating (Summer Peak)	0.5
Lights & Appliances (Winter Peak)	0.8
Lights & Appliances (Summer Peak)	1.5
Total Winter Peak	8.5
Total Summer Peak	3.1

Utility Rates

Electricity	MidAmerican Elec0*****
Natural Gas	MidAmerican Gas

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Lights and Appliances

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Electric Consumption	kWh/yr
Interior Lighting	1743.7
Exterior Lighting	83.4
Garage Lighting	25.0
Refrigerator	529.0
Freezer	0.0
Dishwasher	232.4
Oven/Range	36.1
Clothes Washer	73.5
Clothes Dryer	415.4
Mechanical Ventilation Fan	464.3
Ceiling Fan	0.0
Plug Loads	5005.9
Total	8608.7

Fossil Fuel Consumption	MMBtu/yr
Dryer	0.0
Oven/Range	3.4
Total	3.4

Annual Energy Cost	\$/yr
Interior Lighting	137
Exterior Lighting	7
Garage Lighting	2
Refrigerator	42
Freezer	0
Dishwasher	18
Oven/Range	27
Clothes Washer	6
Clothes Dryer	33
Mechanical Ventilation Fan	37
Ceiling Fan	0
Plug Loads	394
Total	701

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Source Energy & Emissions

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EVERGREEN CONSTRUCITON, LLC

Source Energy Consumption (MMBtu/year)

	All Electric Reference Home	As Designed	Difference	% Difference
Heating	246.2	20.7	-225.4	-91.6%
Cooling	44.5	7.3	-37.2	-83.6%
WaterHeating	60.8	57.1	-3.7	-6.1%
LightsAppliances	155.8	109.5	-46.2	-29.7%
Photovoltaics	0.0	-114.3	-114.3	
Total	507.2	80.3	-426.9	-84.2%

Total Emissions

Type of Emissions	All Electric Reference Home	As Designed	Difference	% Difference
Carbon Dioxide (CO2) - tons/year	22.1	3.5	-18.6	-84.0%
Sulfur Dioxide (SO2) - lbs/year	101.4	15.4	-86.0	-84.8%
Nitrogen Oxides (NOx) - lbs/year	31.6	5.2	-26.4	-83.4%

Emissions By End-Use

(All Electric Reference Home versus As Designed)

	CO2-tons/yr		SO2-lbs/yr		NOx-lbs/yr	
	Reference	Design	Reference	Design	Reference	Design
Heating	10.7	0.9	49.6	4.2	15.2	1.3
Cooling	1.9	0.3	9.0	1.5	2.7	0.5
WaterHeating	2.6	2.5	12.2	11.5	3.8	3.5
LightsAppliances	6.8	4.8	30.6	21.3	9.9	7.0
Photovoltaics	0.0	-5.0	0.0	-23.0	0.0	-7.1

The energy and emission values are calculated by comparing the Rated Home to an all-electric version of the Reference Home as defined in the 'Mortgage Industry National Home Energy Rating Systems Standards' as promulgated by the Residential Energy Services Network (RESNET). 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 Verification Summary

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EVERGREEN CONSTRUCTION, LLC

Projected Rating: Based on Plans - Field Confirmation Required.

Building Information

Conditioned Area (sq ft)	4668
Conditioned Volume (cubic ft)	37996
Insulated Shell Area (sq ft)	6768
Number of Bedrooms	5
Housing Type	Single-family detached
Foundation Type	Conditioned basement

Rating

HERS Index	14
HERS Index w/o PV	33
HERS Index Target (SAF Adjusted)	68
HERS Index of Reference Design Home	68
Size Adjustment Factor	1.00



This home MEETS OR EXCEEDS the EPA's requirements for an ENERGY STAR Home.
HERS Index w/o PV <= HERS Index of Reference Design Home AND HERS Index <= HERS Index Target to comply.

Building Shell

Ceiling w/Attic	None	Window Type	NFRC .17/.21*****
Sealed Attic	None	Window	U-Value: 0.270, SHGC: 0.210
Vaulted Ceiling	12" SIP0***** U=0.018	Window/Wall Ratio	0.27
Above Grade Walls	SIP 5-5/8" U=0.034	Infiltration Type	Blower door test
Found. Walls(Cond)	R-150***** R=15.0	Infiltration	Htg: 600 Clg: 600 CFM50
Found. Walls(Uncond)	None	Duct Leakage to Outside	0.00 CFM @ 25 Pascals
Frame Floors	None	Total Duct Leakage	47.00 CFM @ 25 Pascals
Slab Floors	R-15/R-15***** U=0.032		

Mechanical Systems

GSHP	Htg: 63.3 kBtuh, 4.4 COP. Clg: 39.9 kBtuh, 20.3 EER, with Desuperheater.
Water Heating	Conventional, Elec, 0.98 EF, R-7 wrap.
Programmable Thermostat	Heat=Yes; Cool=Yes
Ventilation System	Balanced: ERV, 92 cfm, 53.0 watts.

Lights and Appliances

Percent Interior Lighting	100.00	Clothes Dryer Fuel	Electric
Percent Garage Lighting	100.00	Clothes Dryer EF	3.01
Refrigerator (kWh/yr)	529.00	Clothes Washer LER	125.00
Dishwasher Energy Factor	0.46	Clothes Washer Capacity	4.30
Ceiling Fan (cfm/Watt):	0.00	Range/Oven Fuel	Natural gas

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