

# Zero Energy Home

Michael Andriopoulos, Zach Zebula,  
Rob Gowisnock, Dave Hendrix

# Mission Statement

- Home Requirements...
  - Family of 4
  - \$200,000
  - In Pennsylvania
  - Zero Energy
  - Sustainable
  - Suitable

# House of Quality

<div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div>												
Direction of Improvement							Competitive Evaluation					
Customer Requirements (What)	Technical Characteristics (How)	1550 sq. ft	Solar Panels	Insulation	Natural Light	Energy Efficient	Aesthetics	X - Us A - Competitor A B - Competitor B (5 is the best)				
								1	2	3	4	5
Relative Importance												
10	Zero Energy		OO	O	O	O	X					XAB
10	Maximum \$200,000	O	X		O	X	X		B	A		X
10	Family of Four	O									XA	B
10	Located in PA		O			X	O	AB				X
7	Sustainable	O	OO	O	O	O	O					XAB
8	Suitable			OO	X		OO			X	A	B
Importance weighting		3	5	4	3	5	3	1	2	3	4	5
Target		Make House	Eliminate Energy	Make House	Lower Heat	Cut Energy	Desirable To	1(low) - 5(high)				
Values		Dependence		Suitable/Efficient	Costs	Needs	Live In	Importance Scale				
Technical Evaluation		XB	X	B	XAB	XA	A	5	8 - strong			
			AB	X		B	XB	4	3 - medium			
		A		A					3	1 - small		
								2				
								1				

OO- Strong Positive

O - Positive

X - Negative

XX - Strong Negative

1(low) - 5(high)

Importance Scale

5 8 - strong

4 3 - medium

3 1 - small

2

1

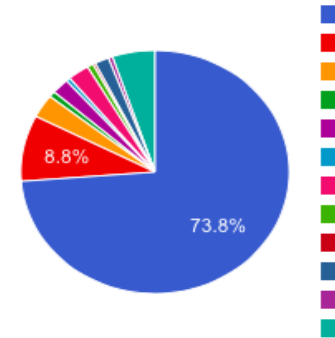
# Concept Generation

	Concept Screening and Scoring							
	Solar Energy	Geothermal	Wind Energy	Hydroelectric	Large Windows	Insulation	Energy Star Appliances	Solar Water Heater
Practicality	5	3	2	2	5	5	5	3
Efficiency	5	4	2	1	4	5	4	4
Effective in Pennsylvania	4	4	2	2	5	5	5	4
Sustainable	4	4	4	3	5	4	4	4
Cost-Friendly	4	2	3	2	4	4	4	4
Total	22	17	13	10	23	23	22	19
Used in House	Yes	No	No	No	Yes	Yes	Yes	Yes

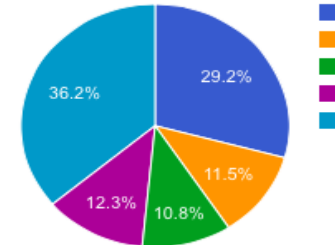
# Concept Selection

House Products	Cost (\$)
Housing Base Cost	\$143,000.00
Solar Panel	\$17,000.00
Appliances	\$6,000.00
TVs	\$1,500.00
Trees	\$4,000.00
Plants	\$1,000.00
Windows	\$5,000.00
Lighting	\$1,400.00
Solar Storage Battery	\$600.00
Solar Water Heater	\$3,300.00
Smart House System	\$1,000.00
Miscellaneous	\$10,000.00
<b>Total</b>	<b>\$193,800.00</b>
House Products w/ Energy	Energy Consumption (kWh) per month
Appliances	190
Solar Panels	0
TVs	75
Lighting	70
Solar Water Heater	80
Miscellaneous	235
<b>Total</b>	<b>650</b>

Total Cost

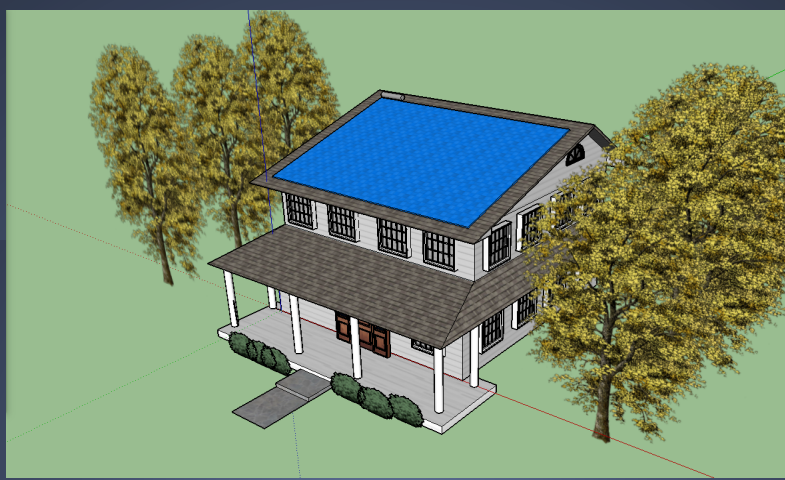


Energy Usage



House Product w/ Energy	Energy Produced (kWh)
Solar Panels	848

# Home Layout



Left: Downstairs Layout  
Right: Upstairs Layout  
Above: Front View (south facing)

