CLEAR

Clean Energy Assessment & Reinvestment

Analysis Tool

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BUILDING PERFORMANCE PROFESSIONALS ASSOCIATION

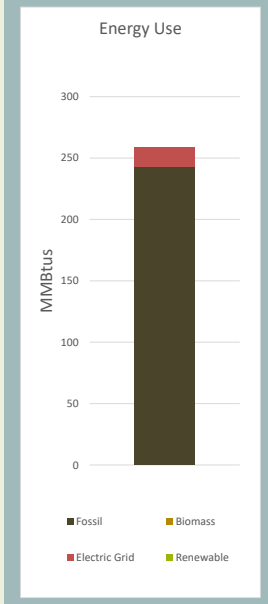
Zero Energy Now Program

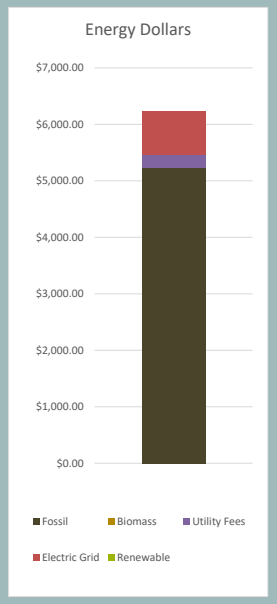
Summary & Report

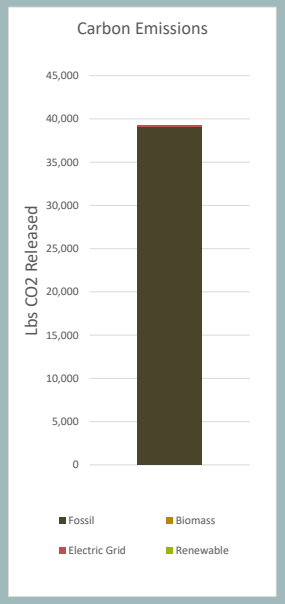
Contractor/Coordinator	**Integrated Solar Applications / New Leaf Design**
House Style	**Expanded Reproduction Colonial Farmhouse**
Location	**Windham County, Vermont**
Project Start Date	**9/25/2019**

How does your home stack up on the path to Zero Energy?

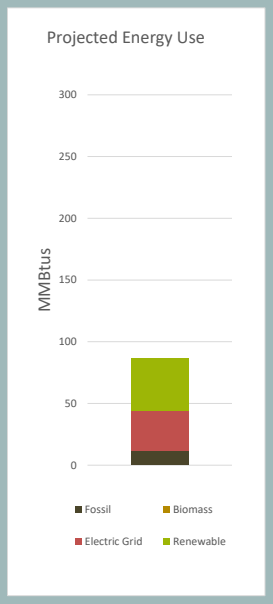
Your home's current energy profile







Your home's potential energy profile...



Proposed Work Scope

Heat Loss Analysis & Envelope Improvement

Envelope Components	Existing Heat Loss in MMBtus	Proposed Reduction	Improved Heat Loss	Cost of Improvement
Flat Attic - Air seal & Insulate				
Attic Slants & Cathedral Ceilings				
Exterior Walls				
Exposed Floors				
Basement A&I				
Basement Moisture				
Special Detail #1				
Special Detail #2				
Special Detail #3				
Living Space Measures				
Envelope Air Flow Analysis	**Existing Air Infiltration**	**Improved Air**		
Air Infiltration - CFM50				
Natural Air Changes per Hour				
Mechanical Ventilation				
Envelope Totals				**Total Cost**
Total Estimated Building Heat Loss	173.60	60.76	112.84	
		Total Cost of Envelope Improvement		$ 73,601.00

Mechanical Installations

Existing Mechanical Systems

Mechanical Unit & System Type		Fuel	Make	Model	Efficiency	Effcy based on
Hydronic Boiler		#2 Fuel Oil			80.00%	Default
DHW 1	Tank Indirec	#2 Fuel Oil			73.60%	Default
DHW 2						

Improved Mechanical Systems

Mechanical Unit & System Type		Fuel	Make	Model	Efficiency	Effcy based on
Mini-Split ASHP		Electric			220.0%	Default
Hydronic Boiler		#2 Fuel Oil			80.0%	Default
DHW 1	Heat Pump	Electric	Stiebel Eltron	80 Gallon	200.0%	Default
DHW 2						
				Total Cost of Mechanical Improvement		$ 33,435.00

Renewable Energy Installations

Renewable Equipment - Existing

System Type	Size in kW DC	Productn Factor	Annual kWh AC	Other Relevant Details	Extg Rnwbl Input in kWh	Extg Load in kWh
					0.00	4,596.78

Renewable Equipment - Improved

System Type	Size in kW DC	Production Factor	Annual kWh AC	Other Relevant Details	Totl Rnwbl Input in kWh	Improved Load in kWh
Roof Mount	10.40	1.20	12,480.00			
					12,480.00	22,027.62
				Total Cost of Renewable Installation		$ 36,768.00

Project Cost

Weatherization	$	73,601.00
Heat Pumps & Appliances	$	33,435.00
Biomass Installation	$	-
Renwble Electric Installation or Buy-In	$	36,768.00
Financing Costs	$	-
Total Project Cost	**$**	**143,804.00**

Financing & Cash Flow Analysis

Pre-project Monthly Energy Loan Pymt	$	-
Pre-Project Monthly Energy Costs	$	520.35
Pre-Project Monthly Out of Pocket	$	520.35
Total Project Cost	$	143,804.00
Total Cash & Rebate Incentives	$	20,359.68
Down Payment or Cost Offset	$	123,444.32
Financed Principal	$	-
Total Monthly Loan Payments	$	-
Post-Project Monthly Energy Costs	$	197.31
Annual Energy Savings	$	3,876.47
Monthly Energy Savings	$	323.04
Post-Project Monthly Out of Pocket	$	197.31
Net Monthly Savings	$	323.04

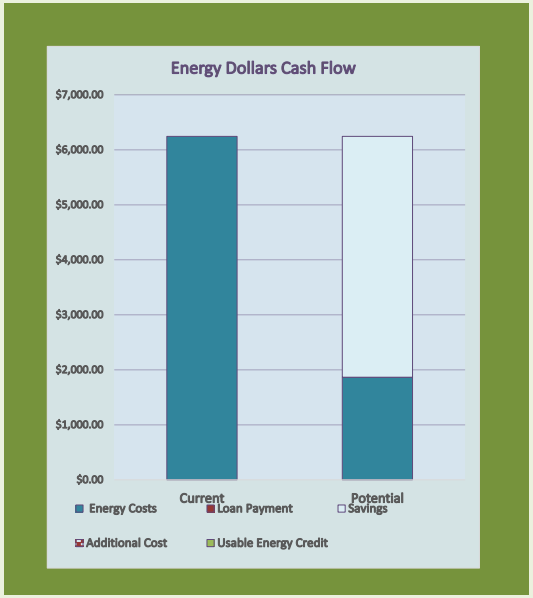
Incentive Summary

		Cash Back Incentive	Tax Credit	Cost Reduction
ZEN Incentives				
Test 2 Incentive		$ 5,000.00		
Test 3 Incentive		$ -		
Income Bonus		$ -	$ -	$ -
Other Incentives				
Weatherization		$ 1,000.00	$ -	$ -
Mechanical		$ 600.00	$ 300.00	$ 1,800.00
Renewable		$ -	$ 9,559.68	$ -
Appliance		$ -	$ -	$ -
Utility		$ 2,400.00	$ -	$ -
Other Adjustmer		$ -	$ 1,500.00	$ -
Total Incentive	**$ 22,159.68**	**$ 9,000.00**	**$ 11,359.68**	**$ 1,800.00**

Financing

Amount to be Financed $ -

	Principal	Term in Years	Rate	Monthly Payment
Loan 1	$ -			
Loan 2				
Loan 3				
Total Loans	**$ -**	**Total Monthly Payment**		**$0.00**



ZERO ENERGY NOW GOALS

	Required Standards	Minimum Required	Projected Achievmnt	Meets ZEN
Test 1	Envelope Load Reduction	10.00%	35.00%	YES
Test 2	Fossil & Grid Energy Reduction	50.00%	82.85%	YES
Test 3	Renewable Energy Component	50.00%	50.36%	YES
	Added Benefits	*Recmnded*	*Projected*	
	Reduction in CO2 Emissions	90.00%	94.19%	lbs elimntd: 37,036.41
	Energy Cost Savings	80.00%	68.96%	in pre-project dollars

Project Design Optimization

	Primary Fossil Fuel	Load In Mmbtus	In Native Units	In Dollars	Likely Difference in Project Cost	Apply
	#2 Fuel Oil	9.40				
Adjst Env Load MMBtus						☐
Adjust HP Load MMBtus						☐
Adjust PV Output kWh						☐
Install HP DHW						☐
Other FF Appliance Chnge:						☐
Adjust Biomass Use						☐
Adjst cost of Fuel						☐

Heating Load	Fossil Fuel (Consmptn)	Primary Fuel Cost	HP Load	kWh Load	Monthly OP	Net Project Cost	*Sav/Mo*
112.84	11.75	$ 2.97	103.44	22,027.62	$ 197.31	$ 123,444.32	$ 323.04

Windham County Colonial Reproduction -- original house built in 1972

A very large project that was admitted to the program after it was completed because it involved all three major ZEN components, and met the requirements for entry and all the standards. The house had had an enormous pre-project heating load – 173 million Btus, and an enormous weatherization project was undertaken to address it – over $73,000. We gave it a nominal 35% envelope improvement which allowed the 10.4 kW solar array to cover over 50% of the energy load. We expect the home to perform at much higher levels, and look forward to verifying the results after a few years. This project was self-financed.