CLEAR

Clean Energy Assessment & Reinvestment

Analysis Tool

BUILDING PERFORMANCE PROFESSIONALS ASSOCIATION

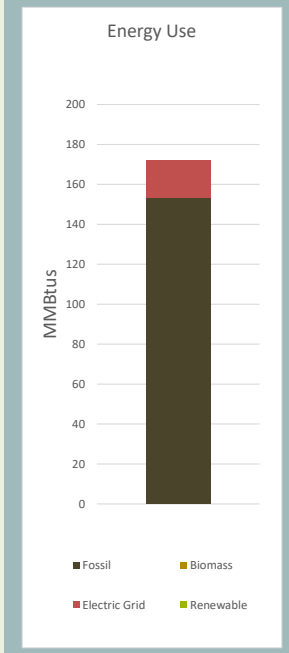
Zero Energy Now Program

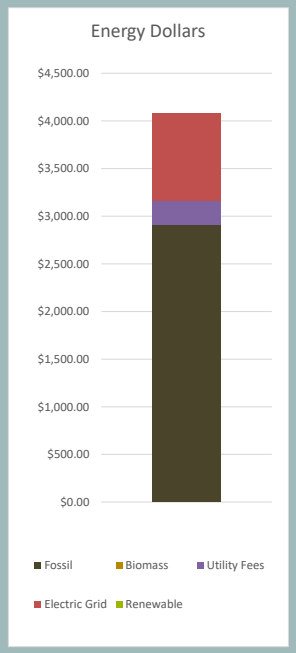
Summary & Report

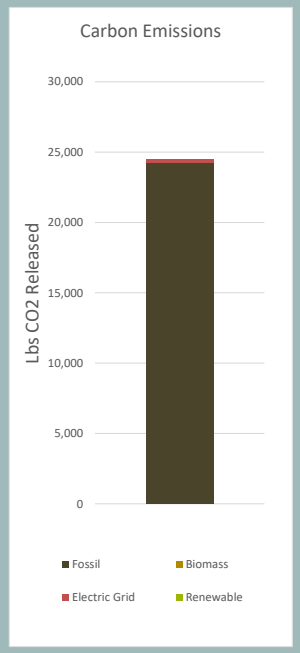
Contractor/ Coordinator	Montpelier Construction/New Leaf Design
House Type	19th Century Cape
Location	Caledonia County, Vermont
Project Start Date	10/1/2020

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

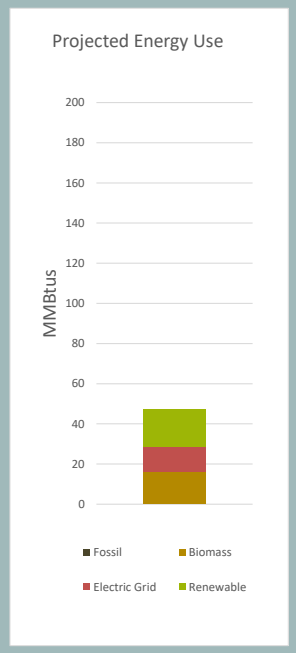
Your home's current energy profile

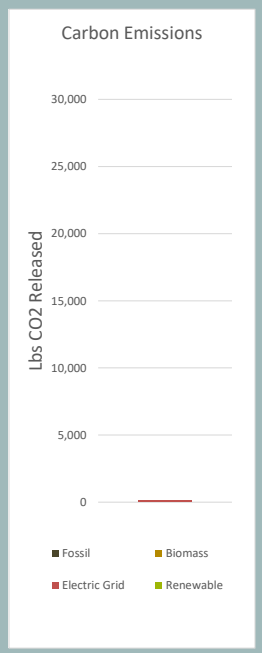






Your home's potential energy profile...





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	1.20	0.60	0.60	
Attic Slants & Cathedral Ceilings	2.40	1.20	1.20	
Exterior Walls	15.10	3.70	11.40	
Exposed Floors	0.50	0.40	0.10	
Basement A&I	10.40	8.30	2.10	
Windows & Doors	19.40	5.30	14.10	
Special Detail #1				
Special Detail #2				
Special Detail #3				
Living Space Measures				
Envelope Air Flow Analysis	**Existing Air Infiltration**	**Improved Air**		
Air Infiltration - CFM50	58.8	45.7	13.1	
Natural Air Changes per Hour				
Mechanical Ventilation				
Envelope Totals				**Total Cost**
Total Estimated Building Heat Loss	96.60	67.50	29.10	
		Total Cost of Envelope Improvement		$ 6,013.73

Mechanical Installations

Existing Mechanical Systems

Mechanical Unit & System Type		Fuel	Make	Model	Efficiency	Effcy based on
Hydronic Boiler		#2 Fuel Oil			73.58%	SSE w SEA
DHW 1	Tank Direct	LP Gas			58.00%	Label
DHW 2						

Improved Mechanical Systems

Mechanical Unit & System Type		Fuel	Make	Model	Efficiency	Effcy based on
Multi-Head ASHP		Electric	Mitsubishi	MXZ2C20NAHZ2U1	160.0%	Default
Central Ducted ASHP		Electric	Mitsubishi	SUZKA18NAHZTB	220.0%	Default
Space Heater		Wd Pellets	Harmon	P-61	80.0%	Default
Hydronic Boiler						
DHW 1	Heat Pump	Electric	Rheem	50 gallon	200.0%	Default
DHW 2						
				Total Cost of Mechanical Improvement		$ 16,127.50

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	5,446.08

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	5.76	0.94	5,433.00			
					5,433.00	8,958.74
				Total Cost of Renewable Installation		$ 17,464.91

Project Cost

Weatherization	$	6,013.73
Heat Pumps & Appliances	$	14,756.55
Biomass Installation	$	1,370.95
Renwble Electric Installation or Buy-In	$	17,464.91
Financing Costs	$	-
Total Project Cost	**$**	**39,606.14**

Financing & Cash Flow Analysis

Pre-project Monthly Energy Loan Pymt	$	-
Pre-Project Monthly Energy Costs	$	340.13
Pre-Project Monthly Out of Pocket	**$**	**340.13**
Total Project Cost	$	39,606.14
Total Cash & Rebate Incentives	$	16,340.88
Down Payment or Cost Offset		
Financed Principal	$	23,265.26
Total Monthly Loan Payments	$	171.97
Post-Project Monthly Energy Costs	$	95.44
Annual Energy Savings	$	2,989.08
Monthly Energy Savings	$	249.09
Post-Project Monthly Out of Pocket	**$**	**267.41**
Net Monthly Savings	**$**	**72.72**

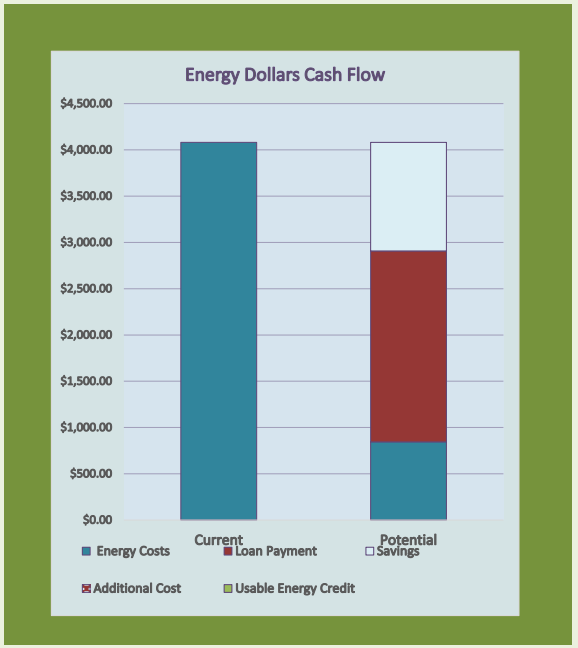
Incentive Summary

	Cash Back Incentive	Tax Credit	Cost Reduction
ZEN Incentives			
Test 2 Incentive	$ 5,000.00		
Test 3 Incentive	$ -		
Income Bonus	$ -	$ -	$ -
Other Incentives			
Weatherization	$ 3,000.00	$ 500.00	$ -
Mechanical	$ 1,600.00	$ 900.00	$ 700.00
Renewable	$ -	$ 4,540.88	$ -
Appliance	$ -	$ -	$ -
Utility	$ 800.00	$ -	$ 100.00
Other Adjustmen	$ -	$ -	$ -
Total Incentive	**$ 17,140.88**	**$ 10,400.00**	**$ 5,940.88**	**$ 800.00**

Financing

Amount to be Financed $ 23,265.26

	Principal	Term in Years	Rate	Monthly Payment
Loan 1	$ 23,265.26	15.00	3.99%	$171.97
Loan 2				
Loan 3				
Total Loans	**$ 23,265.26**	**Total Monthly Payment**		**$171.97**



ZERO ENERGY NOW GOALS

	Required Standards	Minimum Required	Projected Achievmnt	Meets ZEN
Test 1	Envelope Load Reduction	10.00%	69.88%	YES
Test 2	Fossil & Grid Energy Reduction	50.00%	93.00%	YES
Test 3	Renewable Energy Component	50.00%	72.46%	YES
	Added Benefits	*Recmnded*	*Projected*	
	Reduction in CO2 Emissions	90.00%	99.41%	lbs elimntd: 24,302.85
	Energy Cost Savings	80.00%	77.97%	in pre-project dollars

Project Design Optimization

	Primary Fossil Fuel	Load In Mmbtus	In Native Units	In Dollars	Likely Difference in Project Cost	Apply
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*
29.10	0.00		15.98	8,958.74	$ 267.41	$ 23,265.26	$ 72.72

Caledonia County Cape -- original house built mid-19th century

A classic Northeast Kingdom village farmhouse, this home underwent a substantial, but relatively low budget remodel, allowing for major envelope upgrade. A combination of heat pumps and a pellet stove should heat the place effectively, although the solar array, limited by the size of an available rooftop, only covers 60% of the electric load. Resourcefulness of the homeowner, and superb leverage of incentives made this project exceptionally affordable!