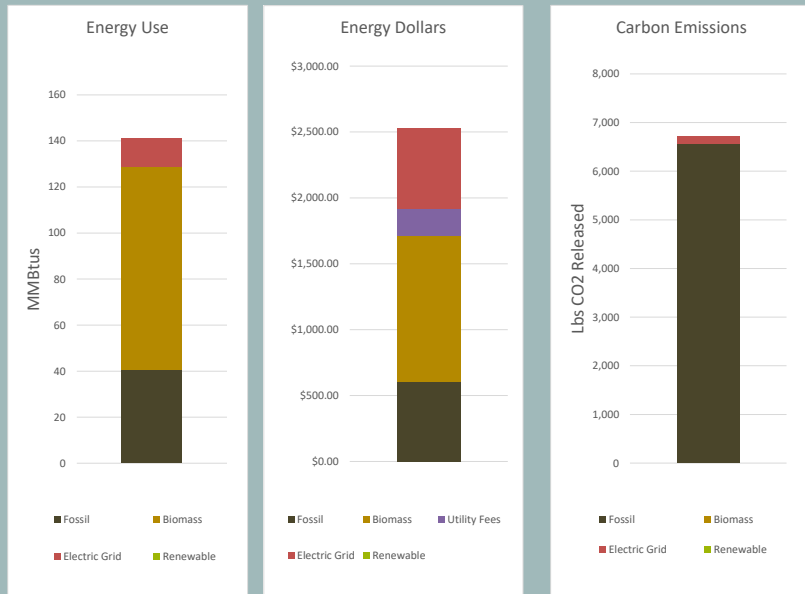


### Zero Energy Now Program

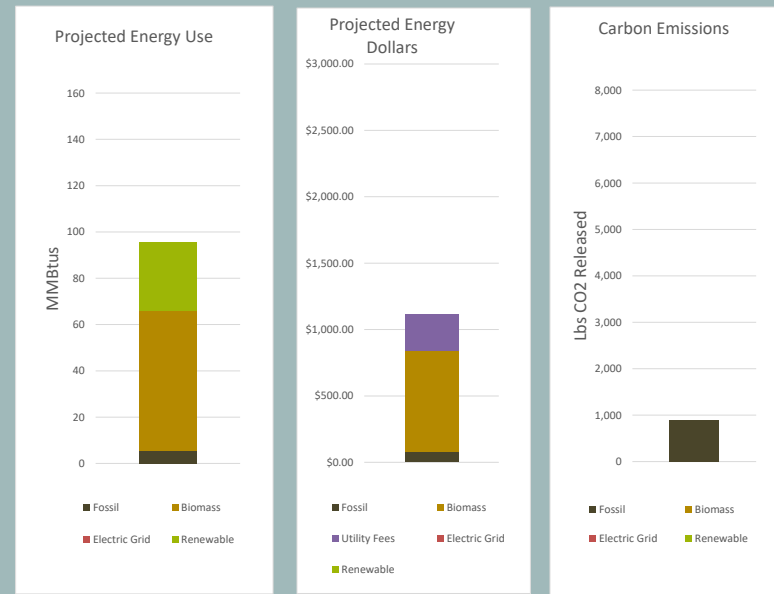
Contractor / Coordinator	Reiss Building & Renovation
House Style	19th Century Farmhouse
Location	Lamoille County, Vermont
Project Start Date	10/21/2020

## 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	3.20	2.30	0.90	
Attic Slants & Cathedral Ceilings	3.40	0.00	3.40	
Exterior Walls	8.00	0.00	8.00	
Exposed Floors	8.60	0.00	8.60	
Basement A&I	8.80	5.90	2.90	
Basement Moisture				
Doors & Windows	18.20	0.40	17.80	
Special Detail #2				
Special Detail #3				
Living Space Measures				
<b>Envelope Air Flow Analysis</b>				
	<b>Existing Air Infiltration</b>	<b>Improved Air</b>		
Air Infiltration - CFM50	3704	3148		
Natural Air Changes per Hour	0.81	0.69		
Air Driven Heat Loss - MMBtus	35.7	5.4	30.3	
<b>Envelope Totals</b>				
Total Estimated Building Heat Loss	74.32	11.98	62.34	<b>Total Cost</b>
<b>Total Cost of Envelope Improvement</b>				<b>\$ 7,760.00</b>



## Mechanical Installations

### Existing Mechanical Systems

Mechanical Unit & System Type	Fuel	Make	Model	Efficiency	Effcy based on
Hydronic Boiler	#2 Fuel Oil	Buderus		80.00%	Default
Space Heater	Cord Wd			60.00%	Default
DHW 1	Tank Indired	#2 Fuel Oil		73.60%	Default
DHW 2					

## 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	3,634.34

### Improved Mechanical Systems

Mechanical Unit & System Type	Fuel	Make	Model	Efficiency	Effcy based on
Mini-Split ASHP	Electric	Mitsubishi	M-Series	220.0%	Default
Hydronic Boiler	#2 Fuel Oil			80.0%	Default
Space Heater	Cord Wd			60.0%	Default
DHW 1	Heat Pump	Electric	Rheem	200.0%	Default
DHW 2					
<b>Total Cost of Mechanical Improvement</b>					<b>\$ 21,450.00</b>

### Renewable Equipment - Improved

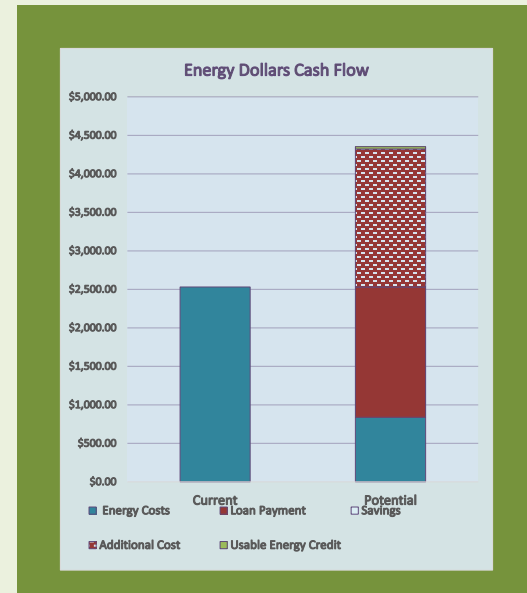
System Type	Size in kW DC	Production Factor	Annual kWh AC	Other Relevant Details	Totl Rnwbl Input in kWh	Improved Load in kWh
Fixd Grnd Mt	7.26	1.20	8,712.00		8,712.00	8,531.40
<b>Total Cost of Renewable Installation</b>					<b>\$ 26,554.00</b>	

Project Cost	
Weatherization	\$ 7,760.00
Heat Pumps & Appliances	\$ 21,450.00
Biomass Installation	\$ -
Renwble Electric Installation or Buy-In	\$ 26,554.00
Financing Costs	\$ -
<b>Total Project Cost</b>	<b>\$ 55,764.00</b>

Financing & Cash Flow Analysis	
Pre-project Monthly Energy Loan Pymt	\$ -
Pre-Project Monthly Energy Costs	\$ 210.93
<b>Pre-Project Monthly Out of Pocket</b>	<b>\$ 210.93</b>
Total Project Cost	\$ 55,764.00
Total Cash & Rebate Incentives	\$ 15,251.30
Down Payment or Cost Offset	
Financed Principal	\$ 40,512.70
Total Monthly Loan Payments	\$ 290.25
Post-Project Monthly Energy Costs	\$ 92.89
Annual Energy Savings	\$ 1,483.67
Monthly Energy Savings	\$ 123.64
<b>Post-Project Monthly Out of Pocket</b>	<b>\$ 383.14</b>
<b>Net Monthly Cost</b>	<b>\$ 172.21</b>

Incentive Summary			
	Cash Back Incentive	Tax Credit	Cost Reduction
<b>ZEN Incentives</b>			
Test 2 Incentive	\$ 2,379.79		
Test 3 Incentive	\$ 1,227.47		
Income Bonus	\$ -	\$ -	\$ -
<b>Other Incentives</b>			
Weatherization	\$ 1,000.00	\$ 340.00	\$ -
Mechanical	\$ 300.00	\$ 600.00	\$ 1,400.00
Renewable	\$ -	\$ 6,904.04	\$ -
Appliance	\$ -	\$ -	\$ -
Utility	\$ 1,600.00	\$ -	\$ -
Other Adjustme	\$ -	\$ 900.00	\$ -
<b>Total Incentive</b>	<b>\$ 16,651.30</b>	<b>\$ 6,507.26</b>	<b>\$ 8,744.04</b>
			<b>\$ 1,400.00</b>

Financing				
	Amount to be Financed			\$ 40,512.70
	Principal	Term in Years	Rate	Monthly Payment
Loan 1	\$ 40,512.70	20.00	6.00%	\$290.25
Loan 2				
Loan 3				
<b>Total Loans</b>	<b>\$ 40,512.70</b>			<b>\$290.25</b>



ZERO ENERGY NOW GOALS				
	Required Standards	Minimum Required	Projected Achievmt	Meets ZEN
Test 1	Envelope Load Reduction	10.00%	16.12%	YES
Test 2	Fossil & Grid Energy Reduction	50.00%	89.59%	YES
Test 3	Renewable Energy Component	50.00%	94.55%	YES
<b>Added Benefits</b>		<b>Recmnded</b>	<b>Projected</b>	
	Reduction in CO2 Emissions	90.00%	86.84%	lbs elimtnd: 5,833.22
	Energy Cost Savings	80.00%	63.88%	in pre-project dollars

Project Design Optimization		Primary Fossil Fuel	Load In Mmbtus			Likely Difference in Project Cost	Apply
	#2 Fuel Oil	4.42	In Native Units	In Dollars			
Adjst Env Load MMBtus	0.00	62.34			\$0.00	<input type="checkbox"/>	
Adjust HP Load MMBtus	0.00	21.62	2,880.21		\$0.00	<input type="checkbox"/>	
Adjust PV Output kWh	0.00		8,712.00		\$0.00	<input type="checkbox"/>	
Install HP DHW						<input type="checkbox"/>	
Other FF Appliance Chnge:							
Adjust Cord Wd	0.00	36.30	2.75	\$756.25	Annually	<input type="checkbox"/>	
Adjst cost of #2 Fuel Oil				\$2.07	per Gal	<input type="checkbox"/>	
Heating Load	Fossil Fuel (Consmptn)	Primary Fuel Cost	HP Load	kWh Load	Monthly OP	Net Project Cost	Addnl OP/Mo
62.34	5.53	\$ 2.07	21.62	8,531.40	\$ 383.14	\$ 40,512.70	\$ 172.21

**Lamoille County Farmhouse – house originally built late 19<sup>th</sup> century**

Homeowners had kept thermostat settings very low in this house to avoid using oil, and burned 4 cords of wood. With a baby on the way, they were most interested in weatherizing the home and converting to electric as much as possible. An inaccessible crawl space under the ell of the house meant that some areas would remain difficult to heat, however, and the contractor was firm about keeping the oil boiler in place as backup, both for heat, and for hot water under very cold conditions. (A heat pump water heater was also included.) With current financing, the project cashes out at \$172/month higher than pre-project energy bills, but the homeowners hope to qualify for an excellent mortgage refinance opportunity which may be available to them in a few months.