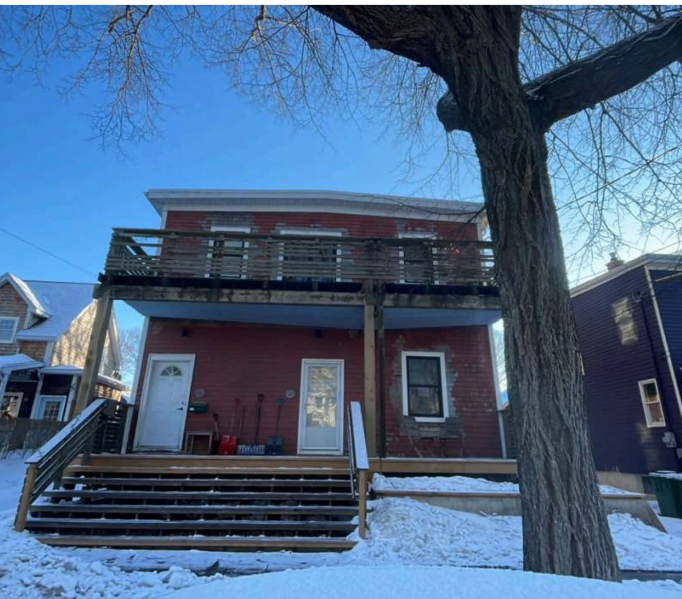




TOWARDS NET ZERO RENOS



CASE STUDY



This historic Halifax home is in the early stages of a deep energy retrofit. With an architect as the homeowner, the project aims to honour the property's heritage character while achieving modern high-performance standards and exceptional energy efficiency.

PROJECT PRIORITIES

- Homeowner Involvement
- Considerations to Tenants
- Addressing Basement/Foundation
- Utilizing Grants and Rebates
- Maintaining Heritage Aesthetics

RENOVATOR: TBD

ENERGY ADVISOR/SERVICE ORGANIZATION: Homesol Building Solutions

TARGET: Net Zero Ready Home Renovation

ENERGY REDUCTION: 75.4%

YEAR BUILT: 1875

YEAR RETROFIT COMPLETED: Unknown

LOCATION: Halifax, Nova Scotia

HOUSE TYPE: Duplex (non-MURB)

SIZE: 3618 sq.ft.

CLIMATE: Zone 5, 3870 HDD

UPGRADES INCLUDE

Domestic Water Heater

Above Grade Walls

Floor Headers

Principle Ventilation

Windows & Doors

Ceiling with Attic Space

Airtightness

Cooling & Heat Pumps

Space Heating

Foundation Wall



TOWARDS NET ZERO RENOS



NET ZERO PLAN

BEFORE

ENERGY CONSUMPTION

268 GJ/year

COMFORT

Heating imbalanced; north rooms and vestibule very cold. Air quality concerns.

BUILDING CONDITION

149 yrs old. Concerns with rubble wall/bedrock basement. Would like to reduce mold and dampness. 10.7 ACH.

RENEWABLES

None

WALL INSULATION

R3.6/in blown cellulose

CEILING INSULATION

R20 blown cellulose + (x2 layers)

FOUNDATION INSULATION

None

WINDOWS

U-1.59 0.32 DH

VENTILATION

None

HEATING

83.0% boiler

COOLING

None

HEAT LOSS & GAIN

HL: 84049 Btu/h, HG: 21242 Btu/h

HOT WATER

0.89 EF electric conserver tank

PROPOSED

66 GJ/year

This project is not yet complete. The below are suggested upgrades towards net zero.

No Change

R-14 + R-20ci

R-60 cell

R-12+12

U-1.0 0.20

65.0% SRE HRV

3.00 COP air source heat pump,
100.0% boiler backup

3.00 COP air source heat pump

HL: 18505 Btu/h, HG: 13970 Btu/h

3.7 EF heat pump water heater



TOWARDS NET ZERO RENOS

ANNUAL ENERGY USE

Before Retrofit
268 GJ/
year

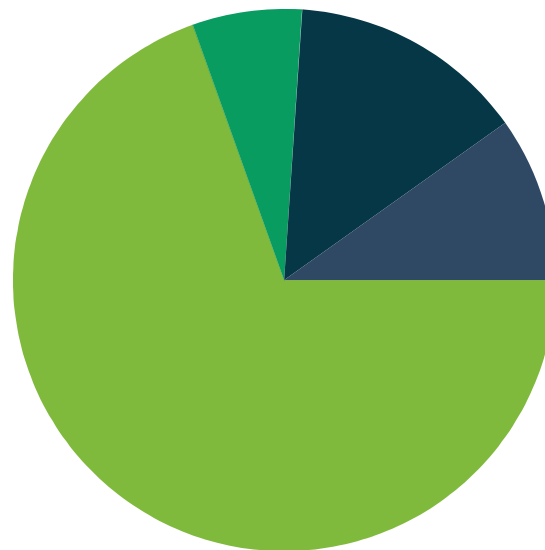
Typical New Home
98 GJ/
year

After Retrofit
66 GJ/
year



ENERGY CONSUMPTION BREAKDOWN

BEFORE RENOVATION



AFTER RENOVATION



- Space Heating
- Other Electrical
- Water Heating
- Light and appliances
- Ventilation
- Space Cooling

AS BUILT ENERGY PERFORMANCE

ANNUAL ENERGY SAVINGS	75.4%
GREENHOUSE GAS SAVINGS	14.10 Tonnes



TOWARDS NET ZERO RENOS



WHY ARE WE RETROFITTING OUR HOME?

As an architect, the homeowner has been very eager to perform a deep energy retrofit to the home. They have made improvements to insulation, air sealing and windows over the years, but would like to tackle concerns with the stone foundation (very wet basement), and a desire to replace oil heating with heat pumps for both units. The homeowners reside in the upstairs unit with tenants below.

WHAT LESSONS DID WE LEARN?

This project is in early stages; consulting with builders, energy advisors and considering available grants/rebates. Namely challenges with basement and foundation. The walls are stone/rubble with exposed bedrock, dirt floor. The floors slope due to hitting the bedrock. Water finds its way into the basement. Frost line about half way up the basement wall. Suggestions around spray foam and pouring a new slab in the basement.

WHAT ELSE NEEDS TO BE DONE TO GET TO NET ZERO?

The roof is flat and doesn't seem to be a good option for solar. We are currently exploring possible solutions to add solar and reach CHBA Net Zero.



TOWARDS NET ZERO RENOS

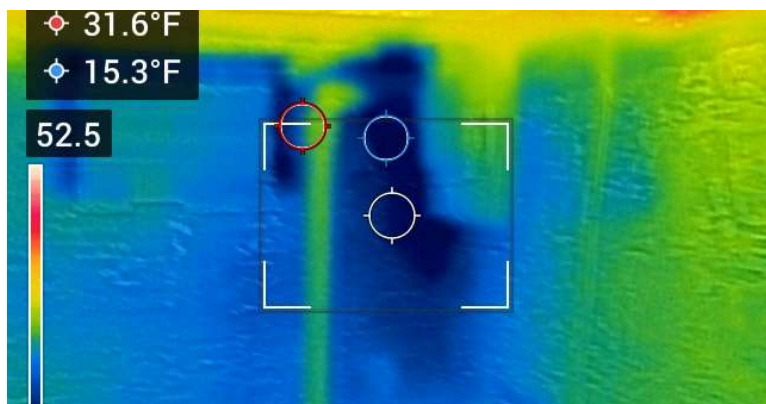
PHOTO GALLERY - BEFORE



Basement walls/floor



Thermal imaging at doors



Thermal imaging in basement



Rear exterior of home with access to upper unit