



TOWARDS NET ZERO RENOS



CASE STUDY



Research-based renovation project lead by Owens Corning which has the goals of reusing an existing foundation, as well as reducing embodied carbon and operational energy usage as much as possible while focusing on an envelope-first approach.

PROJECT PRIORITIES

- Energy efficiency
- Embodied Carbon
- Occupant Comfort

RENOVATOR: DeFilippis Developments Inc.

ENERGY ADVISOR/ SERVICE ORGANIZATION:
Building Knowledge Canada

TARGET: Net Zero Home Renovation

ENERGY REDUCTION: 85.7%

YEAR BUILT: 1950

YEAR RETROFIT COMPLETED: N/A

LOCATION: GRIMSBY, ONTARIO

HOUSE TYPE: Single Detached

SIZE: 2826 sq.ft.

CLIMATE: Zone 5, 3347 HDD

UPGRADES INCLUDE

Airtightness

Domestic Water Heater

Cooling & Heat Pumps

Space Heating

Cathedral / Vault / Flat

Windows & Sliding Glass Doors

Above Grade Walls / Garage Wall

Foundation Wall

Lighting and Appliances

On-site Generation and Storage

Exposed Floors



TOWARDS NET ZERO RENOS



NET ZERO PLAN

BEFORE

ENERGY CONSUMPTION

165 GJ/year

COMFORT

Very old and leaky, with very little insulation.

BUILDING CONDITION

Home was deteriorating structurally in many respects.

RENEWABLES

None

WALL INSULATION

2x6 @ 16" o.c w/ R20 Batt

CEILING INSULATION

R40 batt

FOUNDATION INSULATION

R0

WINDOWS

U-val=1.61, SHGC=0.41)

VENTILATION

None

HEATING

94.0% AFUE furnace

COOLING

10.00 SEER A/C

HEAT LOSS & GAIN

HL: 75556 Btu/h, HG: 25718 Btu/h

HOT WATER

0.67 EF natural gas induced draft fan

PROPOSED

24 GJ/year

Home is aiming to achieve a final air tightness result in the range of passive house. 0.6 ACH.

New home is reusing as much material as possible and will be new-construction comparable.

11.89 kW Solar PV

R24 batt + 2" XTPS IV

R25 + R40

R10 Exterior + 2x4 @ 16" o.c w/ R14

1.2 U Value & SHGC 0.4

No Change

Electric Furnace + 8.70 HSPF Air Source Heat Pump

18.00 SEER air source heat pump

HL: 18498 Btu/h, HG: 19980 Btu/h

0.95 UEF natural gas instantaneous (condensing)



TOWARDS NET ZERO RENOS

ANNUAL ENERGY USE

Before Retrofit
165 GJ/
year

Typical New Home
98 GJ/
year

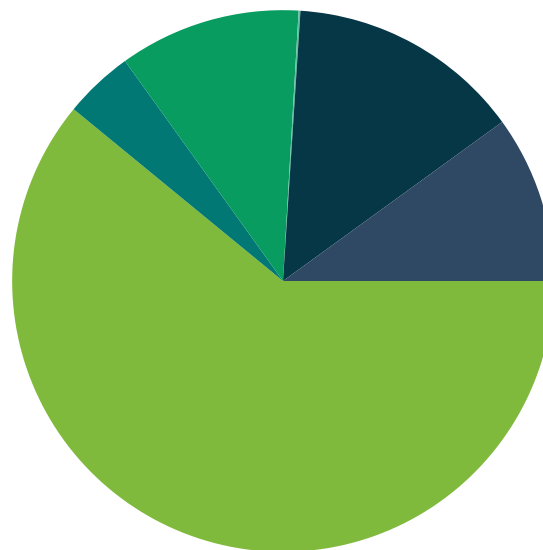
After Retrofit
50 GJ/
year

PV Production
24 GJ/
year



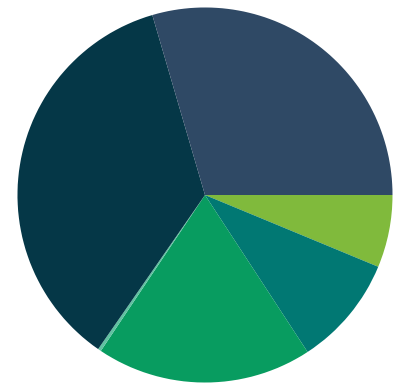
ENERGY CONSUMPTION BREAKDOWN

BEFORE RENOVATION



Space Heating
Other Electrical
Water Heating

AFTER RENOVATION



Light and appliances
Ventilation
Space Cooling

AS BUILT ENERGY PERFORMANCE

ANNUAL ENERGY SAVINGS	85.7%
GREENHOUSE GAS SAVINGS	6.30 Tonnes
ESTIMATED COST SAVINGS	\$2051.28/y



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WHY ARE WE RETROFITTING OUR HOME?

Enjoy the location of the building and the area and would like to continue to maintain the property instead of moving on to a new location or home.

WHAT LESSONS DID WE LEARN?

Structural deterioration can lead to many materials not being able to be used in any capacity, and the state of some materials can not be properly evaluated until deconstruction processes have begun.

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

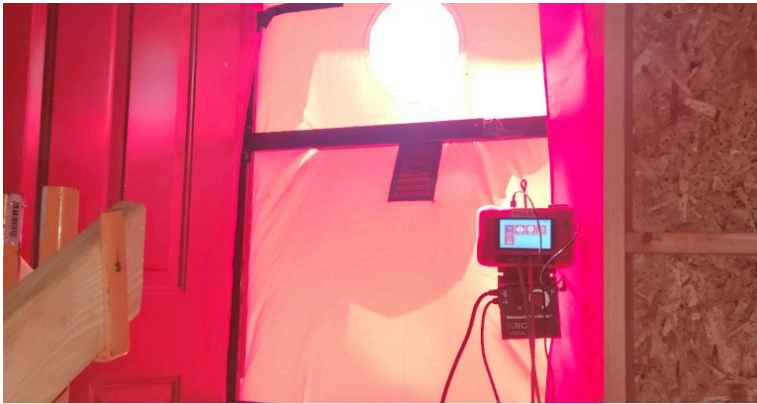
Home still needs to be completed and final air tightness tested.



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PHOTO GALLERY - DURING



Blower Door



Front Elevation



Construction Team