



TOWARDS NET ZERO RENOS



CASE STUDY



This 1958 bungalow with gorgeous riverside views is undergoing a full deep energy retrofit to bring new life and high performance into the home. The homeowners saw this renovation as an opportunity to future-proof their property, keep energy costs low, and enhance year-round comfort.

PROJECT PRIORITIES

- Air Tightness
- Net Zero Ready
- Updating the Home's Design

RENOVATOR: Lanark Design Build Group

ENERGY ADVISOR/SERVICE ORGANIZATION:
Homesol Building Solutions Inc.

TARGET: Net Zero Ready Home Renovation

ENERGY REDUCTION: 56.0%

YEAR BUILT: 1958

YEAR RETROFIT COMPLETED: 2026

LOCATION: Almonte, Ontario

HOUSE TYPE: Single Detached

SIZE: 2430 sq.ft.

CLIMATE: Zone 6, 4354 HDD

UPGRADES INCLUDE

Floor Headers
Ceiling with Attic Space
Slab-on-grade
Foundation Wall
Domestic Water Heater
Windows & Sliding Glass Doors
Principle Ventilation
Doors
Cold Climate Heat Pump
Above Grade Walls/ Garage Wall
Airtightness
Resiliency measures -
foundation waterproofing from
exterior and 100% roofing
membrane



TOWARDS NET ZERO RENOS



NET ZERO PLAN

BEFORE

ENERGY CONSUMPTION

108 GJ/year

COMFORT

Looking to improve air quality
and cold basement.

BUILDING CONDITION

Building is showing it's age.
Heating with gas. 4.25 ACH.

RENEWABLES

None

WALL INSULATION

R12 batt

CEILING INSULATION

R20 blown cellulose w/
vermiculite

FOUNDATION INSULATION

R19 (20%), R0 (80%)

WINDOWS

Double glazed; low-E; argon
(U-val=1.85, SHGC=0.39)

VENTILATION

None

HEATING

92.0% AFUE furnace

COOLING

13.00 SEER A/C

HEAT LOSS & GAIN

HL: 43151 Btu/h, HG: 22284 Btu/h

HOT WATER

0.83 EF natural gas instantaneous
(condensing)

PROPOSED

48 GJ/year

This project is at mid-construction
and not yet occupied by the
homeowners.

The below are upgrades being
completed.

No Change

R40

R80 plus continuous EPS foil faced

R30

U-1.0 0.20 Duxton Energy Star
certified

Dedicated ERV; Panasonic (Model:
PAN-FV10VEC2)

Cold Climate Heat Pump;
Mitsubishi Electric (model, PUZ-
AK30NLHZ-UI, PVA-AA30NL-UI)

Cold Climate Heat Pump;
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HL: 16974 Btu/h, HG: 12003 Btu/h

3.1 EF heat pump water heater

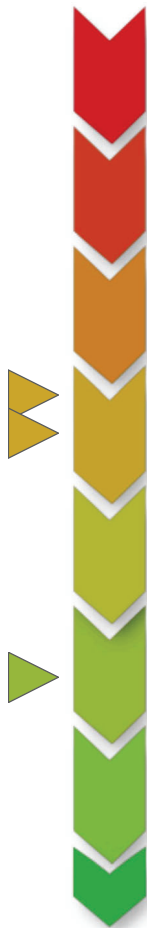


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ANNUAL ENERGY USE

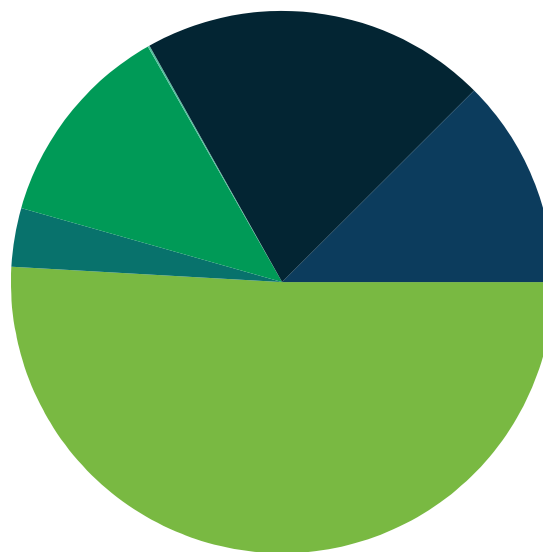
Before Retrofit
108 GJ/
year
Typical New Home
98 GJ/
year

After Retrofit
48 GJ/
year

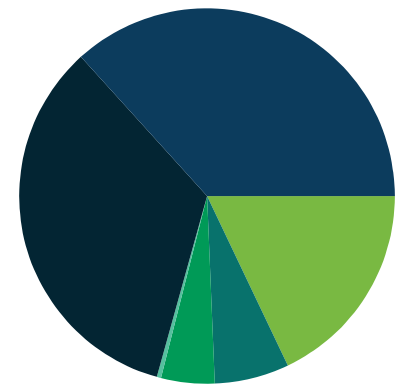


ENERGY CONSUMPTION BREAKDOWN

BEFORE RENOVATION



AFTER RENOVATION



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

AS BUILT ENERGY PERFORMANCE

ANNUAL ENERGY SAVINGS	56.0%
GREENHOUSE GAS SAVINGS	3.90 Tonnes



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WHY ARE WE RETROFITTING OUR HOME?

Recently retired, the homeowners decided to upgrade a recently purchased 1958 bungalow prior to moving in. Their existing house was energy efficient and they fully embraced a vision to do even better with the new project. Lanark Design Build Group - qualified Net Zero renovators and builders - arrived on site with the home stripped to the studs and two stone fireplaces removed. They then rebuilt the footprint, including raising an existing 3-season porch to the main floor level, removed and replaced a large flat roof section and gable front entrance, with a strong emphasis on building science and high performance.

WHAT LESSONS DID WE LEARN?

Project timeline met a disappointing number of grant and rebate program rules. We also ran into a serious issue with the Building Department that seemed to lack knowledge of the most current building sciences. While a submitted plan for a 'hot roof' was approved with the building permit, this was later denied upon inspection. LDBG had to revise the construction to include more ventilation and disrupt air tightness and overall efficiencies in the roof design.

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

Upon completion, net zero requires solar panel installation. A conduit has been installed from the basement/electrical panel up to a point in the attic near the ridge for future wiring. The roof was entirely re-sheathed with new plywood over repaired/re-fastened original board roof sheathing so that it is ready to support the panels. The garage also has a conduit through to the electrical panel, and so the home is also ready to wire a fast charger for an EV.



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PHOTO GALLERY - BEFORE



Riverside of home, pre-reno



Basement pre-construction. Homeowners removed this stone and the upstairs stone fireplace on their own.



Blower door testing to assess baseline of air tightness



Exterior pre-reno



TOWARDS NET ZERO RENOS

PHOTO GALLERY - DURING



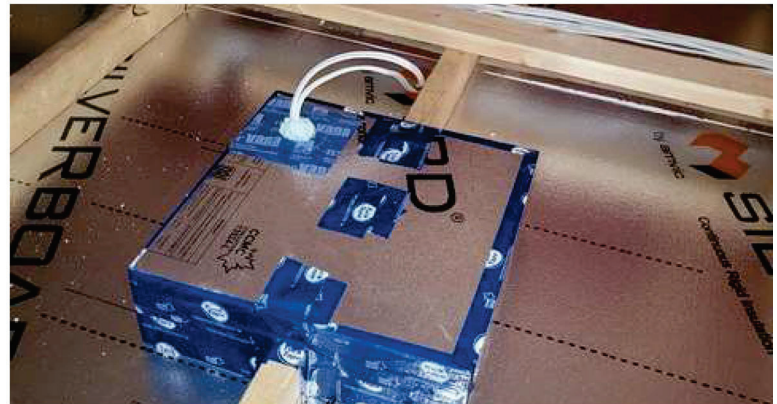
Exterior Insulation and Finish Systems (EIFS) and large windows with river view



The house was taken down to the studs; added insulation, windows, doors



Extensive flat roof construction on river side.
All new windows and doors.



Rigid foam detailing on ceiling



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TECHNICAL DETAIL 1





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TECHNICAL DETAIL 2



Standard detail of Grace Ice & Water Shield over entire roof deck

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