



TOWARDS NET ZERO RENOS



CASE STUDY



The homeowners have recently purchased their 1913 character home. They are both very engaged with and committed to reducing their environmental footprint. They also place a high value on indoor environmental quality, and retaining the character of the home.

PROJECT PRIORITIES

- Efficiency
- Comfort
- Indoor air quality
- Increased useable space
- Increase natural light
- Preserve heritage character

RENOVATOR: Element Construction

ENERGYADVISOR/SERVICE ORGANIZATION:
Airtight Engineering

TARGET: Net Zero Home Renovation

ENERGY REDUCTION: 51.0%

YEAR BUILT: 1913

YEAR RETROFIT COMPLETED: Retrofit On-going

LOCATION: Regina, Saskatchewan

HOUSE TYPE: Single Detached

SIZE: ~1200 sq.ft.

CLIMATE: Zone 7a, 5597 HDD

UPGRADES INCLUDE

Windows & Sliding Glass Doors

Drain Water Heat Recovery

Airtightness

Cathedral / Vault / Flat

Doors

Cooling & Heat Pumps

Principle Ventilation

Ceiling with Attic Space

Foundation Wall



TOWARDS NET ZERO RENOS



NET ZERO PLAN

BEFORE

AFTER

ENERGY CONSUMPTION

154 GJ/year

76 GJ/year

COMFORT

Home is dry and drafty in the winter, and very hot in the summer, especially on the upper levels.

BUILDING CONDITION

Basement is braced, asbestos has been removed, interior has been kept up well. 7 ACH.

RENEWABLES

None

No Change

WALL INSULATION

2x4 wood shaving AG wall

No Change

CEILING INSULATION

Blown ceiling - 14"

Blown ceiling - R60

FOUNDATION INSULATION

Braced Basement

Braced Basement

WINDOWS

Double glazed (U-val=4.55, SHGC=0.66)

AWW triple

VENTILATION

None

80.0% SRE HRV

HEATING

92.0% AFUE furnace

No Change

COOLING

None

18.00 SEER air source heat pump

HEAT LOSS & GAIN

HL: 63038 Btu/h, HG: 17536 Btu/h

HL: 35403 Btu/h, HG: 13400 Btu/h

HOT WATER

0.67 EF natural gas induced draft fan

53.3% DWHR (plumbed to WH and shower)



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ANNUAL ENERGY USE

Before Retrofit
154 GJ/
year

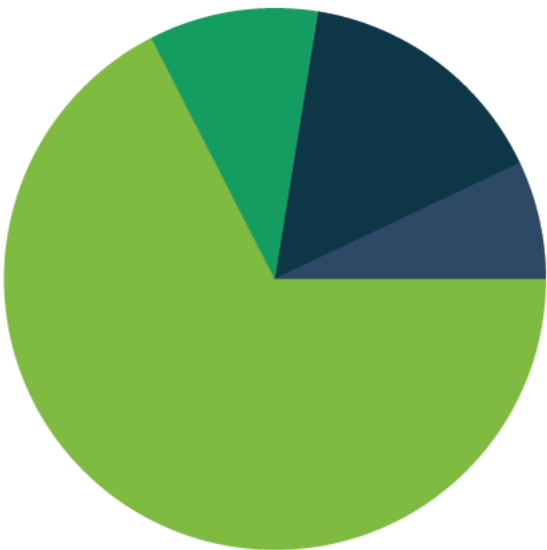
Typical New Home
98 GJ/
year

After Retrofit
76 GJ/
year

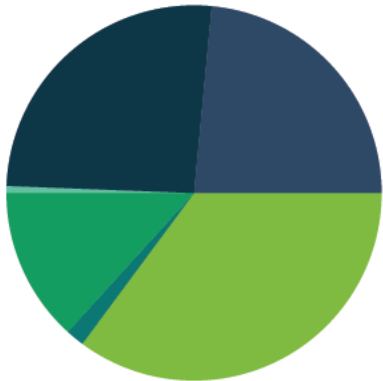


ENERGY CONSUMPTION BREAKDOWN

BEFORE RENOVATION



AFTER RENOVATION



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

AS BUILT ENERGY PERFORMANCE

ANNUAL ENERGY SAVINGS	51.0%
GREENHOUSE GAS SAVINGS	-2.45 Tonnes
ESTIMATED COST SAVINGS	\$160.02/y



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WHY ARE WE RETROFITTING OUR HOME?

The homeowners care about reducing their environmental footprint. As well, they want to improve the indoor air quality and comfort in their home. Finally, they both work from home, and would like to extend the livable space in their home to accommodate this.

WHAT LESSONS DID WE LEARN?

Two goals were pursued at the same time: a net zero retrofit, as well as options to expand the home's living space such as an addition or a coach house. Financing both of these turned out not to be feasible.

On-site solar is not very practical for this house. Firstly, the area is heavily-treed. Secondly, the roof trusses would need to be reinforced to handle the load of solar panels. - This home has features that add to retrofit costs.

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

An air-source heat pump and whole-house air filter have been installed as the first step of the retrofit in order to address summer overheating and wildfire season air quality concerns in the short term. All of the remaining measures in the retrofit plan need to be completed.



TOWARDS NET ZERO RENOS

PHOTO GALLERY - BEFORE



Front exterior



Existing furnace



Existing Attic



Rear exterior



TOWARDS NET ZERO RENOS

PHOTO GALLERY - DURING



Heat pump outdoor unit



Heat pump indoor unit



Heat pump indoor unit2