### READY CASE STUDY

# OWENS CORNING<sup>®</sup> COMFORTCERTIFIED<sup>™</sup> PROGRAM **HUMBER VALLEY RESIDENCE**

Jim Caruk, Master Builder and Owens Corning® brand endorser of PINK® FIBERGLAS® Insulation partnered with Owens Corning® to build his own 4,000 sq.ft. Net Zero Energy Ready ComfortCertified<sup>™</sup> Home.

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**ETOBICOKE, ONTARIO** 

**ENERGY EFFICIENCY FOR YOUR HOME REDUCES HEATING & COOLING ENERGY BY 50%** 

comfort Correction Energy Energy

Energy Ready

Home

NET

SEPTEMBER

2018

### THE PROJECT

"The main reason for doing this project with Owens Corning (O.C.) was to set a standard in energy efficiency not only for myself but for other builders to follow. It really only takes one builder to set a standard and if he is reputable the news will spread, and others will have to step up their game.

The home is approximately 4,000 square feet, the design is more of a transitional home – basically a cross between a traditional and a contemporary design. The area is well established with newer custom homes being built as the older less efficient ones are coming down.

I wanted to set the bar in the area by building an O.C. Net Zero Energy Ready ComfortCertified<sup>™</sup> Home. With rising energy costs, hotter summers, and colder winters, I wanted to build a home that would retain the temperature inside the house no matter what the temperature was outside the house.

#### As we started the build and started to understand the science behind it all, it all made sense. Seal the house from the outside where it all starts.

The installation of the CodeBord<sup>®</sup> insulation was easy, taping all the joints, the taping of the windows and taking a little extra time sealing the exterior makes all the difference. Using the proper insulation and techniques make the difference."

"The original drawings of the project had two furnaces, now we have one. The windows we chose also have a very high energy efficiency rating. The exterior is a mixture of brick, limestone and some exterior paneling, along with a steel roof.

Now that the house is done and the weather outside is stinking hot and humid, the temperature inside is very comfortable on all floors with hardly any variation between floors.

Owens Corning is clearly a leader in insulation and home comfort. When it comes to energy efficiency this is by far the best home we have done. Please don't get me wrong, the homes we have built in the past have always been above and beyond the building code, but this home... is way beyond.

#### Our standard will now be Net Zero Energy Ready ComfortCertified<sup>™</sup> by O.C., always be backed by the best in the industry and you can't go wrong.

Thank you everyone involved from O.C., I think O.C. are the leaders in the industry and still remain the leaders. I'm very proud to have partnered with O.C. on this build. It has set a standard that we all can be proud of and become a leader in our field."

#### JIM CARUK, MASTER CONTRACTOR,

HGTV Host and Editor-in-Chief of Renovation Contractor Magazine



ETOBICOKE, ONTARIO

**THE HOME** 

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**NET ZERO ENERGY READY COMFORTCERTIFIED™ HOME CERTIFICATION PROGRAM** 

**EQUIPMENT VS. ENCLOSURE** 

**PERFORMANCE SUMMARY** 

### THE HOME



### THE HUMBER VALLEY RESIDENCE

#### A BEAUTIFUL, COMFORTABLE AND HEALTHY HOME

Contemporary design meets technical innovation and excellence in the Humber Valley Residence. The ComfortCertified<sup>™</sup> Home Certification Program brings together 50 years of technical research and development by Owens Corning to make homes more energy-efficient<sup>^</sup> while continuing to provide outstanding comfort, durability and health.

We understand that homeowners today are looking for more green, more comfortable, and more energy efficient homes<sup>^</sup> that match their lifestyle. The Humber Valley Residence has been built as a ComfortCertified<sup>™</sup> Net Zero Energy Ready Home to satisfy the needs of today's discerning homeowner.

#### **BUILDING TYPE**

Two storey single-detached house

#### **SQUARE FOOTAGE**

3,446 sq. ft + 1,959 sq. ft finished walkout basement

#### **HEATING**

Air source heat pump + natural gas backup

**COOLING** Air source heat pump *"I wanted to set the bar in the area by building an O.C. Net Zero Energy Ready ComfortCertified™ Home. With rising energy costs, hotter summers and colder winters, I wanted to build a home that would retain the temperature inside the house no matter what the temperature was outside the house."* 

HEAR IT FROM JIM

### THE TRUE VALUE OF NET ZERO

The Humber Valley Residence provides consistent temperatures throughout, eliminates cold drafts and enhances indoor air quality: **a formula for a better living experience**.

#### THE TRUE VALUE OF AN OWENS CORNING<sup>®</sup> NET ZERO ENERGY READY COMFORTCERTIFIED<sup>™</sup> HOME CAN BE MEASURED BY ASSESSING BOTH THE DIRECT AND INDIRECT BENEFITS.

**DIRECT BENEFITS** are easily monetized. These are often experienced as first costs and savings and as operating cost savings<sup>^</sup>. **INDIRECT BENEFITS** are not easily monetized. These often enhance the value of the home for the homeowner.



#### **DIRECT BENEFITS**

The ComfortCertified<sup>™</sup> Home is built to a higher standard than a conventional home. The cost of upgrading the enclosure and installing an air source heat pump is often offset by other savings.

#### THESE INCLUDE:

- Reduced equipment size (going from two furnaces down to one, for instance),
- Smaller and fewer heating ducts,
- Eliminating interior air sealing and exterior house wrap
- Eliminating sprayfoam in exposed floors and rim joists.

For the homeowner, the ComfortCertified<sup>™</sup> Net Zero Ready Home provides long term value by helping to protect from rising energy costs. Renewable energy systems can easily be installed to offset all annual energy use at any point in the future.

#### **INDIRECT BENEFITS**

There are several indirect benefits that have been realized in the Humber Valley Residence<sup>^</sup>.

#### THESE INCLUDE:

- Consistent temperatures with fewer drafts resulting in reduced call-backs related to comfort issues,
- Quieter indoor environment for homeowners to enjoy,
- Reduced carbon emissions by using electric heating with greater reliance on renewable energy,
- High levels of insulation that reduce the home's dependency on the grid and help it to better withstand extreme temperatures
- Reduced risk of mold and better indoor air quality for healthier and happier homeowners.



### NET ZERO ENERGY READY COMFORTCERTIFIED<sup>™</sup> HOME CERTIFICATION PROGRAM



#### The Net Zero Energy Ready ComfortCertified<sup>™</sup> Home Certification Program creates homes for homebuyers who want to enjoy consistent, comfortable temperatures throughout the year, minimal street noise and good indoor air quality. That's because their home will be built with the most advanced building science and the finest products available.

Owens Corning is committed to smart, real system solutions for real homes, creating affordable, energy-efficient and longlasting homes that stay comfortably warm in the winter and cool in the summer. To deliver that, not just any insulation will do. Each home is built using carefully selected products that wrap, seal and help protect the home from the outside elements. With performance proven through building science, Owens Corning ComfortCertified™ homes built with **GREENGUARD Gold Certified Owens Corning**<sup>®</sup> products such as well-known **EcoTouch**<sup>®</sup> **PINK**<sup>®</sup> **FIBERGLAS**<sup>®</sup> **and FOAMULAR**<sup>®</sup> **Rigid Extruded Polystyrene Insulation** are making a difference for the environment, homeowners and builders alike.

### **ADVANTAGES FOR THE HOMEBUYER**

The Benefits of a Net Zero Energy Ready ComfortCertified<sup>™</sup> Home



### **HOW AIR CHANGES AFFECT YOUR COMFORT**



Standard Code Built 3.5 Air Changes per Hour is the equivalent of having an 82 square inch hole in the exterior wall of your house.



**ComfortCertified™** 2.5 Air Changes per Hour is the equivalent of having a 58 square inch hole in the exterior wall of your house.



ComfortCertified<sup>™</sup> Net Zero Energy Ready Home

1.5 Air Changes per Hour is the equivalent of having a 35 square inch hole in the exterior wall of your house.

## **EQUIPMENT VS. ENCLOSURE**

**THE HUMBER VALLEY RESIDENCE IS COMPARED TO THE SAME HOUSE** (size, shape and configuration) built to the minimum energy efficiency requirements of the Ontario Building Code. The insulation requirements from Supplementary Standard SB-12 package A1 were used as the base case scenario to compare the energy consumption between the Ontario Building Code Reference House and the high-performance enclosure of the Humber Valley Residence.

	nclosure		
	ONTARIO BUILDING CODE REFERENCE HOUSE	COMFORTCERTIFIED™ NET ZERO READY HOME	
Attic Space Insulation	R-60	<b>PROPINK® FIBERGLAS®</b> Blown Insulation R-60	
Exposed Floor	R-31	EcoTouch® PINK® FIBERGLAS® Insulation R-28 + FOAMULAR® CodeBord® Extruded Polystyrene Rigid Insulation R-10 (2")	
Walls Above Grade	R-22	EcoTouch® PINK® FIBERGLAS® Insulation R-24 + FOAMULAR® CodeBord® Extruded Polystyrene Rigid Insulation R-10 (2")	
Basement Walls	R-20 ci	FOAMULAR <sup>®</sup> CodeBord <sup>®</sup> Extruded Polystyrene Rigid Insulation R-10 (2") + EcoTouch <sup>®</sup> PINK <sup>®</sup> FIBERGLAS <sup>®</sup> Insulation R-22	
Foundation Slab	R-10 ci Slab Edge at Walkout	FOAMULAR <sup>®</sup> CodeBord <sup>®</sup> Extruded Polystyrene Rigid Insulation R-10 (2")	
Windows & Sliding Glass Doors	Max U-Value 0.28	U-value 0.28	
	Min Energy Factor 25	Energy Factor 25	
Airtightness	No requirement*	1.5 ACH @ 50 Pa	

\*The Ontario Building Code Reference House was modelled with an airtightness of 3.0 ACH @ 50Pa

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	ONTARIO BUILDING CODE REFERENCE HOUSE	COMFORTCERTIFIED™ NET ZERO READY HOME
Space Heating	AFUE 96%	7 HSPF Air Source Heat Pump + Backup AFUE 98% Natural Gas Furnace
Domestic Water Heater	EF 0.80	EF 0.55
Heating Recovery Ventilator	SRE 75%	SRE 75%
Space Cooling	13 SEER**	16 SEER

\*\*Not required by Ontario Building Code, but if installed must be a min. 13 SEER

## WHAT IS THE BEST INVESTMENT



THE AVERAGE LIFESPAN OF A FURNACE OR WATER HEATER IS TYPICALLY 15 YEARS. IN COMPARISON, ABOVE GRADE WALLS LAST AN AVERAGE OF 75 YEARS, ROOFS LAST ABOUT 50 YEARS AND BASEMENT INTERIOR WALLS LAST ABOUT 25 YEARS.

An initial investment towards your building enclosure enables the use of right-sized heating and cooling equipment for increased energy efficiency. Not only does right-sized mechanical equipment reduce initial up front costs, it also provides longer equipment run-time which maintains uniform temperatures throughout the home and increases mechanical equipment life. By investing in a low-energy demand building envelope, you are maximizing the potential of your space heating and cooling equipment.

The Humber Valley Residence focuses on optimizing the envelope, without modifying the mechanicals, to provide the best energy consumption profile possible to save energy, increase comfort and allow the homeowner to potentially install renewable energy on available roof space to offset the energy needed to maintain occupant lifestyles.

## **IT'S ALL ABOUT THE ENCLOSURE**





- BY BUILDING HOMES WITH A TIGHTER AND MORE INSULATED ENCLOSURE, THE MECHANICAL EQUIPMENT IN THE HOME DOES NOT NEED TO WORK AS HARD TO MAINTAIN A STEADY TEMPERATURE.
- LESS DEMAND ON THE MECHANICAL SYSTEMS MEANS A SMALLER AND LESS COSTLY SYSTEM WITH LOWER HEATING AND COOLING BILLS.
- HOMEOWNERS ACHIEVE COMFORTABLE CONDITIONS WITH LESS DRAFTS AND CONSISTENT TEMPERATURES AROUND THE HOUSE.

## PERFORMANCE SUMMARY

THE OWENS CORNING<sup>®</sup> COMFORTCERTIFIED<sup>™</sup> NET ZERO ENERGY READY HOME WAS COMPARED TO THE STANDARD BUILDING CODE HOUSE WITH A BREAKDOWN OF ENERGY CONSUMPTION IN THE HOUSEHOLD.

### STANDARD BUILDING CODE ENERGY CONSUMPTION BREAKDOWN



Approximately 65% of energy consumption in the household would normally go to heating the home. It is clear that the most impactful energy reductions will be through reducing the heating requirement. Through the installation of highly insulated envelope components and attention to air tightness, the home's heating energy use drops by over 50%.

### **ENERGY CONSUMPTION BREAKDOWN COMPARISON**





WATCH JIM CARUK BUILD HIS OWENS CORNING® COMFORTCERTIFIED™ NET ZERO ENERGY READY HOME FROM START TO FINISH! <u>http://comfortcertifiedhomes.com/</u>

### ACKNOWLEDGEMENTS - JIM CARUK, Caruk Hall Construction

The Net Zero Energy Ready ComfortCertified<sup>™</sup> Home Certification Program, Case Study © 2018 Owens Corning Canada LP



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'50% more heating & cooling energy reduction than code built home generated & verified by 3rd party modeling based on Hot 2000. May vary by province. Owens Corning makes no certification, guarantee or warranty beyond the limited warranty of the Owens Corning® products. ^Compared to a Code built home.