Canadian Home Builders' Association

OWENS CORNING

CACEA Canadian Association of Consulting Energy Advisors

BUILDING KNOWLEDGE CANADA INC.

Optimizing Energy Performance:

An Interactive Roundtable for Builders Looking to Take the First Steps to Building Better Homes

Your Hosts

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Canadian Home Builders' Association

POLL

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Technical Services & Codes & Standards Director

Owens Corning Canada

OUR MISSION

To build a sustainable future through material innovation

OUR PURPOSE

Our people and products make the world a better place

OUR VALUES

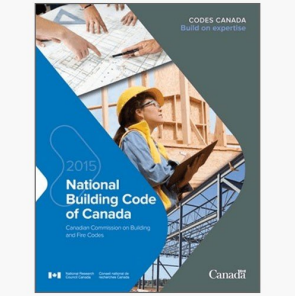
Global in scope, human in scale

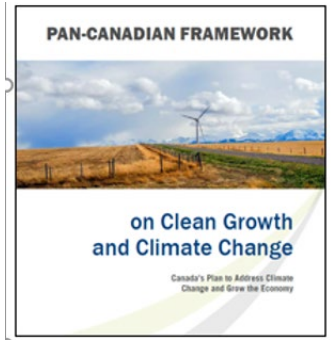
Caring
Curious
Collaborative
Committed

PATH TOWARDS IMPROVED ENERGY EFFICIENCY

- Current and future Code requirements
- Integrated Design Process to help develop short, medium and long-term energy efficiency solutions and strategies
- Discovery home
- Valuable Industry partners
- Differentiation & value selling

CODES & COMPLIANCE PATHS





Performance Path

Tier 1
<= 100% House Energy Target + 0% envelope improvement

Tier 2
<= 90% House Energy Target + 5% envelope improvement

Tier 3
<= 80% House Energy Target + 10% envelope improvement

Tier 4
<= 60% House Energy Target +20% envelope improvement

Tier 5
<= 30% House Energy Target + 40% envelope improvement

(Flexibility & Innovation)

Prescriptive Path

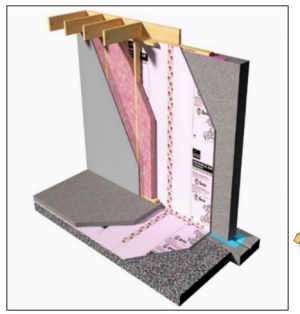
Table 9.36.2.6.A.
Effective Thermal Resistance of Above-ground Opaque Assemblies in Buildings
without a Heat-Recovery Ventilator
Forming Part of Sentence 9.36.2.6.(1)

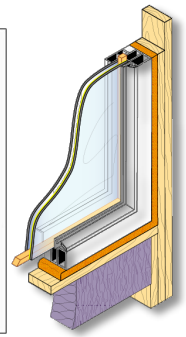
Above-ground Opaque *Building* Assembly	Heating Degree-Days of *Building* Location, in Celsius Degree-Days					
	Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
	Minimum Effective Thermal Resistance (RSI), (m²K)/W					
Ceilings below attics	6.91	8.67	8.67	10.43	10.43	10.43
Cathedral ceilings and flat roofs	4.67	4.67	4.67	5.02	5.02	5.02
Walls	2.78	3.08	3.08	3.08	3.85	3.85
Floors over unheated spaces	4.67	4.67	4.67	5.02	5.02	5.02

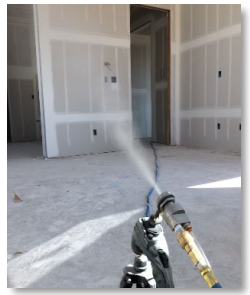
Table 9.36.2.6.B.
Effective Thermal Resistance of Above-ground Opaque Assemblies in Buildings with a Heat-Recovery Ventilator
Forming Part of Sentence 9.36.2.6.(1)

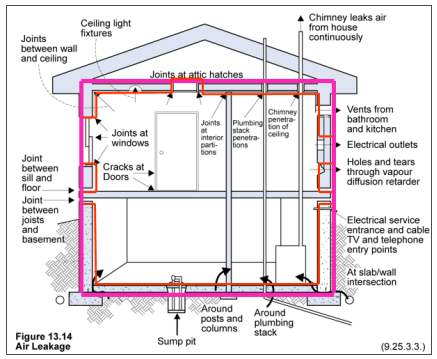
Above-ground Opaque *Building* Assembly	Heating Degree-Days of *Building* Location, in Celsius Degree-Days					
	Zone 4 < 3000	Zone 5 3000 to 3999	Zone 6 4000 to 4999	Zone 7A 5000 to 5999	Zone 7B 6000 to 6999	Zone 8 ≥ 7000
	Minimum Effective Thermal Resistance (RSI), (m²K)/W					
Ceilings below attics	6.91	6.91	8.67	8.67	10.43	10.43
Cathedral ceilings and flat roofs	4.67	4.67	4.67	5.02	5.02	5.02
Walls	2.78	2.97	2.97	2.97	3.08	3.08
Floors over unheated spaces	4.67	4.67	4.67	5.02	5.02	5.02

HOUSE AS A SYSTEM
INTEGRATED DESIGN PROCESS (Design Charrette)









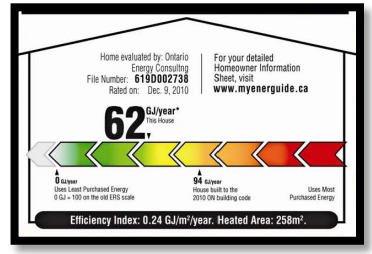
Exterior air barrier

Interior air barrier

- Insulation systems
- Windows
- Airtightness strategy
- HVAC
- Hot water
- Renewables
- Desired level of performance/certification

netzero readyhome
The ultimate in comfort and efficiency

ENERGY STAR



Builder/Trades/Sales

Energy Advisor

Canadian Home Builders' Association

OWENS CORNING ®

CACEA Canadian Association of Consulting Energy Advisors

Industry Partners

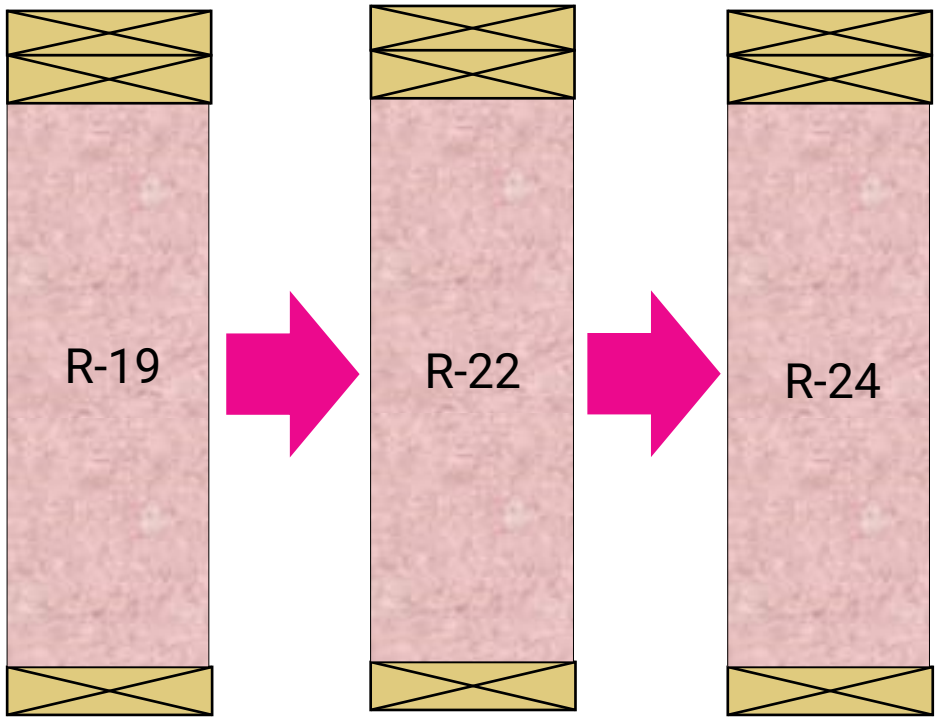
Architect/Building Official

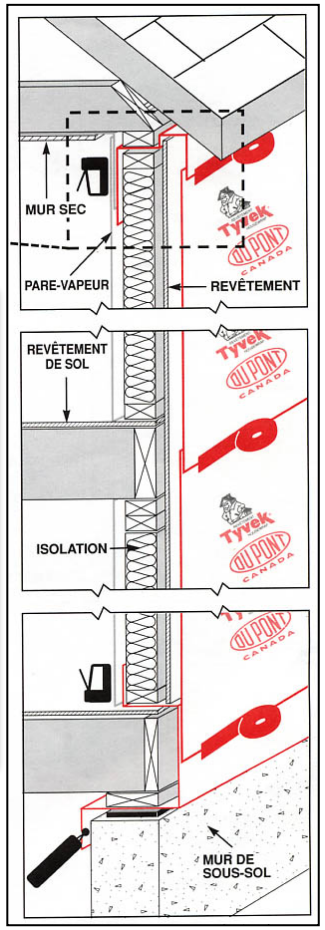
PERFORMANCE IMPROVEMENT OPTIONS

START WITH SIMPLE IMPACTFUL SOLUTIONS FIRST!

Optimized Wall Cavity & Attic Insulation + Smart Framing + Air Sealing

Path of continuous improvement





R40 → R60+

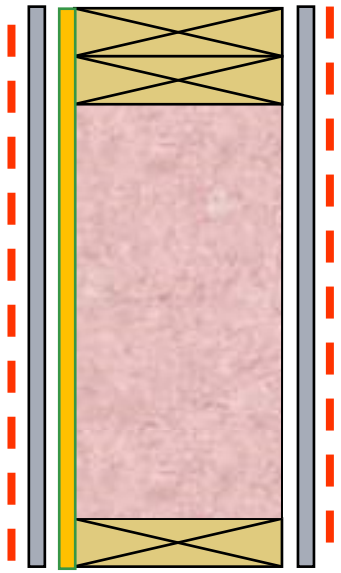
Smart framing:

- **Cost savings**
- **Less lumber & waste**

Path Towards Improved Energy Efficiency (Above Grade Walls)

	Zone 4 <3000 (Vancouver)	Zone 5 3000 to 3999 (Toronto)	Zone 6 4000 to 4999 (Montreal)	Zone 7A 5000 to 5999 (Calgary)	Zone 7B 6000 to 6999 (Yukon)	Zone 8 ≥7000 (NWT)
Walls	RSI 2.78 *(R-15.78)*	RSI 2.97 *(R-16.86)*	RSI 2,97 *(R-16.86)*	RSI 2,97 *(R-16.86)*	RSI 3.08 *(R17.49)*	RSI 3.08 *(R-17.49)*

Code requirements today with HRV

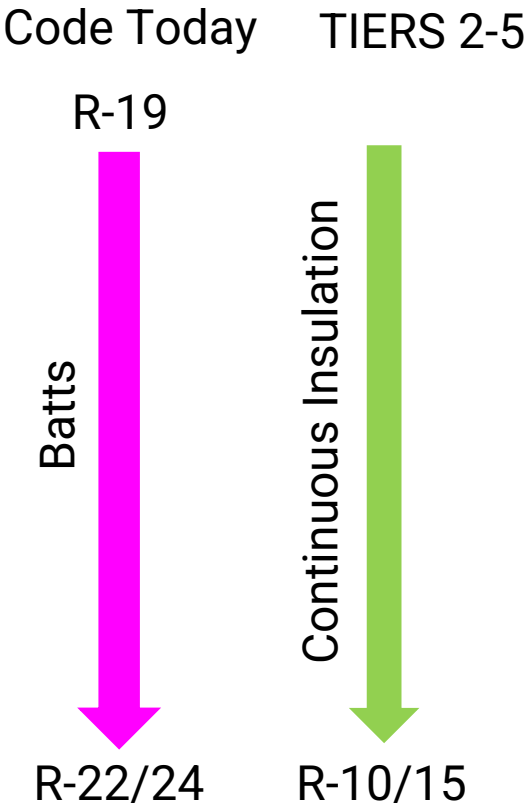


2x6 studs 16" cc

Cavity Insulation	R-Eff. Assembly Without CI	Compliance
• R19 batts	R-15.94	Zone 4
• R22 batts	R-17.02	Zones 4,5,6 & 7A
• R24 batts	R-17.64	All zones

2x6 studs 24" cc

Cavity Insulation	R-Eff. Assembly Without CI	Compliance
• R19 batts	R-16.45	Zone 4
• R22 batts	R-17.70	All zones
• R24 batts	R-18.44	All zones

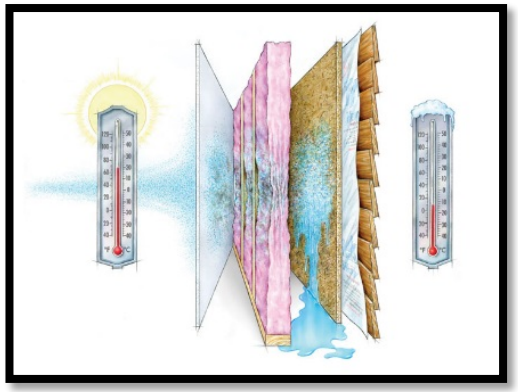


First easy steps for builders :

- **Optimized Cavity (R-24) + Studs Spaced on 24 inch Centers + Improved Airtightness; (R-17 $_{effective}$ +)**
- **Continuous Insulation + Better Windows + Efficient Mechanicals; (R-28$_{effective}$ +)**

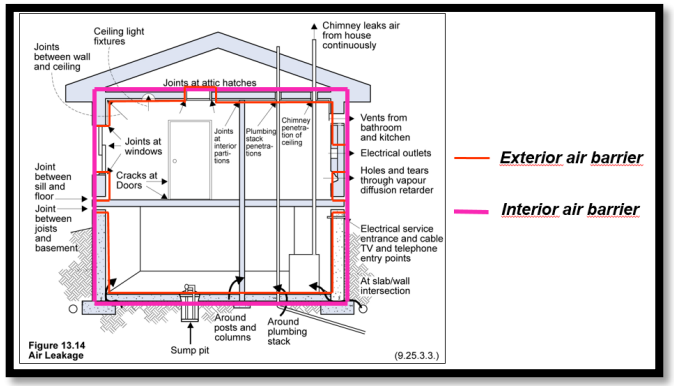
CRITICAL DETAILS TO ENSURE OPTIMUM PERFORMANCE & DURABILITY

Lateral bracing



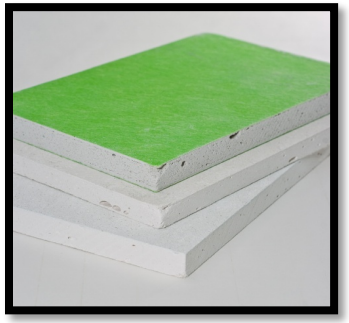
Water Vapor Profile
(drying potential of enclosures)

Water Management Details

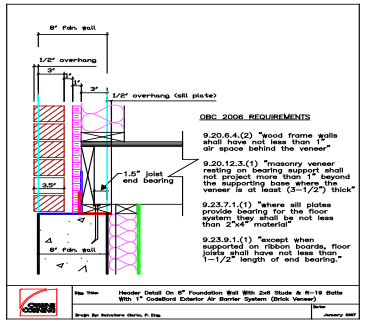


<u>Continuous</u> Air Barrier System

Compatibility/durability with water/air sealing products (caulking, sealing membranes and tapes)



Fire protection?
Limiting Distance



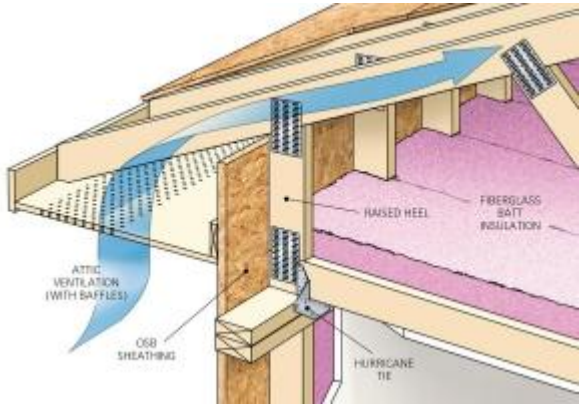
Thickness of
Foundation Wall

Attachment of Cladding
Through Continuous Insulation

PREFABRICATED PANELS VS SITE BUILT

HIGH PERFORMANCE ATTICS R60+

Loose fill insulation

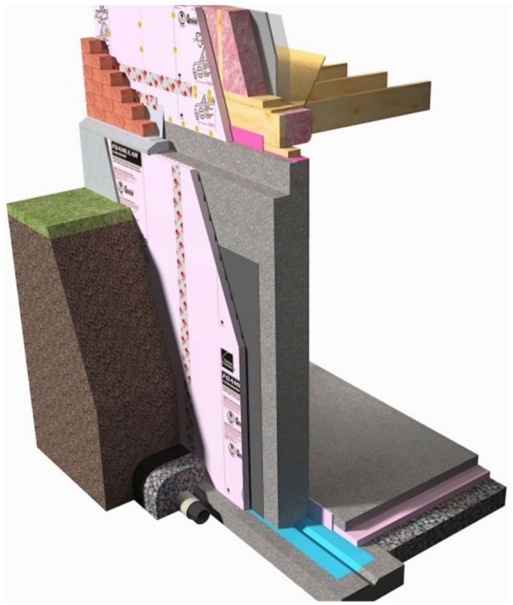


Raised heel trusses

Air and vapor control

Adequate ventilation

BASEMENT INSULATION STRATEGIES

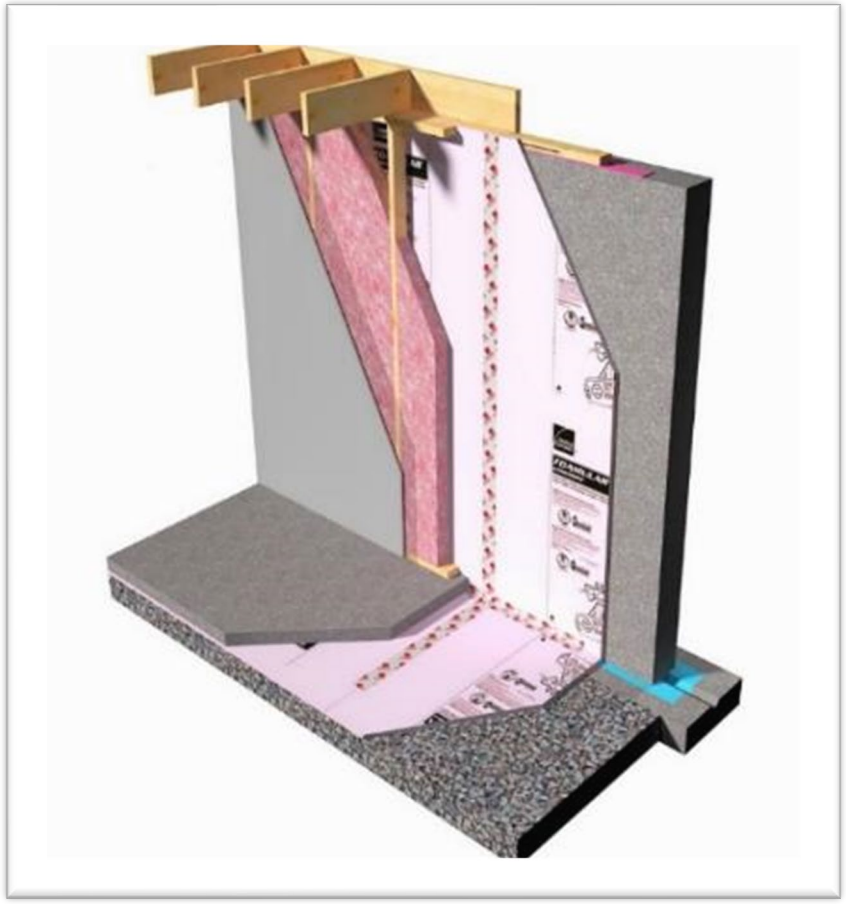


FOAMULAR® C-200 Cel-Drain® with drainage channels, CCMC 13387R:

- Thermal Protection
- Durability (Concrete wall not subjected to temperature fluctuations)
- Reduced risk of frost heaving with susceptive soils
- Moisture Protection (even if concrete cracks, water will not get in! no call backs)
- Moisture can dry to interior, low condensation risk

Above grade insulation finishing options: Cement Board or
THERMO-SHIELD FOUNDATION COATING (Gemite)

BASEMENT INSULATION STRATEGIES

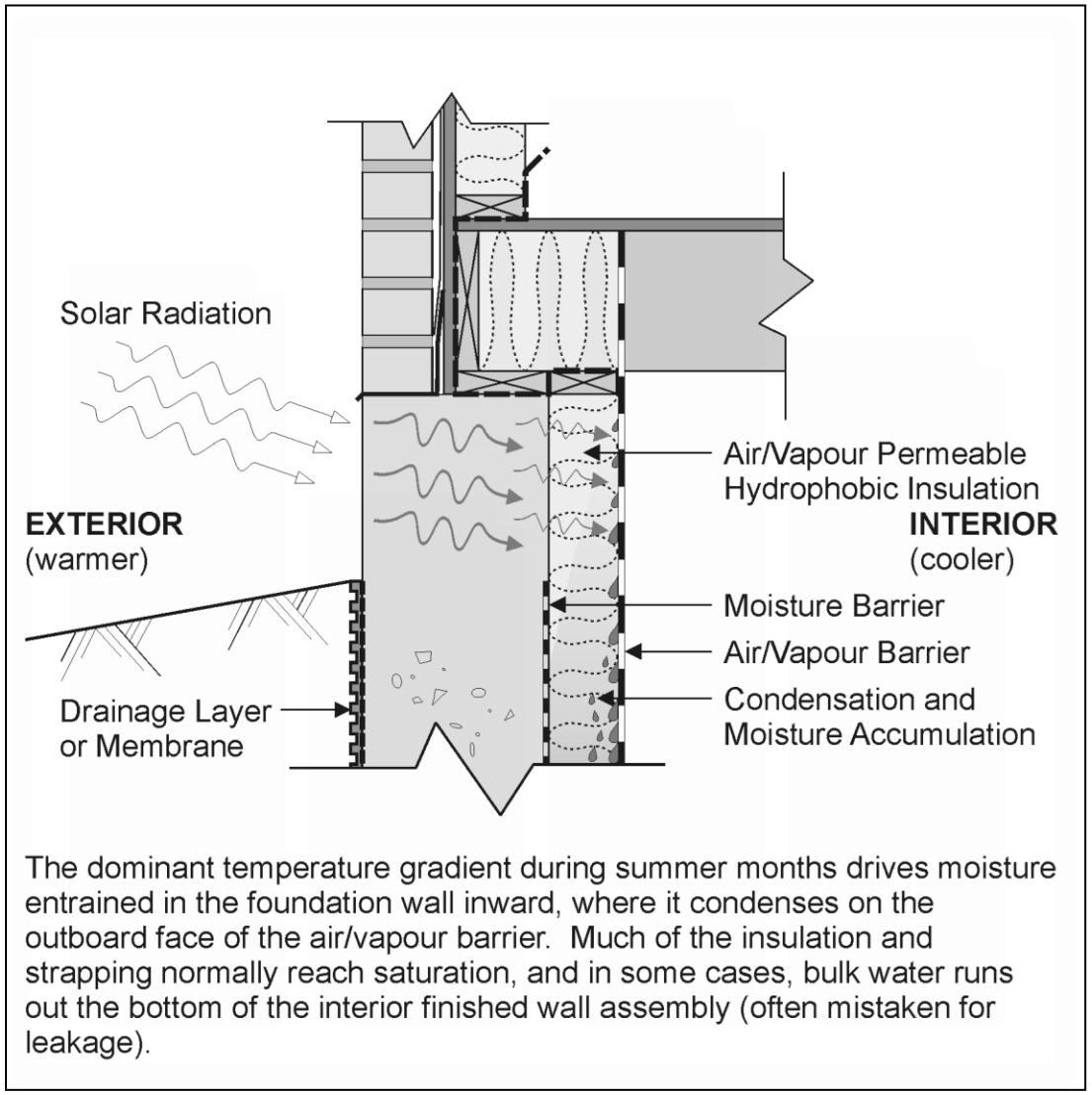


FOAMULAR® NGX™ CodeBord ® plus
ECOTOUCH PINK® FIBERGLAS® Batt Insulation

Does not require gypsum board finish!

FOAMULAR® NGX™ CodeBord ® plus
THERMAFIBER® RAINBARRIER® CI HC 80
QAI Certifications & Listings

CONDENSATION RISK (Spring)

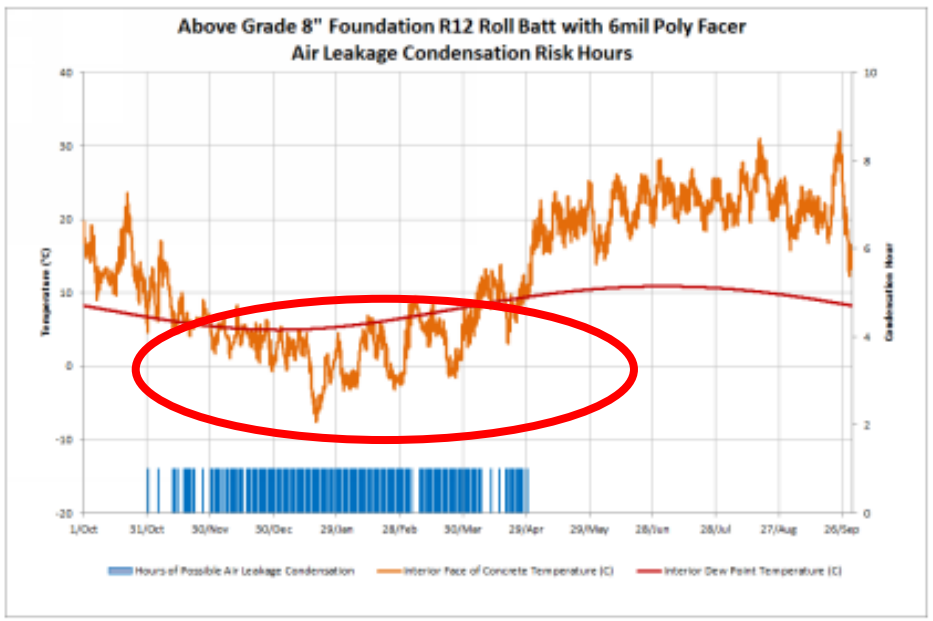


The dominant temperature gradient during summer months drives moisture entrained in the foundation wall inward, where it condenses on the outboard face of the air/vapour barrier. Much of the insulation and strapping normally reach saturation, and in some cases, bulk water runs out the bottom of the interior finished wall assembly (often mistaken for leakage).

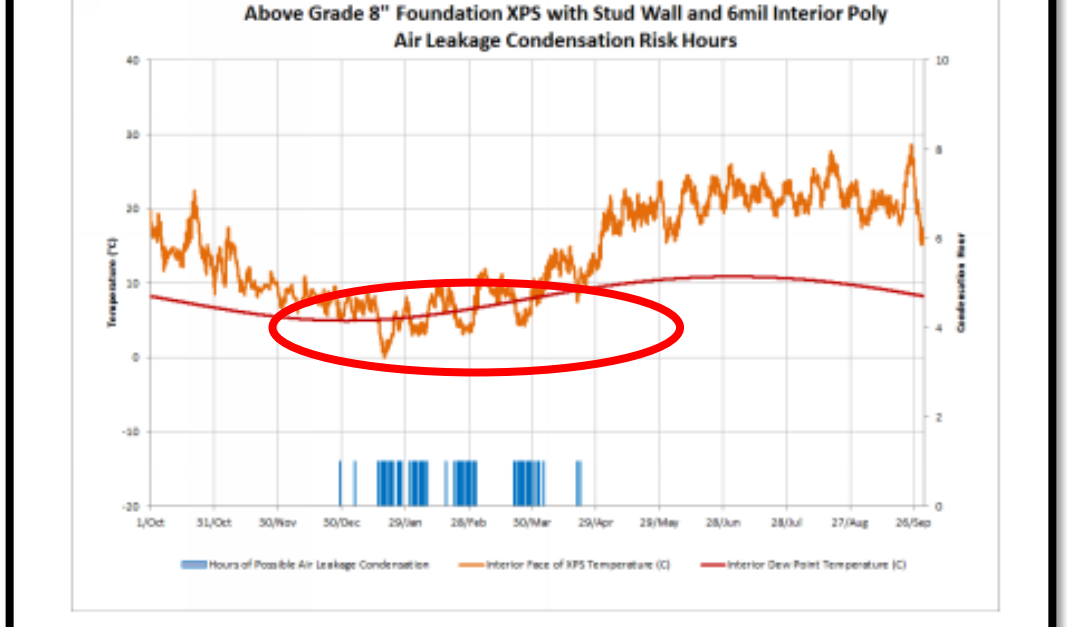
Source: Performance Guidelines for Basement Envelope Systems and Materials, CNRC

LOW PERMEANCE INSULATIONS TO REDUCE RISK OF CONDENSATION IN BASEMENTS

Unfinished Basement – R12 Roll Batt with Poly Facer
Above Grade – Concrete Exposed to Climate
Winter – Air leaks past poly and condenses on the concrete



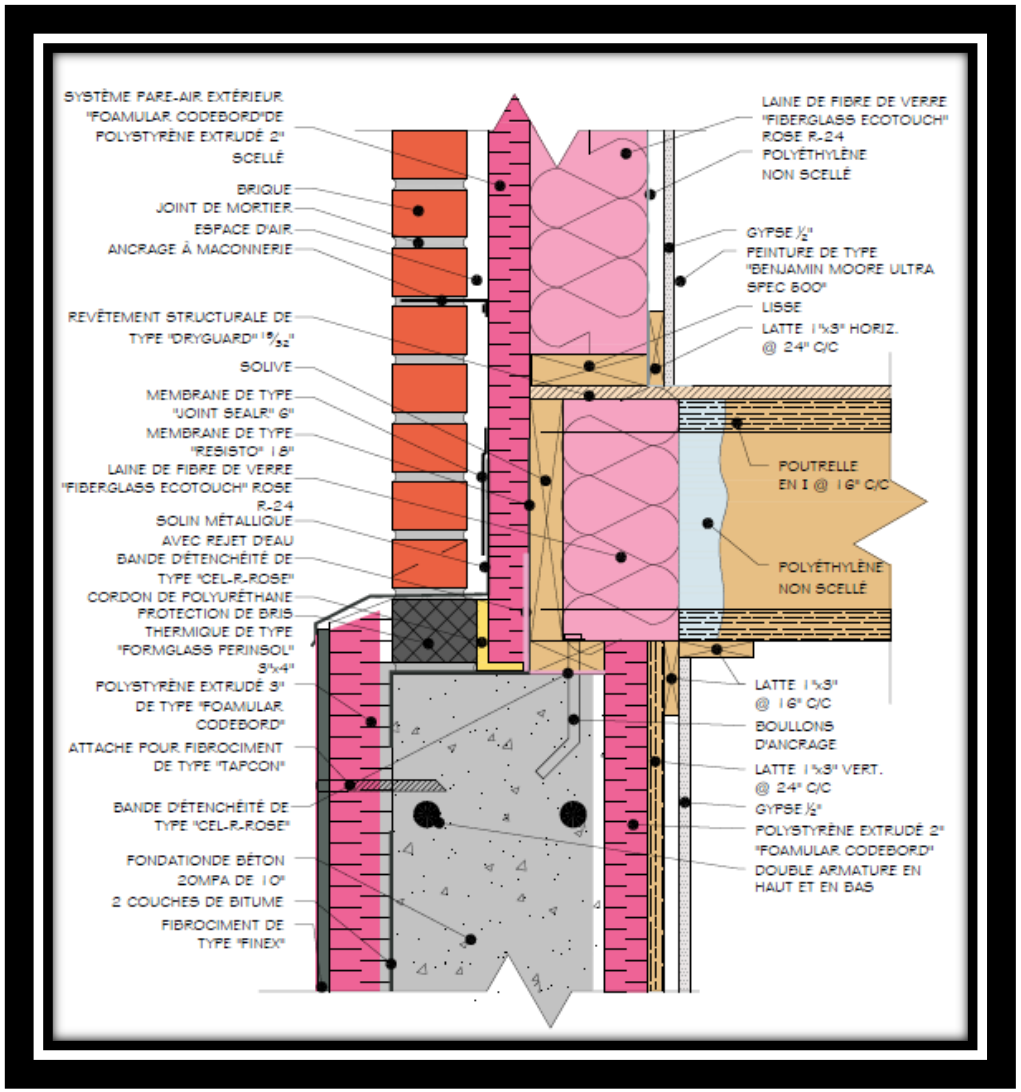
Finished Basement – 1" XPS, Stud Wall with Fiberglass, Poly Vapour Barrier
Above Grade – Concrete Exposed to Climate
Winter – Condensation is limited on the face of the XPS



RDH Building Science Labs

Smart Vapor Barriers are a good choice!

INNOVATION OPTIONS



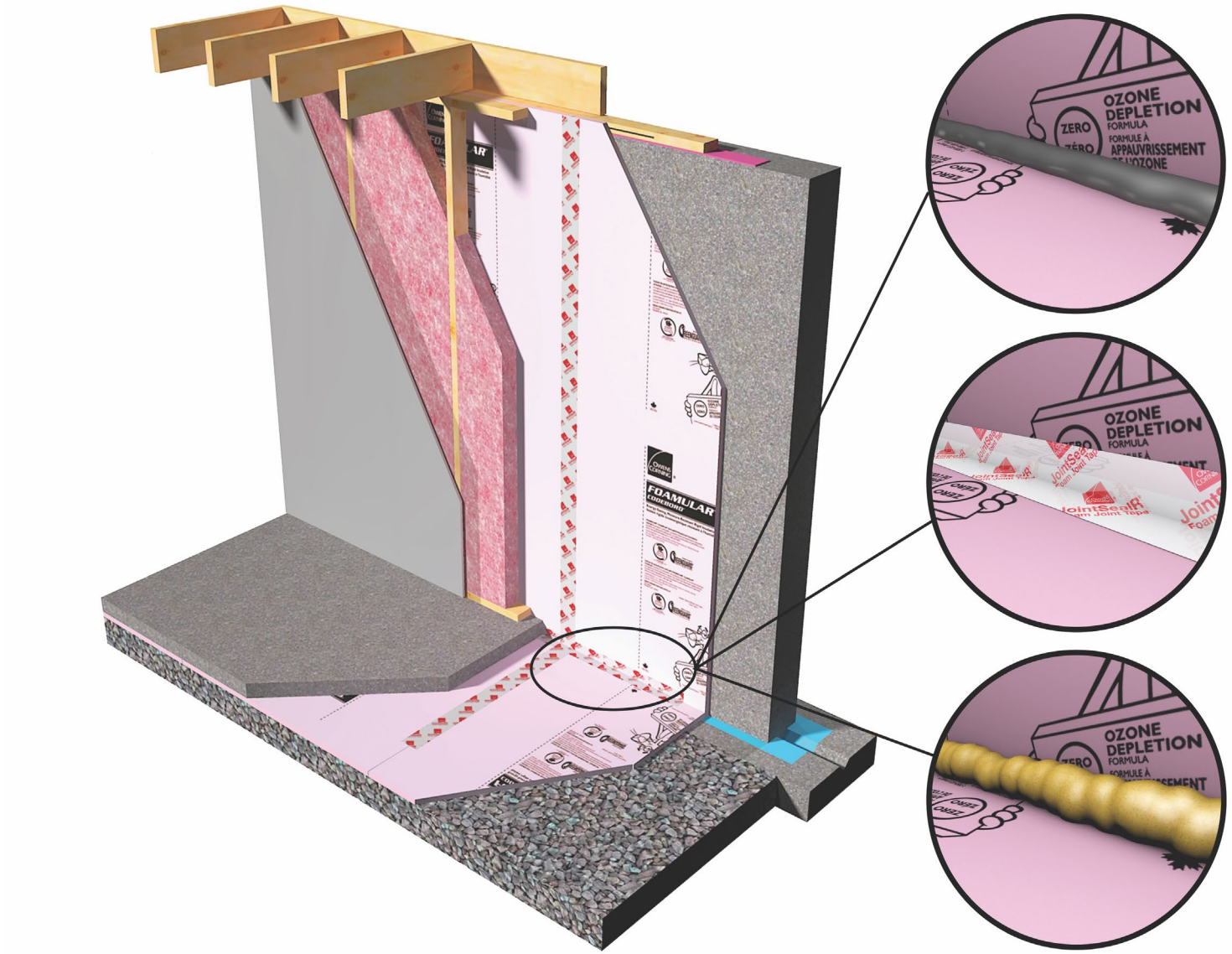
Insulated Ledge Block

FOAMGLAS® PERINSUL S (Standard)

FOAMULAR®

RADONBARRIER™

RADON ABATEMENT SYSTEM

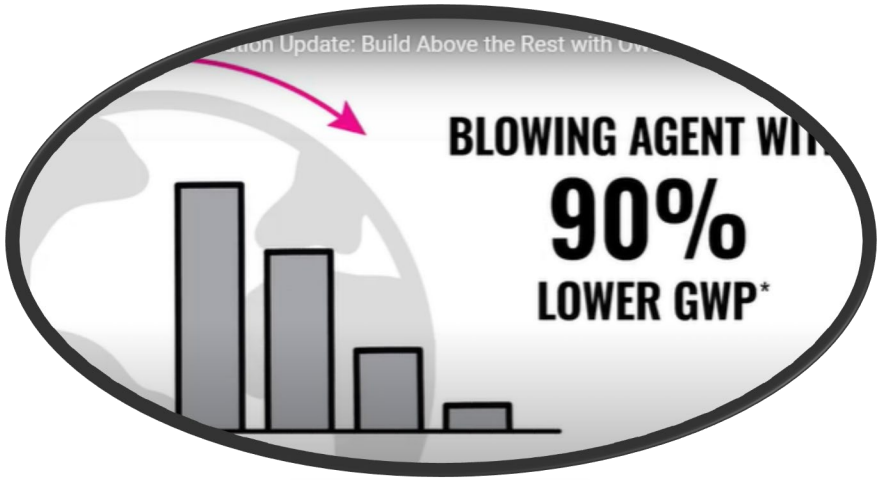


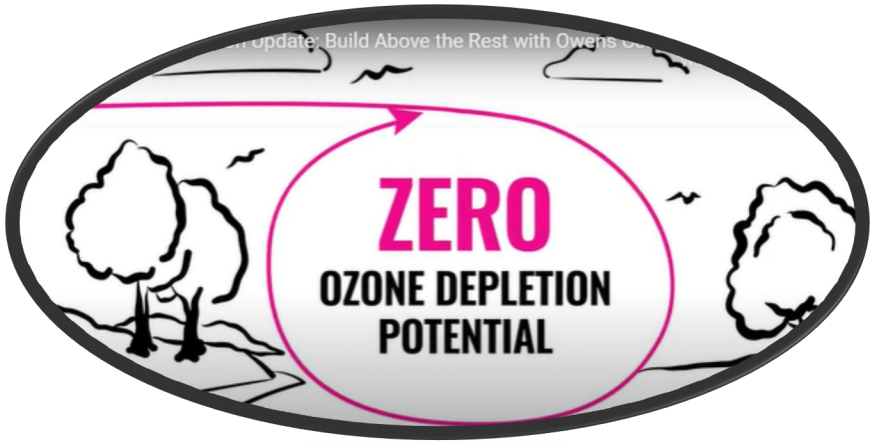
FOAMULAR® NGX™ CODEBORD®

Flexible caulking

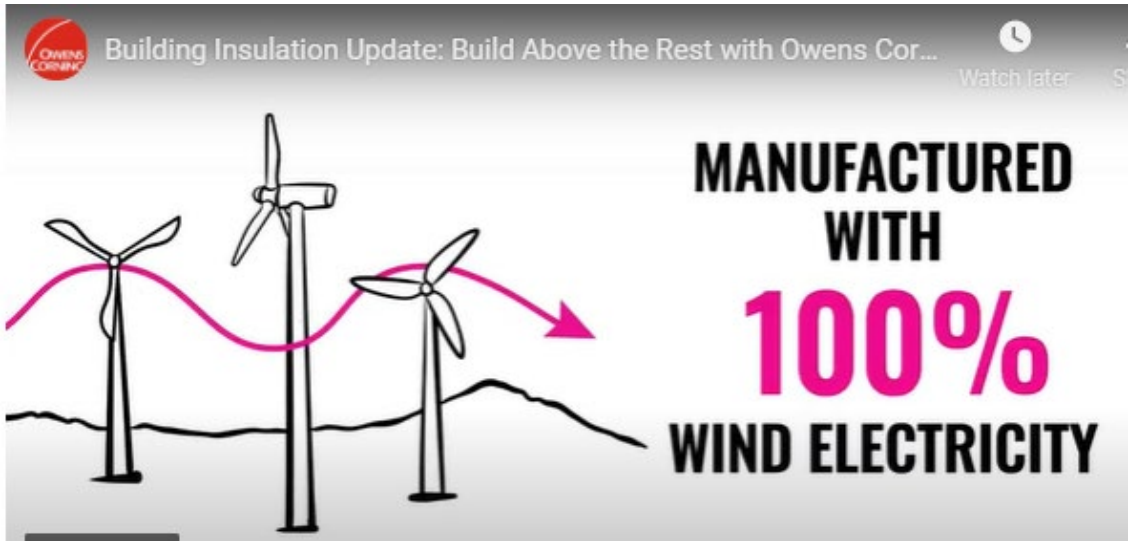
Joint SealR Tape

Propink Comfort Seal Foam Sealant





WITH EVERY 10 BOARDS INSTALLED



PINK NEXT GEN FIBERGLAS INSULATION

SUSTAINABILITY

ON THE PATH TO NET ZERO 2030

- *Made with 100% wind-powered electricity**
- *Industry's highest recycled content†*
- *Saves 12X the energy used to make it in the first year***
- *GreenGuard certified for low VOCs*

INTEGRATED DESIGN PROCESS RESULTS

INTEGRATIVE DESIGN PROCESS

LOCATION	PERFORMANCE TIER #	2005 Quebec Building Code	Current Quebec Building Code	Current Builder Package (Novoclimat) with 16" O.C. Walls	Tier 2 NBC (10% Overall / 5% Envelope)	Tier 3 NBC (20% Overall / 10% Envelope)	Tier 4 NBC (40% Overall / 20% Envelope)	Tier 5 NBC (70% Overall / 40% Envelope)	NetZero Ready
Energy Performance	% Better than Current Quebec Code	-18.5%	0.0%	27.9%	6.2%	14.6%	29.6%	47.9%	40.2%
Solar System Needed for NZ	GJ	90	76	55	71	65	53	40	45
	kW	21	18	13	17	15	12	9	11
	# of Panels	62	52	38	49	44	37	27	31
	# Panels to Stay Below 40kWh/Day			10					
Optimization Impact (24" O.C. Stud Spacing for Walls)				55					
Ceiling With Attic Space	Min. R-value	R30.1 nominal	R41 nominal	R58.5*eff* (*2x4 Truss, 18" Blown Cellulose*)	R60 (12" heel height)	R70 (12" heel height)	R70 (12" heel height)	R80 (16" heel height)	R70
Ceiling Without Attic Space	Min. R-value	R30.1 nominal	R41 nominal	R41.0 *eff*	R40	R40	R40	R40	R40
Exposed Floor	Min. R-value	R26.7 nominal	R25 *eff* (R29.5 nom. with R7.5ci)	*I joist @16" oc, R28 Batt*	R40	R40	R40	R40	R31+R10ci [5]
Walls Above Grade	Min. R-value	R19.3 nom.	R22 *eff* (R24.5 nom. with R4ci)	2x6@16"o.c., R19 Batt + R7.5ci	R24+R5ci [3]	R24+R12ci [5]	R24+R16ci [6]	R24+R16ci [6] 2x6@24"oc	R24+R10ci [5]
Basement Walls	Min. R-value	R12.5 nom.	R15 *eff* (R17 nom. with R4ci)	2x3 (offset) @24" o.c., 3.75" Spray Foam (~R22)	R24+R5ci [3]	R24+R12ci [5]	R24+R16ci [6]	R24+R16ci [6] 2x6@24"oc with R12ci on Exterior	R24+R10ci [5]
Below Grade Slab (below frost line)	Min. R-value	none	R-5	1" XPS Full Coverage (R6.2eff.)	-	R10ci	R10ci	R20ci	R10ci with Thermal break
Windows and Sliding Glass Doors	Max. U-Factor		0.32 (1.8Usi) / 0.26	Atis E* 1.3-1.5 Usi, SHGC ~0.5 avg.	U 1.60 (0.28), SHGC 0.26	U 1.40 (0.25), SHGC 0.26	U 1.20 (0.21), SHGC 0.40	U 1.00 (0.18), SHGC 0.40	0.21 (1.2Usi) (prev. E* Zone 3)
Space Heating Equipment	Min. Efficiency		Electric Resistance Heating	Lennox ML14XP1 Central Heat Pump (HSPF 9) with Electric Furnace Backup	Gas-fired Furnace: 95% AFUE	Gas-fired Furnace: 95% AFUE	Gas-fired Furnace: 95% AFUE	Dual Fuel: -Gas Furnace (95% AFUE) -Air-Source Heat Pump (HSPF 9.0)	-Electric Furnace -Air-Source Heat Pump (HSPF V 8.6)
Space Cooling Equipment	Min. Efficiency		SEER 14.5	Central Heat Pump SEER 16	SEER 14.5	SEER 14.5	SEER 16	SEER 21	SEER 15
HRV	Min. % SRE @0°C	no HRV	54% @ -25°C	VanE Novo+ 100H HRV 67%, & Kitchen Range Exhaust	70% @ 0°C 65% @ -25°C	70% @ 0°C 65% @ -25°C	75% @ 0°C 65% @ -25°C	75% @ 0°C 65% @ -25°C with ECM	75% ECM
Domestic Water Heater	Min. Efficiency		Electric Tank: SL ≤ 40 + 0.20V	Giant Electric Tank (172STPS) 279L, 78W Standby Loss	Gas Tank 0.7 UEF	Gas Tank 0.7 UEF	Tank Condensing: 0.90 UEF	Heat Pump Water Heater 3.0 COP	Electric Instantaneous 0.90 EF
Drain Water Heat Recovery	Min. % Efficiency (per CSA B55.1)	none	none	-	-	-	42% (unequal flow)	42% (equal flow)	42% (equal flow)
Airtightness	Max. Air Changes (ACH @ 50 Pa)	+/- 3.57	+/- 3.0	1.5 Detached / 2.0 Attached	2.0	1.5	1.0 (Aerobarrier)	0.7 (Aerobarrier)	1.5

Benchmarking

Continuous Improvement Options

ENERGY EFFICIENCY OPTION PACKAGES BY TIER & CLIMATE ZONE

LOCATION:		VANCOUVER (Z4)					
	PERFORMANCE TIER #:	NBC	Tier 1 (0% Overall / N/A Envelope)	Tier 2 (10% Overall / 5% Envelope)	Tier 3 (20% Overall / 10% Envelope)	Tier 4 (40% Overall / 20% Envelope)	Tier 5 (70% Overall / 40% Envelope)
House 1 [1]	% Overall vs. NBC Min.	-	0.3%	10.6%	21.7%	41.7%	75.4%
	% Envelope vs. NBC Min.	-	3.1%	21.2%	50.7%	64.3%	89.9%
	GJ	-	66.5	62.3	55.1	46.9	31.3
House 2 [2]	% Overall vs. NBC Min.	-	0.5%	10.5%	29.0%	45.8%	80.9%
	% Envelope vs. NBC Min.	-	0.0%	12.8%	41.7%	55.9%	87.7%
	GJ	-	109.2	100.8	82.7	68.6	37.4
Ceiling With Attic Space	Min. R-value	R-39.2 *eff* (R40 nominal)	R40	R50	R60 (12" heel height)	R70 (12" heel height)	R70 (12" heel height)
Ceiling Without Attic Space	Min. R-value	R-26.5 *eff* (R28 nominal)	R28	R31	R40	R40	R40
Exposed Floor	Min. R-value	R-26.5 *eff* (R28 nominal)	R28	R31	R40	R40	R40
Walls Above Grade	Min. R-value	R-15.8 *eff* (R19 nominal)	R19	R24	R24+R5ci [3]	R24+R8ci [4]	R24+R12ci [5]
Basement Walls	Min. R-value	R-11.3 *eff* (R14 nominal)	R14	R20+R5ci [3]	R24+R5ci [3]	R24+R8ci [4]	R24+R12ci [5]
Below Grade Slab (below frost line)	Min. R-value	-	-	-	-	R10ci	R20ci
Windows and Sliding Glass Doors	Max. U-Factor	U 1.80 (0.32), SHGC 0.26	U 1.80 (0.32), SHGC 0.26	U 1.80 (0.32), SHGC 0.26	U 1.60 (0.28), SHGC 0.40	U 1.40 (0.25), SHGC 0.40	U 1.20 (0.21), SHGC 0.40
Space Heating Equipment	Min. Efficiency	Gas-fired Furnace: 95% AFUE	Gas-fired Furnace: 95% AFUE	Gas-fired Furnace: 95% AFUE	Gas-fired Furnace: 95% AFUE	Gas-fired Furnace: 95% AFUE	Dual Fuel: -Gas Furnace (95% AFUE) -Air-Source Heat Pump (HSPF 8.0)
Space Cooling Equipment	Min. Efficiency	SEER 14.5	SEER 14.5	SEER 14.5	SEER 14.5	SEER 16	SEER 21
HRV	Min. % SRE @0°C	-	60% @ 0°C 55% @ -25°C	60% @ 0°C 55% @ -25°C	70% @ 0°C 65% @ -25°C	75% @ 0°C 65% @ -25°C	75% @ 0°C 65% @ -25°C
Domestic Water Heater	Min. Efficiency	Gas Tank 0.69 UEF	Gas Tank 0.69 UEF	Gas Tank 0.70 UEF	Gas Tank 0.70 UEF	Tank Condensing: 0.90 UEF	Heat Pump Water Heater 2.1 COP
Drain Water Heat Recovery	Min. % Efficiency (per CSA B55.1)	-	-	-	42% (unequal flow)	42% (equal flow)	42% (equal flow)
Airtightness	Max. Air Changes (ACH @ 50 Pa)	2.5	2.5	2.0	1.5	1.0 (Aerobarrier)	1.0 (Aerobarrier)
Lighting		-	-	-	75% CFL/LED lighting	75% CFL/LED lighting	75% CFL/LED lighting
Appliances		-	-	-	-	ENERGY STAR clothes washer, refrigerator, dishwasher	ENERGY STAR clothes washer, refrigerator, dishwasher
Bathroom Faucets		-	-	-	Low-Flow (<= 5.7 L/min)	Low-Flow (<= 5.7 L/min)	Low-Flow (<= 5.7 L/min)
Shower Heads		-	-	-	Low-flow (<= 7.6 L/min)	Low-flow (<= 7.6 L/min)	Low-flow (<= 7.6 L/min)

LOCATION:		WINDSOR (Z5)					
	PERFORMANCE TIER #:	NBC	Tier 1 (0% Overall / N/A Envelope)	Tier 2 (10% Overall / 5% Envelope)	Tier 3 (20% Overall / 10% Envelope)	Tier 4 (40% Overall / 20% Envelope)	Tier 5 (70% Overall / 40% Envelope)
House 1 [1]	% Overall vs. NBC Min.	-	2.5%	10.4%	20.0%	42.3%	72.7%
	% Envelope vs. NBC Min.	-	6.5%	20.2%	47.3%	65.5%	88.3%
	GJ	-	73.6	69.7	62.3	51.4	34.3
House 2 [2]	% Overall vs. NBC Min.	-	1.1%	10.7%	30.6%	47.7%	79.7%
	% Envelope vs. NBC Min.	-	2.1%	14.5%	47.5%	60.8%	88.0%
	GJ	-	128.4	118.4	95.1	77.4	42.3
Ceiling With Attic Space	Min. R-value	R-49.2 *eff* (R50 nominal)	R50	R60 (12" heel height)	R60 (12" heel height)	R70 (12" heel height)	R80 (16" heel height)
Ceiling Without Attic Space	Min. R-value	R-26.5 *eff* (R28 nominal)	R28	R40	R40	R40	R40
Exposed Floor	Min. R-value	R-26.5 *eff* (R28 nominal)	R28	R40	R40	R40	R40
Walls Above Grade	Min. R-value	R-17.5 *eff* (R24 nominal)	R24	R24+R5ci [3]	R24+R5ci [3]	R24+R12ci [5]	R24+R16ci [6]
Basement Walls	Min. R-value	R-16.9 *eff* (R22 nominal)	R20ci	R24+R5ci [3]	R24+R5ci [3]	R24+R12ci [5]	R24+R16ci [6] 2x6@24"oc
Below Grade Slab (below frost line)	Min. R-value	-	-	-	-	R10ci	R20ci
Windows and Sliding Glass Doors	Max. U-Factor	U 1.80 (0.32), SHGC 0.26	U 1.80 (0.32), SHGC 0.26	U 1.80 (0.32), SHGC 0.26	U 1.40 (0.25), SHGC 0.40	U 1.20 (0.21), SHGC 0.40	U 1.00 (0.18), SHGC 0.40
Space Heating Equipment	Min. Efficiency	Gas-fired Furnace: 95% AFUE	Gas-fired Furnace: 95% AFUE	Gas-fired Furnace: 95% AFUE	Gas-fired Furnace: 95% AFUE	Gas-fired Furnace: 95% AFUE	Dual Fuel: -Gas Furnace (95% AFUE) -Air-Source Heat Pump (HSPF 8.7)
Space Cooling Equipment	Min. Efficiency	SEER 14.5	SEER 14.5	SEER 14.5	SEER 14.5	SEER 16	SEER 21
HRV	Min. % SRE @0°C	-	60% @ 0°C 55% @ -25°C	70% @ 0°C 65% @ -25°C	70% @ 0°C 65% @ -25°C	75% @ 0°C 65% @ -25°C	75% @ 0°C 65% @ -25°C with ECM
Domestic Water Heater	Min. Efficiency	Gas Tank 0.69 UEF	Gas Tank 0.69 UEF	Gas Tank 0.7 UEF	Gas Tank 0.70 UEF	Tank Condensing: 0.90 UEF	Heat Pump Water Heater 2.1 COP
Drain Water Heat Recovery	Min. % Efficiency (per CSA B55.1)	-	-	-	-	42% (unequal flow)	42% (equal flow)
Airtightness	Max. Air Changes (ACH @ 50 Pa)	2.5	2.5	2.0	1.5	1.0 (Aerobarrier)	0.7 (Aerobarrier)
Lighting		-	-	-	75% CFL/LED lighting	75% CFL/LED lighting	75% CFL/LED lighting
Appliances		-	-	-	-	ENERGY STAR clothes washer, refrigerator, dishwasher	ENERGY STAR clothes washer, refrigerator, dishwasher
Bathroom Faucets		-	-	-	Low-Flow (<= 5.7 L/min)	Low-Flow (<= 5.7 L/min)	Low-Flow (<= 5.7 L/min)
Shower Heads		-	-	-	Low-flow (<= 7.6 L/min)	Low-flow (<= 7.6 L/min)	Low-flow (<= 7.6 L/min)

LOCATION:		LETHBRIDGE (Z6)					
	PERFORMANCE TIER #:	NBC	Tier 1 (0% Overall / N/A Envelope)	Tier 2 (10% Overall / 5% Envelope)	Tier 3 (20% Overall / 10% Envelope)	Tier 4 (40% Overall / 20% Envelope)	Tier 5 (70% Overall / 40% Envelope)
House 1 [1]	% Overall vs. NBC Min.	-	2.5%	11.8%	20.7%	40.5%	73.4%
	% Envelope vs. NBC Min.	-	6.3%	21.7%	35.9%	58.0%	80.8%
	GJ	-	77.3	72.3	65.0	54.5	34.9
House 2 [2]	% Overall vs. NBC Min.	-	1.2%	13.4%	24.3%	46.4%	77.2%
	% Envelope vs. NBC Min.	-	2.0%	17.1%	30.6%	56.5%	81.5%
	GJ	-	138.1	124.2	109.1	84.0	46.7
Ceiling With Attic Space	Min. R-value	R-49.2 *eff* (R50 nominal)	R50	R60 (12" heel height)	R70 (12" heel height)	R70 (12" heel height)	R80 (16" heel height)
Ceiling Without Attic Space	Min. R-value	R-26.5 *eff* (R28 nominal)	R28	R40	R40	R40	R40
Exposed Floor	Min. R-value	R-26.5 *eff* (R28 nominal)	R28	R40	R40	R40	R40
Walls Above Grade	Min. R-value	R-17.5 *eff* (R24 nominal)	R24	R24+R5ci [3]	R24+R12ci [5]	R24+R16ci [6]	R24+R16ci [6] 2x6@24"oc
Basement Walls	Min. R-value	R-16.9 *eff* (R22 nominal)	R20ci	R24+R5ci [3]	R24+R12ci [5]	R24+R16ci [6]	R24+R16ci [6] 2x6@24"oc with R12ci on Exterior
Below Grade Slab (below frost line)	Min. R-value	-	-	-	R10ci	R10ci	R20ci
Windows and Sliding Glass Doors	Max. U-Factor	U 1.60 (0.28), SHGC 0.26	U 1.60 (0.28), SHGC 0.26	U 1.60 (0.28), SHGC 0.26	U 1.40 (0.25), SHGC 0.26	U 1.20 (0.21), SHGC 0.40	U 1.00 (0.18), SHGC 0.40
Space Heating Equipment	Min. Efficiency	Gas-fired Furnace: 95% AFUE	Gas-fired Furnace: 95% AFUE	Gas-fired Furnace: 95% AFUE	Gas-fired Furnace: 95% AFUE	Gas-fired Furnace: 95% AFUE	Dual Fuel: -Gas Furnace (95% AFUE) -Air-Source Heat Pump (HSPF 9.0)
Space Cooling Equipment	Min. Efficiency	SEER 14.5	SEER 14.5	SEER 14.5	SEER 14.5	SEER 16	SEER 21
HRV	Min. % SRE @0°C	-	60% @ 0°C 55% @ -25°C	70% @ 0°C 65% @ -25°C	70% @ 0°C 65% @ -25°C	75% @ 0°C 65% @ -25°C	75% @ 0°C 65% @ -25°C with ECM
Domestic Water Heater	Min. Efficiency	Gas Tank 0.69 UEF	Gas Tank 0.69 UEF	Gas Tank 0.7 UEF	Gas Tank 0.7 UEF	Tank Condensing: 0.90 UEF	Heat Pump Water Heater 3.0 COP
Drain Water Heat Recovery	Min. % Efficiency (per CSA B55.1)	-	-	-	-	42% (unequal flow)	42% (equal flow)
Airtightness	Max. Air Changes (ACH @ 50 Pa)	2.5	2.5	2.0	1.5	1.0 (Aerobarrier)	0.7 (Aerobarrier)
Lighting		-	-	-	75% CFL/LED lighting	75% CFL/LED lighting	75% CFL/LED lighting
Appliances		-	-	-	-	ENERGY STAR clothes washer, refrigerator, dishwasher	ENERGY STAR clothes washer, refrigerator, dishwasher
Bathroom Faucets		-	-	-	Low-Flow (<= 5.7 L/min)	Low-Flow (<= 5.7 L/min)	Low-Flow (<= 5.7 L/min)
Shower Heads		-	-	-	Low-flow (<= 7.6 L/min)	Low-flow (<= 7.6 L/min)	Low-flow (<= 7.6 L/min)

WINNIPEG

DISCOVERY HOME

- On site training for all trades to facilitate implementation of new construction details & systems
- Performance validation and cost evaluation
- Identify improvement & optimization opportunities

NATIONAL PILOT PROJECTS

Ressources naturelles Canada
Natural Resources Canada
Canada

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DIFFERENTIATION

CUSTOMIZED SELL SHEETS

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OWENS CORNING INTEGRATIVE DESIGN PROCESS FOR REJEAN GOYET

MODÈLE BERGERAC (PRÉVU 2023)

			TERREBONNE, QC (Z6)			
	LOCATION:					
	PERFORMANCE TIER #:		Current Quebec Building Code	Current Builder Package (Novoclimat) with 16" O.C. Walls	Novoclimat optimisé proposition	NetZero Ready Opt.
L'ASSOMPTION	Energy Performance	% Better than Current Quebec Code	0.0%	28.8%	30.6%	45.9%
	Solar System Needed for NZ	GJ	76	54	53	41
		kW	18	13	12	10
		# of Panels	52	37	36	28
	Ceiling With Attic Space	Min. R-value	R41 nominal	R58.5*eff* (2x4 Trusss, 18" Blown Cellulose)	R58.5*eff* (2x4 Trusss, 18" Blown Cellulose)	R70
	Ceiling Without Attic Space	Min. R-value	R41 nominal	R41.0 *eff*	R41.0 *eff*	R40
	Exposed Floor	Min. R-value	R25 *eff* (R29.5 nom. with R7.5ci)	*I joist @16" oc, R28 Batt*	*I joist @16" oc, R28 Batt*	R31+R10ci [5]
	Walls Above Grade	Min. R-value	R22 *eff* (R24.5 nom. with R4ci)	2x6@16"o.c., R19 Batt + R7.5ci	2x6@16"o.c., R19 Batt + R7.5ci	R24+R10ci [5]
	Basement Walls	Min. R-value	R15 *eff* (R17 nom. with R4ci)	2x3 (offset) @24" o.c., 3.75" Spray Foam (~R22)	2x4 @24" o.c., R14 batt + R15ci exterior	R24+R10ci [5]
	Below Grade Slab (below frost line)	Min. R-value	R-5	1" XPS Full Coverage (R6.2eff.)	1" XPS Full Coverage (R6.2eff.)	R10ci with Thermal break
	Windows and Sliding Glass Doors	Max. U-Factor	0.32 (1.8Usi) / 0.26	Atis E* 1.3-1.5 Usi, SHGC ~0.5 avg.	Laflamme EcoNova U1.08 moyen	0.21 (1.2Usi) (prev. E* Zone 3)
	Space Heating Equipment	Min. Efficiency	Electric Resistance Heating	Lennox ML14XP1 Central Heat Pump (HSPF 9) with Electric Furnace Backup	-Electric Furnace -Air-Source Heat Pump (HSPF V 9)	-Electric Furnace -Air-Source Heat Pump (HSPF V 8.6)
	Space Cooling Equipment	Min. Efficiency	SEER 14.5	Central Heat Pump SEER 16	Central Heat Pump SEER 16	SEER 15
	HRV	Min. % SRE @0°C	54% @ -25°C	VanEE Novo+ 100H HRV 67%	VanEE Novo+ 100H HRV 67%	75% ECM
	Domestic Water Heater	Min. Efficiency	Electric Tank: SL ≤ 40 + 0.20V	Giant Electric Tank (172STPS) 279L, 78W Standby Loss	Giant Electric Tank (172STPS) 279L, 78W Standby Loss	Heat Pump Water Heater 3.0 COP
	Drain Water Heat Recovery	Min. % Efficiency (per CSA B55.1)	none	-	-	42% (equal flow)
	Airtightness	Max. Air Changes (ACH @ 50 Pa)	+/- 3.0	1.0	1.0	1.0
	Lighting			80% CFL/LED lighting	80% CFL/LED lighting	75% CFL/LED lighting
	Appliances		-	-	-	ENERGY STAR clothes washer, refrigerator, dishwasher
	Bathroom Faucets		-	-	-	Low-Flow (<= 5.7 L/min)
	Shower Heads		-	-	-	Low-flow (<= 7.6 L/min)
	Other			IAQ, Materials & Energy Req's	IAQ, Materials & Energy Req's	Energy Monitor & Solar Ready

éco habitation

CONNECTED LIFESTYLE

A "Net-Zero Ready" home with a charging station for an electric car.

COMPARATIVE TABLE

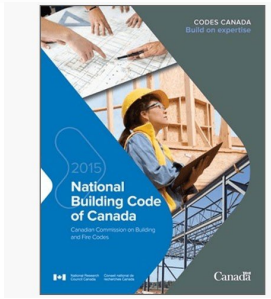
		Typical Scenario: ÉnerGuide 78	Connected Lifestyle: ÉnerGuide 87
Home	Purchase price of the house	$320,000	$340,000
	Novoclimat 2.0	0	-$2,000 ($4,000 for first time buyer)
	Discount on mortgage insurance (10% of the CMHC or Genworth premium)	0	-$1,152
	Desjardins Green Homes Program	0	-$1 750
	Monthly mortgage payment ($20,000 down payment, 2.95% over 25 years)	$1,465	$1,565
	Monthly energy cost for the house	$198 ($6.60/day)	$80 ($2.70/day)
	Cost of home insurance (10% off)	$100	$90
	Total monthly cost – House	**$1,763**	**$1,735**
Vehicle	Purchase price of the vehicle	$31,692	$42,385
	Grant from the Government of Quebec	0	-$8,000
	Grant from the federal government	0	-$5,000
	Annual maintenance cost	$400	$200
	Annual auto insurance	$1,000	$800
	Grant for the charging station	0	-$700
	Annual energy cost – Vehicle (15,000 km)	$1,820	$271
	Total monthly cost – Vehicle	**$866**	**$647**
COMBINED	**TOTAL MONTHLY COST – TRANSPORTATION AND HOUSING**	**$2,629**	**$2,382 (-9%)**
	ANNUAL SAVINGS	**0 $**	**$2,964**
	ANNUAL GREENHOUSE GASES – TRANSPORTATION AND HOUSING	**3,639 kg**	**306 kg (almost 12x less)**

The table was created using:

- *Desjardins Car Loan Calculator, Desjardins Mortgage Calculator and CMHC Loan Insurance Calculator*
- *Data from CanmetENERGY's Vehicle Emission Comparison Tool*
- *Ford Focus comparable data based on an article by Radio-Canada.ca "Êtes-vous prêts pour votre première voiture électrique ?"*

**Housing discounts are not deducted from the mortgage total.*

DIFFERENTIATION FOR BUILDERS



Novoclimat
CONFORT. SANTÉ. ÉCONOMIES !

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The ultimate in comfort and efficiency

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WORKING TOGETHER TO FOR A BETTER TOMORROW!

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energy STAR
ENERGY STAR

Salvatore D. Ciarlo, P. Eng.

Technical Services & Codes & Standards Director

Owens Corning Canada

OUR MISSION

To build a sustainable future through material innovation

OUR PURPOSE

Our people and products make the world a better place

OUR VALUES

Global in scope, human in scale

Caring
Curious
Collaborative
Committed

Canadian Home Builders' Association

POLL

Presented by:
Cindy Gareau, Executive Director

Why You Should Work with an Energy Advisor

CACEA Canadian Association of Consulting Energy Advisors

CACEA Canadian Association of Consulting Energy Advisors

Our Mission

To support a sustainable profession of successful and credible Canadian Energy Advisors

Our Mandate

Ensure credible, skilled members and be a valued, respected sector partner

Our Members

Includes EAs, suppliers, stakeholders and allies, and those in the process of becoming registered EAs.

Members across Canada access to:

- knowledge and information;
- a supportive network; and
- a unified voice to influence change.

Contact

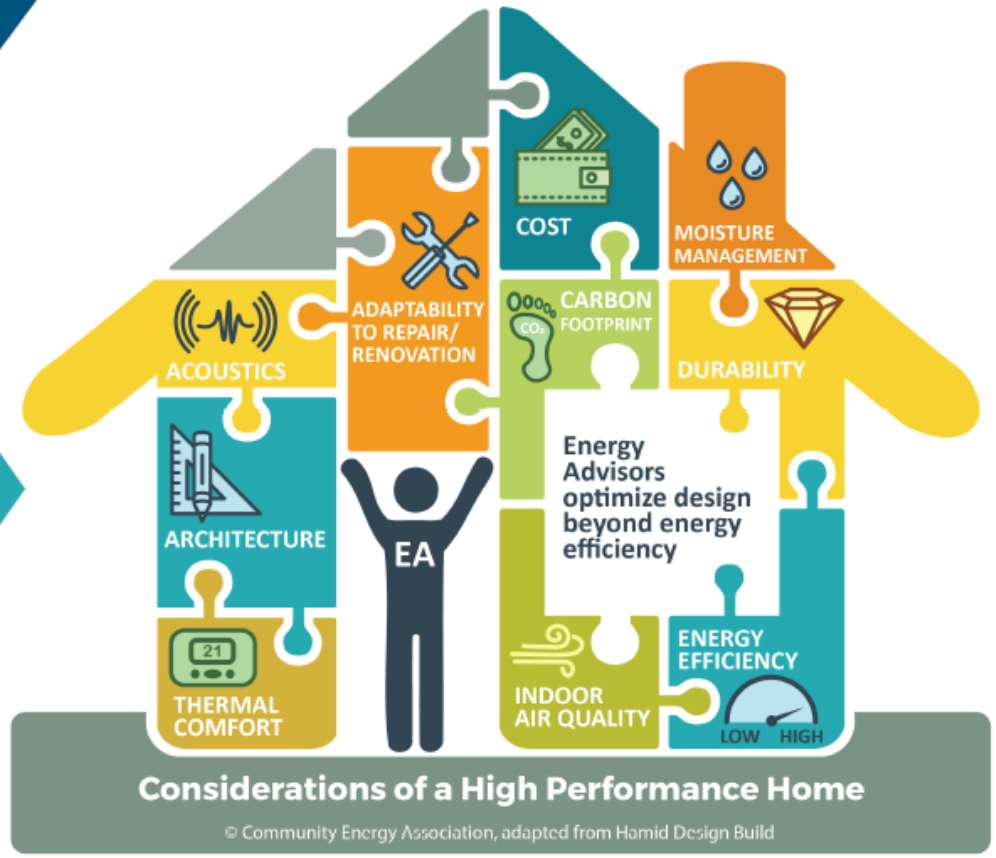
Cindy Gareau, Executive Director
manager@cacea.ca • 888-315-2774 • www.cacea.ca

CACEA promotes sustainable building practices and contributes to the following Canadian Home Labeling Programs: R-2000 ENERGUIDE ENERGY STAR HIGH EFFICIENCY HAUTE EFFICACITÉ netzero home BuiltGreen

EAs are your key strategic partner

Working with an Energy Advisor

Your roadmap to a High Performance Home



Prepared in partnership by:

Community Energy Association

CANADIAN HOME BUILDERS' ASSOCIATION BRITISH COLUMBIA

CACEA Canadian Association of Consulting Energy Advisors

How to Find an EA

- CACEA Directory
  https://cacea.ca/find-an-energy-advisor/
- CHBA Net Zero Directory
  https://www.chba.ca/CHBAFR/CHBA/Housing_in_Canada/Net_Zero_Energy_Program/NZE_Qualified_Service_Organizations.aspx
- NRCan List of Service Organizations
  https://www2.nrcan.gc.ca/oee/nh-mn/f-t/index.cfm?fuseaction=s.ssf&language=eng
- Your Network
  Other builders, utilities, municipalities, suppliers/contractors trades, etc.

Understand the Players

- Program Provider
- Service Organization (SO)
- Energy Advisor (EA)

Steps When Working with an EA

- STEP 1: Model Your Home
- STEP 2: Optimization
- STEP 3: Mid-Construction Verification
- STEP 4: Final Site Inspection
- STEP 5: Reporting and Rebates

CACEA in partnership with CHBA BC and the Community Development Association developed a checklist for Modelling Information Requirements and Air Leakage Testing to help builders work with EAs.

https://cacea.ca/wp-content/uploads/2021/03/Simple-Guide-for-Working-with-an-Energy-Advisor.pdf

Thank you

CACEA Canadian Association of Consulting Energy Advisors

THE HOME THAT SCIENCE BUILT

Home Building: Staying relevant in a swiftly changing industry

Presented by: Andrew Oding, Vice President | Director of Building Science

October 7, 2021

BUILDING KNOWLEDGE CANADA INC.

"WHAT'S DANGEROUS IS NOT TO EVOLVE."

INNOVATE OR DIE !

The challenges of today and tomorrow.

Affordability (of home)

Affordability (of owning/operating home)

Carbon Emissions

Energy Efficiency

Embodied Carbon

Climate change

Resiliency

Durability (damage risk)

IAQ Occupant Health

Be careful of rushing to Net Zero tomorrow.

First, figure out where you need to be today.

The next 1-10 years will be the toughest….

Budgets are tight, Costs are going up

Soft costs are rising

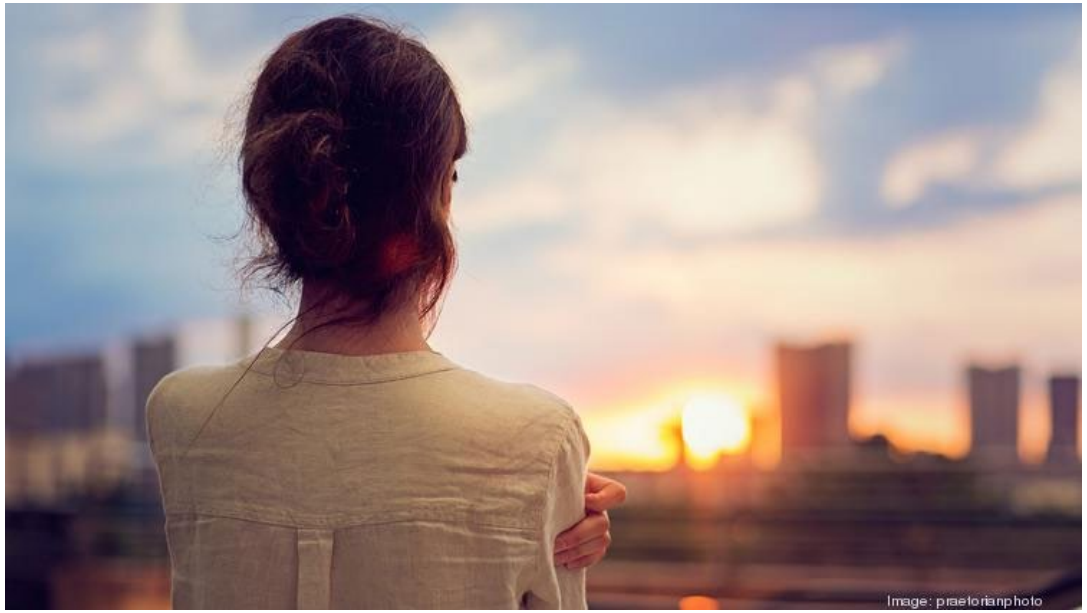
Consumer expectations are high and GROWING

Codes and regulation are moving like a small terrier drinking Redbull

Finding skilled , professional workers and trades is terrifyingly difficult

Risk of new technologies , new processes , new alternatives is concerning

How do we move ahead without **suffering unintended consequences** ?



Where do we even start?

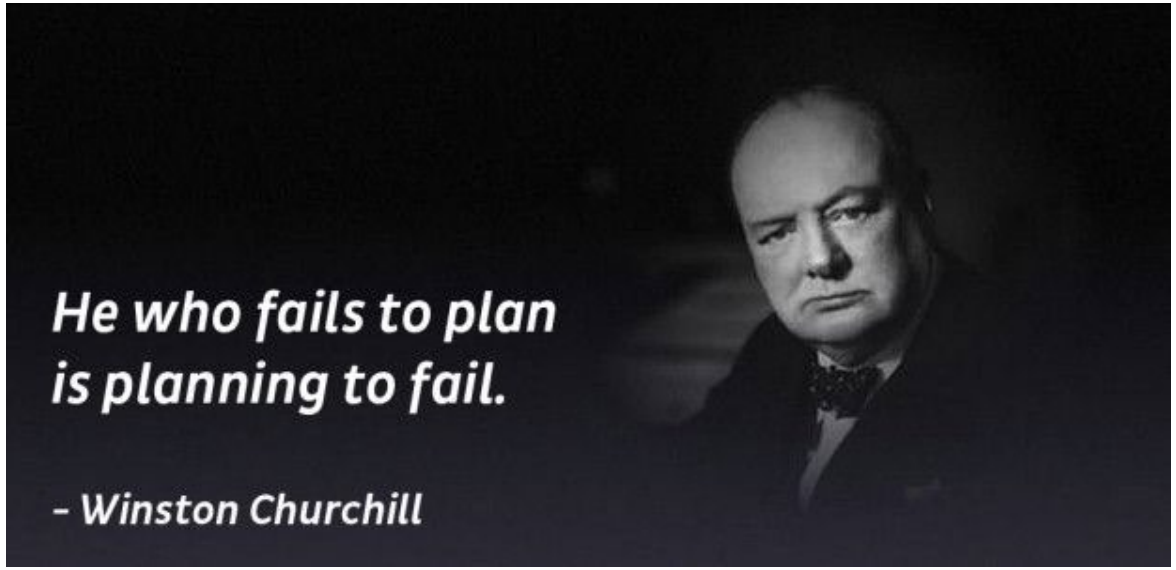
Start slow.

Be thoughtful.

Know your building science.

Identify your friends & resources

Make a 1-5-10yr plan.



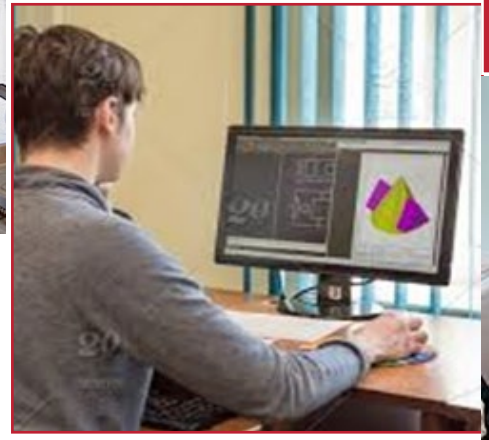
The Role of the Professional Consulting Energy Advisor

CACEA Canadian Association of Consulting Energy Advisors

A holistic approach to building
Affordable
Beautiful
Practical
Efficient
Low-Risk
Homes for Canadian Families.

Discovery & Benchmarking

Optimization & Partnering



Project Plan and Pre-Design

BUILDING KNOWLEDGE CANADA INC.

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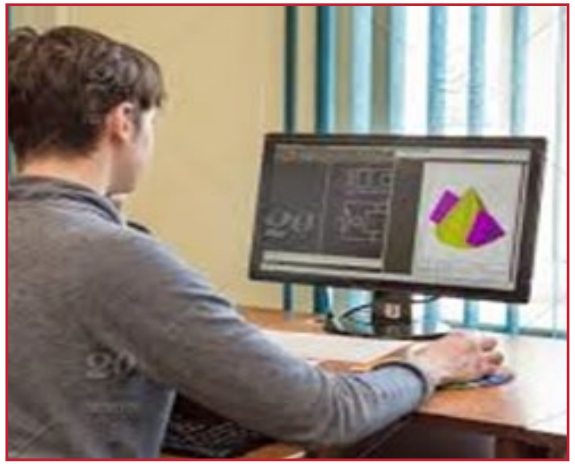
Discovery & Benchmarking

1. Where are you now ? How do you compare?
2. Environmental scanning
3. How do you compare to current and future codes/programs? ***"SKATE TO WHERE THE PUCK IS GOING" EH?!***
4. Maintain a firm foundation of **building science** knowledge –Your whole team. **Risk mitigation against unintended consequences.**
5. Identify challenges/opportunities and **"innovation comfort zone"**



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Optimization & Partnering

1. Performance Compliance vs Prescriptive : **Better Home** - **<u>Less Cost than CODE.</u>**
2. Identify Affordable, synergistic technology & process options.
3. Identify and formalize your team: internal & external.

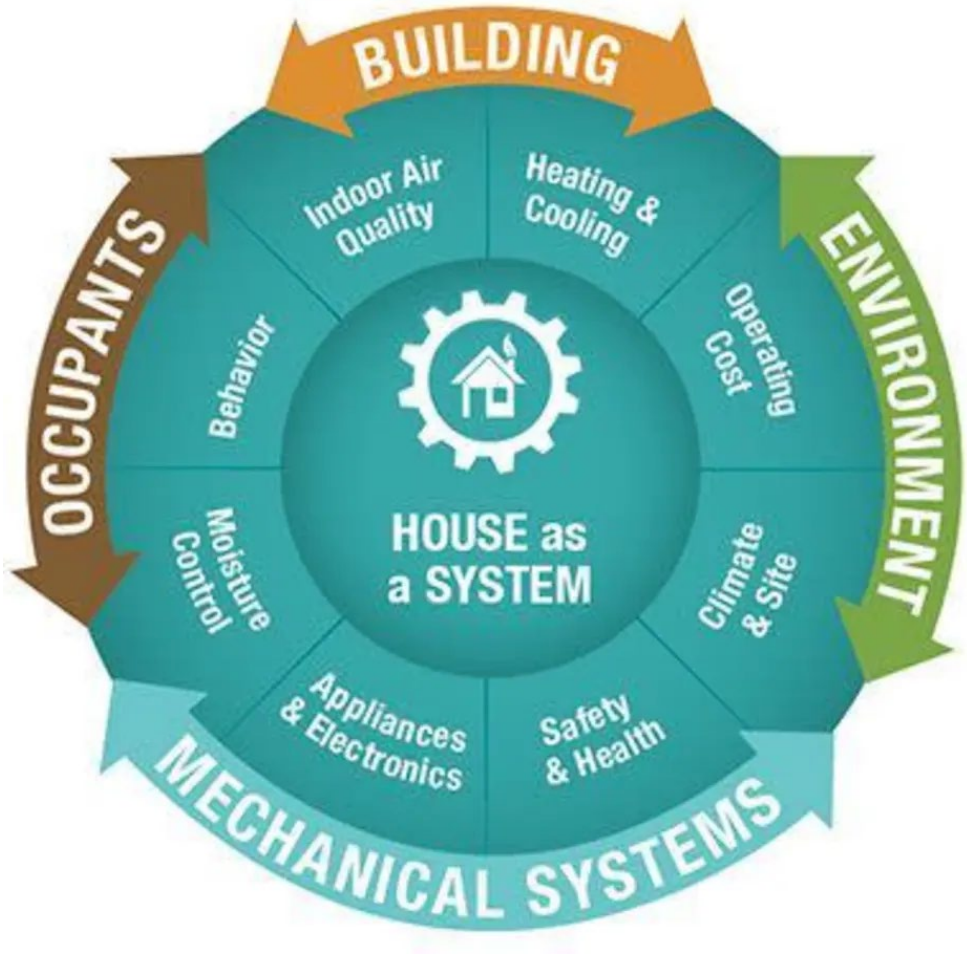
   Internal champions, Professional consultant, **Manufacturer & Trade Partners who get-it.**

CACEA Canadian Association of Consulting Energy Advisors

Project Planning & Pre-Design

1. **House-as-a-system** analysis and review
2. **TOTAL COST vs FIRST COST:** Know your REAL cost.

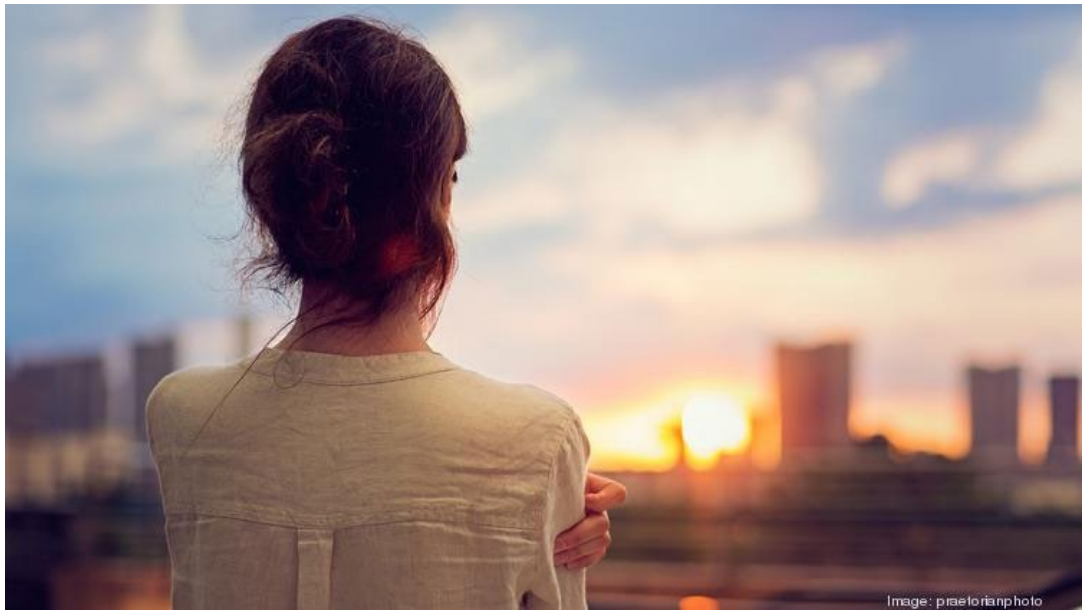
- Cost effective envelope solutions
- Cost effective Mechanical Solutions
- Cost effective process changes and cycle time reduction
- MORE effective building process –Due to EFFECTIVE planning process and partners.



The next 1-10 years could be your best ….

THE END GAME

- Don’t just survive. THRIVE !
- Lower your hard & soft costs
- Simplified Permit Application & Process
- Ease-of –construction
- Reduced RISK and WARRANTY issues
- Reputation and Legacy : Brand Building
- A Staff and team that love what they build-and what they do



Discussion & Questions

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Owens Corning

Cindy Gareau
Executive Director
Canadian Association of Consulting Energy Advisors (CACEA)

Andy Oding
Vice President, Director Building Science, Building Knowledge Canada

Canadian Home Builders' Association

DRAW

Thank you to our presenters!

Sal Ciarlo
Codes and Standard and Building Solutions Manager
Owens Corning

Cindy Gareau
Executive Director
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The recording and slides will be available to CHBA members at chba.ca/webinars