ENERGY STAR ONTARIO New Homes RESNET – San Antonio, 2nd March, 2005



Moving Energy Star To The Great White North

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ENERGY STAR ONTARIO New Homes Overview



 Canadian Policy Context Ontario "Pilot" Ontario Context Summary of Building Packages & Development Process Highlights & Key Differences Comparisons, Costs & Savings

ENERGY STAR ONTARIO New Homes Ontario DA - EnerQuality



 Delivery Agent in Ontario For NRCan Programs is EnerQuality
 Similar to US Provider but has exclusive for Province

- Quality Assurance
- Training Delivery
- Marketing
- Technical Support
- Reporting to NRCan
 - Data from field inspection forms

ENERGY STAR ONTARIO New Homes Sponsors & Leaders





ENERGY STAR ONTARIO New Homes HAPPENING NOW



- Program announced 12 January, 2005
 Builder Agreement & logo soon
 Training: inspectors, partners March 10
 Marketing by trainees, material, media
 Already 6 builders in discussion for 100%
 Two builders in Ottawa:

 All 2005 new homes (600)
 All Energy Star Community (400 homes)
 - Grand opening /signing ceremony with NRCan Minister w/National media





ENERGY STAR ONTARIO New Homes Ontario Context



• NY to MN / CA to AL • 415,000 sq. miles • 250,000 lakes 12,000,000 people (~40%) 85,000 housing starts / year (~40%) >90% in South • $\frac{1}{2}$ in GTA Cold Climate (s)

ENERGY STAR ONTARIO New Homes Ontario Context - Climate





ENERGY STAR ONTARIO New Homes Ontario Context - Climate





ENERGY STAR ONTARIO New Homes Ontario Context



 Wood frame construction > 95% w/ Basements • Forced air heating AC 40% homes Ontario Building Code inferior to IECC zone 5 - Non low e windows - R8 Basement insulation to 2 ft BG - No air tightness control

ENERGY STAR ONTARIO New Homes Ontario Context





ENERGY STAR ONTARIO New Homes BUILDER PROCESS



1. Sign agreement

2. Select energy efficiency measures

Packages & Trade-Offs or





3. Field inspection by ESO inspector

Individually or 1/3 Sampling

4. Label compliant homes

- Label issued by inspector



ENERGY STAR ONTARIO New Homes BUILDING PACKAGES



 What builders want Table of minimum prescriptive requirements for each element Optional trade-offs provide choices BP's apply to all Part 9 types Single detached, attached, walk-ups Modular, ICF, SIPS, panelized Any orientation, any size, any eligible heating system

ENERGY STAR ONTARIO New Homes BUILDING PACKAGES - Development



• Define best practices per element Achievable by production builders Add electrical and appliance savings Lock in Energy Star family of products Better than US HERS 87 Iterative process Each time better defined and easier

ENERGY STAR ONTARIO New Homes DEVELOPMENT SUMMARY - Survey



• Builder Survey - Dec. 2004 - Like packages, easier air sealing, certification & sampling Trade-offs requested · 2x4 & 2x6 walls w/o ins. bd Reduced spec windows Basement walls lifted above floor Gas water heaters - 4/14 surveyed likely to do Energy Star - 8/10 remaining likely as option

ENERGY STAR ONTARIO New Homes BUILDING PACKAGES v1.2 - Table

Element	MI
	(S
Heating & Hot Water	En
Ducts	All
Windows, Patio Doors	En
Window Area	<1
Doors	In
Heated Ceiling w/ attic	R4
Heated Ceiling w/o attic	R3
Exterior Walls	R1
Basement Walls ⁽⁸⁾	ful
slab w/o in-floor heating	
> 2 ft below grade:	un
< 2 ft below grade:	R+
Slab w/ in-floor heating	R+
Exposed Floors	R3
House Air Leakage	Air
Ventilation	Pri
12 6	Ρlι
	_dis
Electrical Savings	A
	of



ENERGY STAR ONTARIO New Homes BUILDING PACKAGES – Equivalents and Trade-Offs



Provide Choices

- Equivalent Assemblies in tables
- Trade-Offs in tables
 - Decrease in spec of one element
 - Increase in one or more others
- Or effective resistance calculation
- Or EGH software
 - equal annual energy performance

ENERGY STAR ONTARIO New Homes Eligible Heating Systems



Fuel	Equipment
All	Furnaces and
	water heater
All	Thermostats
Natural Gas /	Furnace
Propane	Water Heate
	Fireplace
	Hydronic /
and the second	Combination
-	
Oil	Furnace
	Water Heate
	Hydronic /
	Combination
Electricity ⁽⁵⁾	Ground Sour
17.6	Heat Pump
Wood	Fireplace / S











 Canadian Energy Star Windows (new) • U-Value by NFRC 100 or CSA A440.2 - Zone A (<3500 DDC) - U 0.35 - Zone B (<5500 DDC) - U 0.32 - Zone C (<8000 DDC) - U 0.28 • Or ER by CSA A440.2 • 5% window area exempt Window area limit: 13% heated boundary wall area





Zone A in South, Zone B in North until Jan 2006 and 11% wall area limit
15% wall area if zone C in South, zone D in North

ENERGY STAR ONTARIO New Homes Eq. Main Walls - South





ENERGY STAR ONTARIO New Homes Eq. Main Walls - South



Equiva	lent Main Wall A
	standard wd. 2x6
	standard wd. 2x4
1. J.A. 56 546-57-558-5	steel 2x6 @ 16" (
	SIPS wall panels
1 H.L.	ICF walls
	Any wall assembl
	SIPS wall panels ICF walls Any wall assemb

ENERGY STAR ONTARIO New Homes Trade-Offs: Main Walls - South

ENERGY STAR



ENERGY STAR ONTARIO New Homes Eq. Basement Walls – South < 5000 DDC



Equiva	lent Basement V
	R10 insulating bd.
	wd. 2x4 @ 16" o.c
	R12 roll blankets (
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	wd. 2x3 @ 16" o.c
-	gypsum bd. finish)
	steel 2x4 @ 24" o.
	gypsum bd. finish)
	Any basement wal
	resistance greater

ENERGY STAR ONTARIO New Homes Trade-Offs: Basement Walls – South



Sec. And	Substitute:
	Any interior side ba
	applied to the top 4
	46" above floor
2000	Add:
<u>~ 546776</u>	EPS or XPS insulating
	to footing, with an

	Substitute:
	Interior side basem
	Add any of the fo
	Any interior side ba
	Furnace w/ min. AF
	Or
17.11.42	Any interior side ba

ENERGY STAR ONTARIO New Homes Air Leakage Control







ENERGY STAR ONTARIO New Homes Air Leakage Control



 Test required 0.2 cfm50/ft2 (1 L/s/m2) NLA of 2.0 in2/100 ft2 (1.4 cm2/m2) • CAN/CGSB 149.2 at 10 Pa Double the requirement of R-2000 2.5 – 3.0 ACH50 in most houses with a basement

ENERGY STAR ONTARIO New Homes Ventilation



 Based on OBC 9.32 PVC (Principal Ventilation Capacity) 15 cfm x (#bedrooms + 1) Central control for switching PVC Total Ventilation Capacity no less than $2 \times PVC$ HRV optional

ENERGY STAR ONTARIO New Homes Ventilation – Additional Requirements



 Continuous or interval operation of PVC & Distribution

 Interconnect required between operation of PVC & Distribution

 Interval operation requires eq. average delivery & timer control
 PVC surface mount fan < 1.5 sone

ENERGY STAR ONTARIO New Homes Ducts



All ducts required to be within the heated boundary (common)

- Sealing is not a code requirement in Canada
- Resistance by builders and consultants
- Recommended but not required by Energy Star Ontario for introduction
- Subject to further study using US test methods.

ENERGY STAR ONTARIO New Homes Electrical & Appliances



Target of 1000 kWh / yr.
Eligible Technologies:

Heating Distribution
Ventilation Distribution
Lighting
Air conditioning

- Clothes Washer
- Refrigerator
- Dishwasher
- On-site Power Production
- Simple one page worksheet

Table of Electricity & Appliance Savings Credits			
Technology	Eligibility	Formula	Credit
Heating	 Furnace or air handler with ECM motor 	○ South: 300 KWh	
Distribution	• Output not to exceed 140% of design load	 North: 400 kWh 	
	 Hydronic heating distribution and no FA 		
Ventilation	 Conventional PSC motor forced air system 	 With PVC exhaust 	
Distribution	with interval operation controller to result	fan or HRV w/ECM	
	in 50% on time or	motor or fan-less	
	 ECM motor in furnace or air handler with 	HRV: 400 kWh	
	continuous operation.	 With conventional 	
	 Low speed available for circulation 	HRV: 200 kWh	
	 Furnace w/ modulating heat output 	o Add 200 kWh	
	 Dedicated ventilation duct system with an 	o Conventional HRV:	
	HRV or balanced fans operated with out a	600 kWh	
	central forced air system.	• HRV w/ ECM motor:	
		800 kWh	
Lighting	 Energy Star labeled compact fluorescent 	o #CFL/T5 x 40 kWh	
	lamps (CFL), or, T5 or T8 linear fluorescent	○ #T8 x 90 kWh	
	(LF) lamps, installed in hardwired fixtures		
	by the builder.		
	• At least 50% of the fixtures are required to		
	be fitted with the eligible lighting.		
	• Lighting in unfinished areas, closets and		
	garages are excluded.		
Air	 Energy Star labeled split system air 	o SEER 13: 350 kWh	
Conditioning	conditioning equipment.	o SEER 15: 500 kWh	
	 Output not to exceed 125% of design load 	o North less 70, 100	
Clothes	 Energy Star labeled clothes washer 	o 450 kWh	
Washer			
Refrigerator	o Energy Star labeled retrigerator	o 150 kWh	
Dishwasher	o Energy Star labeled dishwasher	o 100 kWh	
On-Site	Solar DHW, Photovoltaic, gray water heat	• As determined by	
Power	recovery, wind, fuel cell, co-gen and micro	supplier	
Production	turbine on-site power production systems.		
1	I otal is requir	red to exceed 1000 kWh	

ENERGY STAR ONTARIO New Homes Comparisons, Costs & Savings





ENERGY STAR ONTARIO New Homes Comparison with Ontario Code





ENERGY STAR ONTARIO New Homes Comparison with IECC-04





ENERGY STAR ONTARIO New Homes BUILDING PACKAGES - Ratings





ENERGY STAR ONTARIO New Homes Costs



Item	Des
Roof insulation	Add
Wall insulation	Subs
	R5 i
Basement Walls	Subs
	inter
Diverge 3	to b
Windows	Subs
Furnace	No c
Hot Water	0.60
House Air Sealing	Sele
	pene
	bulk
Ventilation and	Inte
distribution controls	exha
Electrical Efficiency	Incr
	(ven
3 rd Party Inspection	Мау
Total	. .

ENERGY STAR ONTARIO New Homes Savings



	1 and
Spec	Heating
	MJ/yr
Toronto < 5000 DDC	
OBC	126496
OBC w/ 90% furnace	110615
Energy Star Ont.	68203
A SHART SEVER SENSALIST A	
Ottawa < 5000 DDC	
OBC	146868
OBC w/ 90% furnace	128430
Energy Star Ont.	80530
	Z
Sudbury > 5000 DDC	
OBC	164092
OBC w/ 90% furnace	143492
Energy Star Ont.	85152