

The Acceleration of Net Zero:

How the Canadian Home Builders' Association (CHBA) is Supporting Industry Innovation

Derek Satnik, Net Zero Energy Housing, CHBA

Feb. 5, 2016



About the CHBA

- Founded in 1943, the Canadian Home Builders' Association (CHBA) is **the voice of Canada's residential construction industry.**
- The residential construction industry is a vital part of Canada's economy ***in every community*** across the country:
 - ↳ We directly and indirectly support more than 900,000 jobs, paying more than \$50 billion in wages.
 - ↳ We generate \$125 billion in annual economic activity, and provide over \$30 billion in federal and provincial revenues each year.
- Representing more than 8,500 businesses across Canada (mainly small and medium sized) CHBA members include home builders, renovators, land developers, trade contractors, product and material manufacturers, building product suppliers, lending institutions, insurance providers, service professionals, municipalities and more.



Kevin Lee, CEO
since May 2013

About the Presenter

Sonja Winkelmann, Director of Net Zero Energy Housing, CHBA

- 11 years of experience in the field of energy efficient housing
 - ↳ Since May 2014, Director, Net Zero Energy (NZE) Housing, CHBA
 - ↳ 4 years, Executive Director, NZE Home Coalition
 - ↳ 1 year, Program Consultant, Climate Change Central
 - ↳ 4.5 years, EnerVision (EnerGuide, R-2000, LEED-H and Building Canada)
- 9 years of experience in Human Resources, primarily Training & Development
- Formal education in International Business Administration (6-month exchange in Germany), and Environmental Management
- Fun Fact: Lived in Mississauga total of 18 years (14+4) & Calgary total of 25 years (14+11)



Background

Oct 2013	CHBA Board struck a Working Group <i>to assess feasibility</i> of a NZE Council
Apr 2014	CHBA Board approved the development of a self-funding NZE Council
May 2014	Sonja came on board as the Director of NZE Housing
Jul 2014	NZE Housing Council (NZC) <i>Management Committee</i> was appointed
Sep 2014	First meeting of the NZC Management Committee (Terms of Reference)
Dec 2014	Founding Members of the NZC were announced (45 + 11 non-voting)
Mar 2015	1 st meeting of the Council – Year 1 Key Priorities were agreed upon
May 2015	2 nd meeting of the Council
Sep 2015	Launch of the NZ Labelling Program PILOT
Oct 2015	3 rd meeting of the Council
Dec 2015	Year 2 Key Priorities were agreed upon
Mar 2016	<i>4th meeting of the Council (Start of 2nd Year of the 2-Year Term)</i>



Net Zero Energy Housing Council (NZC)

The Council supports the CHBA Strategic Priority to **Advance Innovation** in our industry, with the goal of creating a **market advantage** for CHBA builder and renovator members who choose to pursue Net Zero Energy housing.

This will not only help to meet the housing aspirations of Canadians, but renew Canadian world leadership in high performance housing.

The **MANDATE** of this self-funding Council is **to deliver services that will support members' voluntary adoption of NZE.**

Barriers to NZE

Marketing and Promotion

- Poor branding, understanding, awareness, and demand
- Difficult to articulate value proposition (sales & marketing)

Competency & Capacity

- Limited education/accreditation and training/skills development

Technical Standards, QA & Tools

- Lack of standards and support tools

Cost Reduction

- High cost to build or retrofit (capital & labour)

Financing & Real Estate

- Lack of appropriate financing mechanisms and/or incentives

Policy

- Limited enabling policy (e.g. net metering, codes and regulations)

Key Priorities for Year 1 & 2

- **A NZE Labelling Program** to distinguish and recognize NZE homes and the builders/renovators
- **Marketing & Communications initiatives** to develop the NZE brand, build awareness and understanding of the value of NZE homes, and stimulate market demand
- **Educational initiatives** to bridge the knowledge gap for early adopters and accelerate builder capacity to capitalize on NZE
- **Financing initiatives** to address the initial cost of NZE homes through innovative and effective financing mechanisms

Council Members

Management Committee Members

1. Building Knowledge Canada, Andy Oding, **CHAIR**
2. RDC Fine Homes Inc., Bob Deeks, **VICE-CHAIR**
3. Avalon Master Builder, Chris Williams
4. Coleman-Dias³ Construction Inc., Stefanie Coleman-Dias
5. Denim Homes Inc., Caleb Howden
6. Habitat Studio, Peter Amerongen
7. Insightful Healthy Homes Inc., Arthur Lo
8. Landmark Group of Builders, Reza Nasseri
9. Minto Group, Derek Hickson
10. Wraithaven Homes Ltd., Steven Wright

Council Members

*5 Sponsor Seats
Still Available!*

Sponsor Members

GOLD

Owens Corning Canada, Andy Goyda

SILVER

**All Weather Windows, Tracy Nadiger
Dettson Industries, Marc Chenier**

BRONZE

**Enbridge Gas Distribution, Shannon Bertuzzi
JELD-WEN of Canada, Lisa Bergeron**



Council Members

General Members

1. BASF Canada, Sharon Lishman
2. BC Hydro, Gary Hamer
3. Canadian Wood Council, Rob Jonkman
4. City of Calgary, Justin Pockar
5. Canadian Manufactured Housing Institute, Kathleen Maynard
6. Cosella-Dorken, Tom Fallon
7. Council of ICF Industries, Murray Snider
8. EnerQuality, Kirk Johnson
9. Icynene Inc., Andrew Deamone
10. Lafarge Eastern Canada, Opi Marok
11. NAIMA Canada, Jay Nordenstrom
12. Rheem Canada, Mark Muzyka
13. s2e Technologies Inc., Derek Satnik
14. Union Gas Limited, Farzin Masoumi Rad
15. VELUX Canada Inc., Russell Ibbotson



Council Members

Builder/Renovator Members

1. Brookfield Residential, Dave Henderson
2. Corvinelli Homes Ltd., John Corvinelli
3. Doug Tarry Homes, Doug Tarry
4. Effect Home Builders Ltd., Dale Rott
5. Naikoon Contracting Ltd., Josef Geluch
6. North Ridge Development, Errol Fisher
7. Reid's Heritage Homes, Jennifer Weatherston
8. Penner Projects Ltd., Dave Penner
9. Sean, Sean Mason
10. Slood Construction Ltd., John Slood
11. Sonbuilt Custom Homes Ltd., Jonathan Zerkee
12. Steve Snider Construction Inc., Stephen Snider

Academia Members

1. Nova Scotia Community College, Kelly Hutton
2. SAIT Polytechnic, David Silburn
3. University of Guelph, Avis Devine

Council Members

Ex-Officio (Non-Voting) Members

1. CMHC, Thomas Green
2. NRCan CanmetENERGY, Robin Sinha
3. NRCan OEE, Leslie-Ann Robertson

Ex-Officio – Reciprocal (Non-Voting) Members

1. CHBA Board/Executive Committee, Jane Morgan
2. CHBA Board/Executive Committee, Bard Golightly
3. CHBA Board/Executive Committee, Steve Deveaux
4. CHBA Manufacturers' Council, Tom Fallon
5. CHBA Technical Research Committee (TRC), Bob Deeks
6. CHBA Canadian Renovators' Council (CRC), Todd Senft
7. CHBA Professional Development Committee (PDC), Errol Fisher
8. CHBA National Marketing Committee (NMC), Miles Kohan

2015 CHBA Home Buyer Preference Study



Study Facts

- CHBA report produced in partnership with Avid Ratings Canada
- The first nationwide market preference study for the home building industry
- Results released March 2015
- 1,581 new homeowners across six provinces of Canada (BC, AB, SK, MB, ON, NB)
- A significant 13% response rate (average response rates in other countries for similar studies are around 5%, such as the NAHB preference study in the U.S.)
- It provides in-depth insight into what homes buyers are looking for – and **demonstrates the importance of energy efficiency to today's home buyers.**

2015 CHBA Home Buyer Preference Study

Top 10 “Must Have” Home Features

1. Walk-in closets
2. ***Energy efficient appliances***
3. ***Overall energy efficient home***
4. ***High-efficiency windows***
5. Kitchen islands
6. Linen closets
7. Open concept kitchens
8. Large windows
9. 2-car garage
10. Walk-in pantry



Buy the full survey results online at chba.ca/buyersurvey

2015 CHBA Home Buyer Preference Study

Overall Energy-Efficient Home

- 3rd highest ranked “must have” item is an **overall energy-efficient home**:
 - ➔ – 63.7% of respondents rated this feature as a **must have** item
 - an additional 25.5% considered them **really want** items
- An overall energy-efficient home ranks as **important to all age groups** of home buyers.
- An analysis by product types indicates that it is most important to those seeking a single detached bungalow, while somewhat less important to buyers shopping in the high-rise market.

Buy the full survey results online at chba.ca/buyersurvey



2015 CHBA Home Buyer Preference Study

Certification

- When asked to rate the level of importance of home energy certification by a designated program:
 - ➔ – 48.7% of respondents consider this a **must have** feature
 - an additional 28.8% rate it as a **really want** item
 - Only 6.0% of respondents feel this is **not important**

Buy the full survey results online at chba.ca/buyersurvey

2015 CHBA Home Buyer Preference Study

Power Generation

- Overall, alternative power generation systems rank low on the preference list for today's home buyers.
- **Solar electric (PV) is the highest-ranking**, but are still only a **must have** feature to 9.1% of respondents.
- ➡ – **46.5% of respondents indicate that solar power might be nice if affordable.**
- The **lowest ranking power generation system** is the small-scale wind turbine, with 48.0% of respondents rating it as **not important**.



2015 CHBA Home Buyer Preference Study

Back-Up Power Generation

- As Mother Nature's storms continue to make headline news across the globe, **the preference for an emergency whole-home generator** will also be an interesting feature to monitor.
 - The study finds this is **not important** to 33.5% of respondents
 - ➡ – **However, 41.7% indicate it might be nice if affordable**

Buy the full survey results online at chba.ca/buyersurvey

NZE Labelling Program Objectives

- Distinguish/recognize NZE builders *and* homes
- Achieve a technical standard (2 tiers: NZE and NZE Ready)
- Track/measure success (ie increase in # of labels)
- Leverage the name recognition and cachet of “net zero energy”
- Develop a program that has technical rigor and simplified administration
- Targeting the mass market

Existing Programs

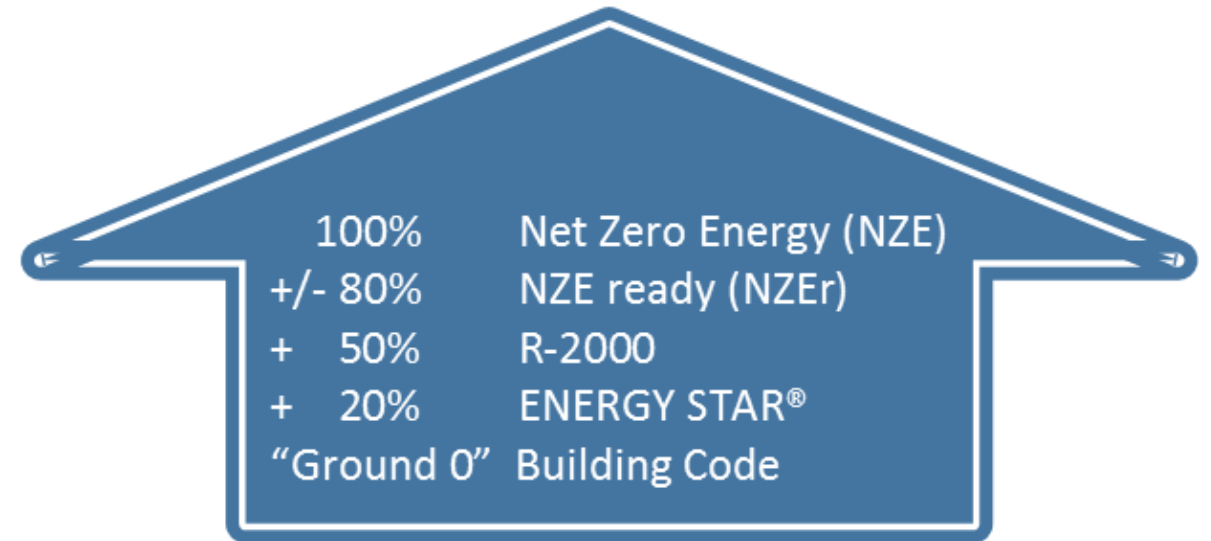


A Full Spectrum of Market Offerings

The CHBA supports a full spectrum of voluntary energy performance levels to provide Canadians with higher performing homes.

These programs present a complete market offering that is applicable to custom and production homes, renovations and low-rise MURBs.

The CHBA NZE Labelling Program has been designed so that a home could still qualify for NZEr, R-2000, or ENERGY STAR® if NZE isn't achievable for one reason or another.



Definition

A NZE home is one that is *designed, modelled and constructed* to produce as much energy as it consumes on an annual basis.

- **NOT NZE “as operated”** – but uses assumptions for occupant consumption (Plug/occupant loads in NZE homes are between $\frac{1}{2}$ to $\frac{2}{3}$ of total energy use)
- The energy produced is a) generated on-site and b) renewable.
- NZE can be achieved via net-metering AND/OR battery storage.
- It includes all forms of energy (ie passive and thermal) including acknowledgment of gas and electrical base loads.

NZE Ready (NZEr) = A NZE home that has not yet installed the renewables

A few thoughts...

- **NZE today is NOT NZE 5 years from now:**
 - Developing technologies
 - Efficiency of Renewables in increasing aggressively
 - Balance our aspirational END GAME with a series of balanced steps forward
- **What we cannot compromise:**
 - Exceptional COMFORT (envelope & passive measures)
 - Enhanced IAQ /IEQ (Control & Conditioning)
 - Durability
 - Minimum maintenance and complexity
 - Affordability



A Voluntary Canadian Standard...

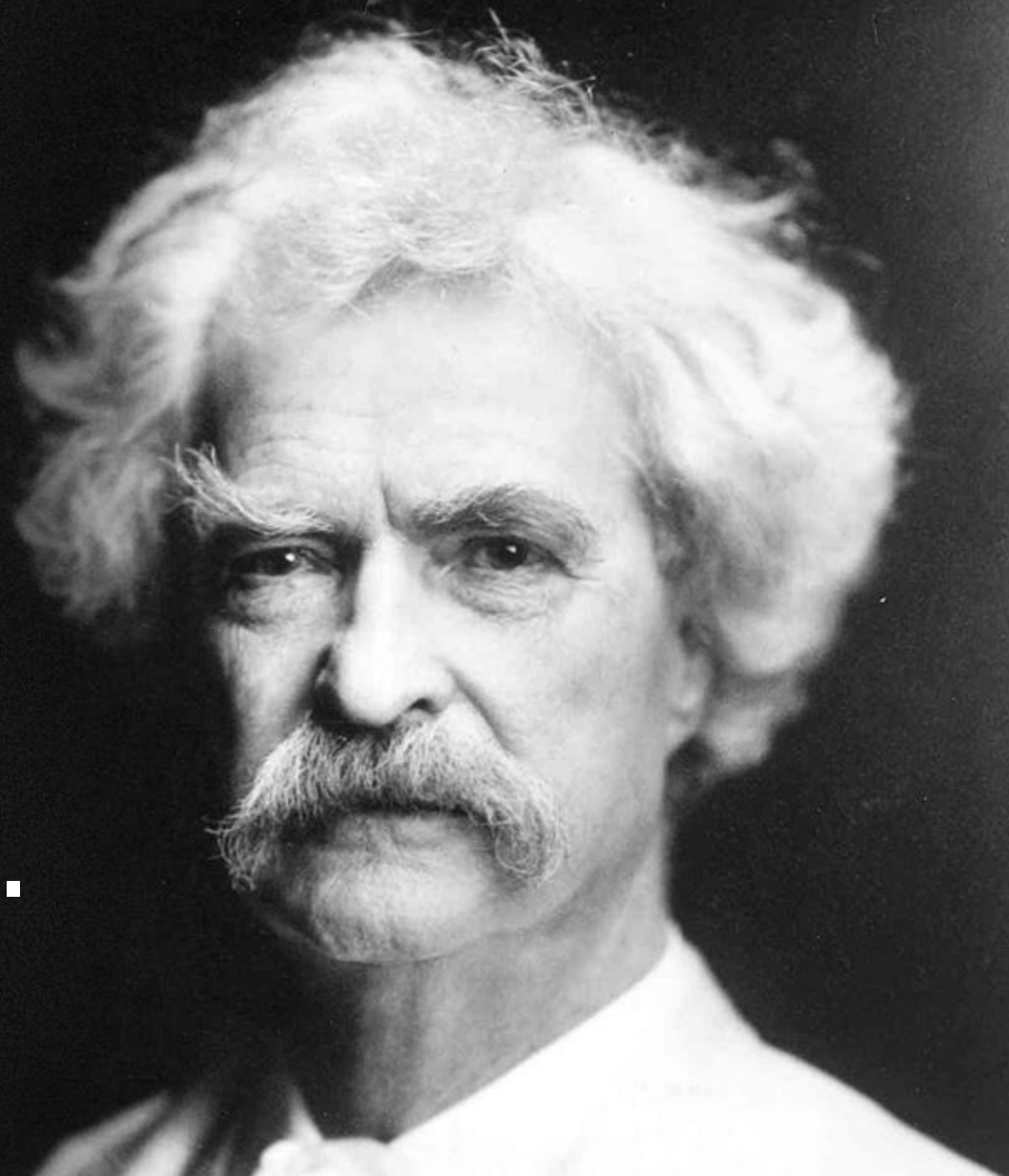
- that clearly defines NZE/NZEr homes for the general consumer.
- with built-in ability and mechanisms which adapts to emerging technologies and consumer expectations, guided principally by the builder industry in partnership with government support systems.
- which is administratively appropriate for all homebuilders including custom homes, renovations, large volume production, and low rise multifamily.
- that provides a ROADMAP to designing, constructing (and possibly operating) affordable, comfortable, healthy, durable and appealing homes for Canadians.

A Program Designed for User Experience



Continuous
improvement
is better than
delayed perfection.

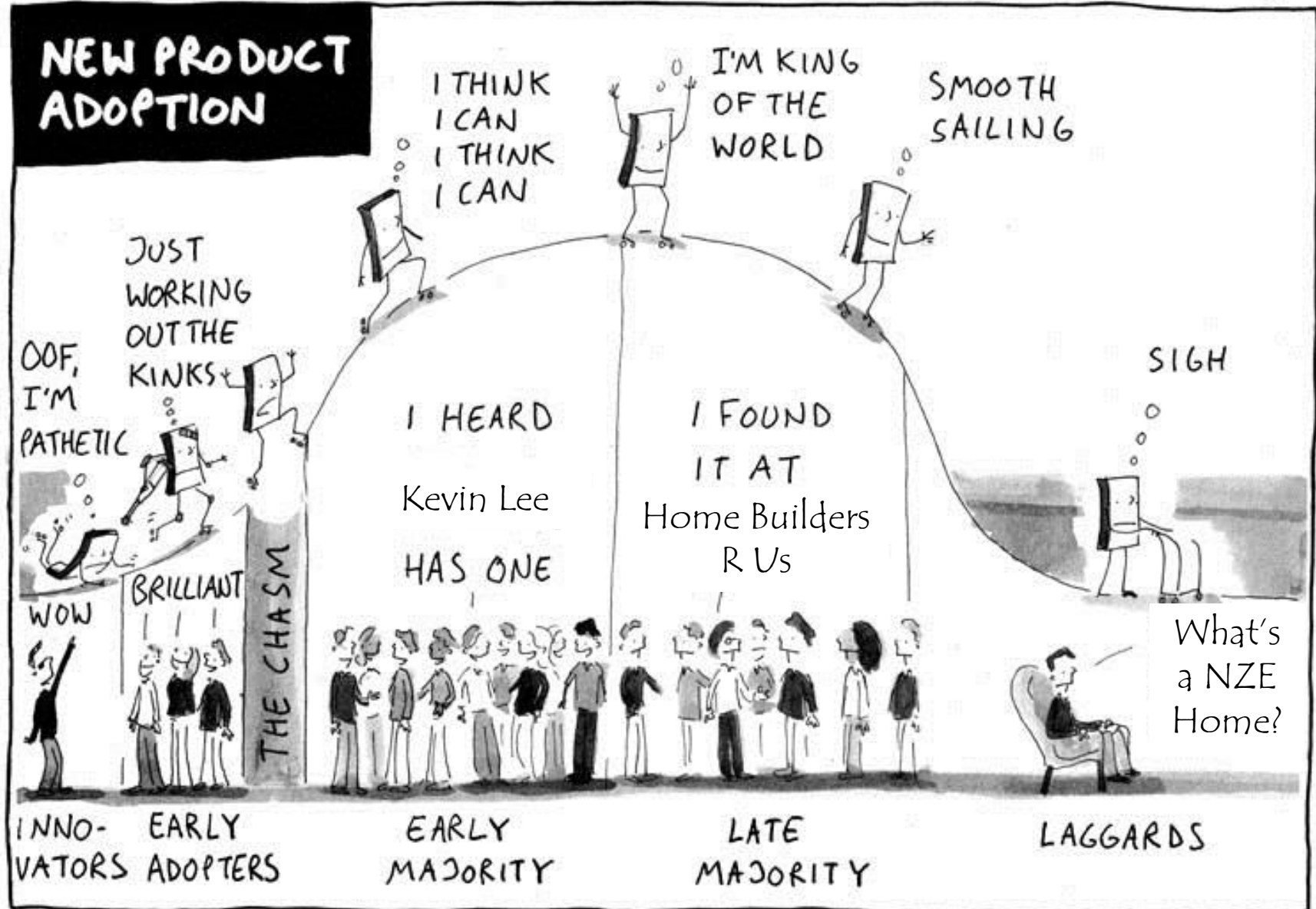
Mark Twain





BRAND CAMP

by Tom Fishburne



© 2007 Thanks to G. Moore

SKYDECKCARTOONS.COM

NZE Labelling Program PILOT

PILOT Technical Specifications for a CHBA NZE Qualified Home

BASE: R-2000 v.12

- + **EnerGuide for Houses** - Net Annual Energy Use ≤ 0 GJ
- + **R-2000 NZE Pilot** requirements (incl. R-2000 v.14 draft)
- + **CHBA requirements:**
 - **NZE:** Renewable energy design evaluation & installation verification
 - **NZEr:** “Renewable Ready” design evaluation & verification
 - **All:** Energy monitoring device with real time information for consumer
- + *ENERGY STAR® v.12 Performance Path min. requirements (OPTIONAL)*

We’ve combined all of the technical requirements into one document – and are already working on version 1 (v1) for launch in 2016.



NZE Labelling Program PILOT

Future Program Development

- Fine tune NZE Multi-Unit Residential Buildings (MURBs) and NZE Renovations
- NZE Communities (District/Micro Energy & CHP)
- The Water/Energy Nexus - water use affects NZE homes... but how & by how much?



NZE Labelling Program PILOT

Become a CHBA NZE Qualified Builder/Renovator in 4 steps

1. **Membership:** CHBA Membership
2. **Training:** R-2000 and NZE Builder Training
3. **Licences:** EnerGuide and R-2000 licenses (ENERGY STAR® is optional)
4. **Labels & Certifications:** R-2000 v12 certification (includes EnerGuide v12 label) from NRCan (ENERGY STAR® label is optional) and NZE/NZEr label from CHBA

Once your first NZE/NZEr home is labelled you earn the designation of CHBA NZE Qualified Builder. Congratulations!

To maintain this designation, participate in on-going NZE education (TBC during the Program Pilot) and build at least one NZEr home every 3 years.

NZE Labelling Program PILOT

CHBA NZE Qualified Service Organizations (SO)

Our primary avenue for delivering the NZE Labelling Program will be to utilize the existing expertise and infrastructure of the R-2000 Licensed Service Organizations.

The SOs provide the following services for the CHBA NZE Labelling Program:

- Supporting the builder/renovator to ensure they meet all program requirements, including acquiring NRCan licenses and successfully completing the required Builder Training.
- Delivering CHBA NZE Builder Training, including administering the exam by a CHBA NZE Qualified Trainer.
- Ensuring the home meets all program requirements, including performing Modelling, Testing and Inspections/Verification by a CHBA NZE Qualified Energy Advisor.

NZE Labelling Program PILOT

Who can be a NZE Qualified Energy Advisor (EA) or Trainer?

A CHBA NZE Qualified EA must:

- Be an R-2000 Licenced EA
- Have consulted on a successful R-2000 NZE Project (if not, must complete one under mentorship of an EA who has)

A CHBA NZE Qualified Trainer must:

- Be an R-2000 Builder Training Trainer
- Be a CHBA NZE Qualified EA
- Have participated in a review of the NZE Builder Training content with a CHBA NZE Qualified Trainer

NZE Labelling Program PILOT

Current CHBA NZE Qualified Service Organizations (SO)

1. CHBA British Columbia
2. CHBA New Brunswick
3. CHBA Newfoundland and Labrador
4. *CHBA Nova Scotia*
5. EnerQuality Corporation, ON
6. Enertest Corporation, ON
7. **EnerVision Healthy Housing Choices, AB**
8. EnviroCentre, ON
9. HAWK-EYE Technical Solutions, NS
10. Homesol Building Solutions, ON
11. Mindscape Innovations, ON
12. Sun Ridge Residential, SK
13. Sustainable Housing, NS

NZE Labelling Program PILOT

What happens after the Pilot?

We must first evaluate the results of:

- The NRCan R-2000 NZE Pilot (12 builders invited to participate)
- The ecoEII Owens Corning NZE Communities initiative (5 builders, 5 homes each)
- Our Pilot

Also: The Consumer Marketing & Communications initiatives must be complete so we can have the NZE brand, along with key messaging for the various target audiences. This will build awareness and understanding of the value of NZE homes, and stimulate market demand.

NZE Labelling Program PILOT

Educational initiatives are being developed to bridge the knowledge gap for early adopters and accelerate builder capacity to capitalize on NZE:

- **NZE Networking & Exchange** - For NZC Members only
- **CHBA NZE Builder Training** - March 3 in Calgary and March 4 in Edmonton
- **NZE Webinars** - sign up for “Net Zero News” to be notified of upcoming dates
- **NZE Builder Boot Camp** - May 2 in Kelowna

***The NZC Education Working Group** is conducting a needs assessment and gap analysis - and will work with key stakeholders to develop more educational opportunities*



NZE BUILDER BOOT CAMP

May 2, 2016 in Kelowna, BC

8:30-5:00 NZE Builder Boot Camp

5:00-6:30 NZE “Business-Building” Networking Reception

In this 1-day intensive Net Zero Energy (NZE) Builder Boot Camp, you’ll hear from experienced builders and Energy Advisors a variety of techniques for how to take a home to NZE performance. Lessons learned in past projects, and the next steps along the “road” to NZE will be highlighted.

This unique event will **dramatically reduce the learning curve of participants**, as well as offer access to experts in four main areas: **Design, Envelope, Mechanicals, and Renewable Energy.**

Register at www.chba.ca/conference! **Early Bird rates end Feb 19!**



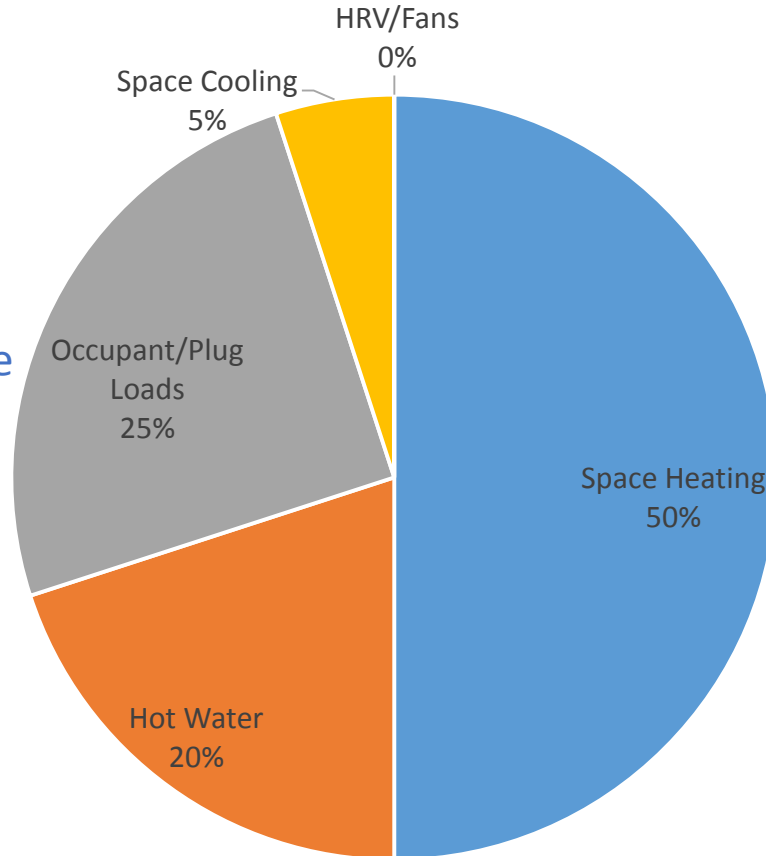
NZE Labelling Program PILOT

What have we learned so far about how to get there?

- SIMPLE design – especially the mechanicals!!!
- Building envelope requirement (space heating): 33% more efficient than Building Code (R-2000 is 25%)
- Air Tightness target is 1.0 ACH50 or less (max. is 1.5 ACH50)
- Enclosure design:
 - ✓ Attic R60+ (at least 10" raised heel trusses)
 - ✓ Walls R35+
 - ✓ Below grade walls R25+
 - ✓ Below grade slab R10+
 - ✓ Windows R5+ (triples)
- 8/12 pitch is ideal for PV

Occupant Behaviour – Biggest Loads!

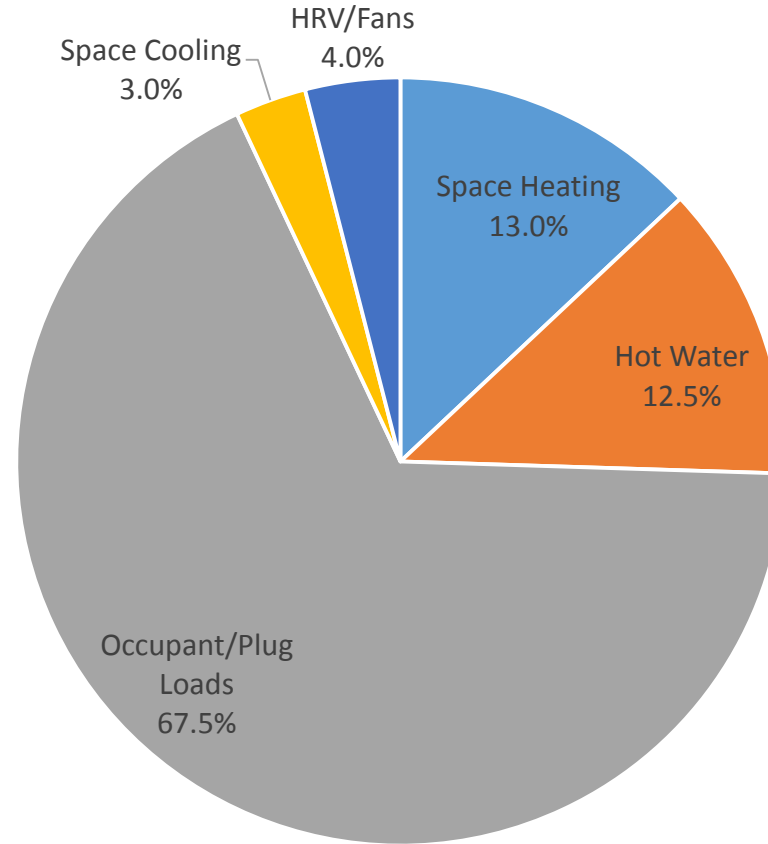
Standard NBC 9.36 Home



2011 Average Energy Use
Canadian Households
110-120 GJ/year

Source: [StatsCan](http://statscan.gc.ca)

A NZE Home



Average Energy Use
NZE Home
36-40 GJ/year

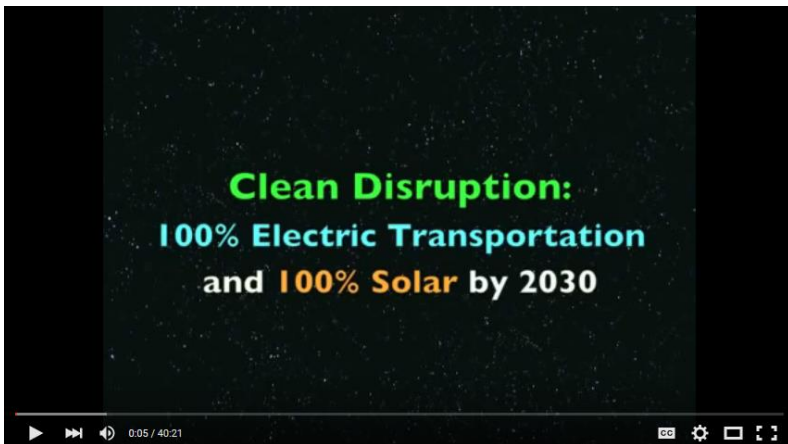
Roof space is prime real estate for PV panels!!!



What does the future hold???

Disruptive clean technologies

- Electric vehicles
- Self-driving vehicles
- Solar energy (incl. OPV)
- Batteries



Tony Seba, author of “Clean Disruption”
<https://www.youtube.com/watch?v=RBkND76J91k>

*A Texas Utility Offers a
Nighttime Special: Free
Electricity (9 pm to 6 am)*

*New Efficiency Record of 21.25%
Efficiency for Multi-crystalline
Silicon Solar Cell*

*Research: Solar
Window Coating Claims
One-Year Payback*

*Cone Shaped Spinning Solar Cells
Generate 20 Times More Electricity
Than Flat Photovoltaics*

*Solar3D Unveils 1st Working
Prototype, 250% More Efficient
than Control Solar Cell*

*An EV Charger that
Forms a Small
Household Microgrid?*





“IF I HAD ASKED PEOPLE
WHAT THEY WANTED,
THEY WOULD HAVE SAID:
FASTER HORSES...”

Henry Ford

Landmark Group of Builders, Edmonton



Habitat Studio, Edmonton



Avalon Master Builder, Calgary



The Minto Group, Ottawa



Reid's Heritage Homes, Guelph







Contact / More Info

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Twitter: @NZEhomes



Great info at both
of these sites!

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