

# Getting to Zero

Progress towards  
low-energy housing  
in Canada

**CanmetENERGY**

*Leadership in ecoInnovation*



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Ressources naturelles  
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**Canada**

# Questions I'll answer tonight:

1. Why is housing R&D important?
2. What is a Net-Zero home , and can you build one in Canada?
3. How do we define Net-Zero Energy Homes?
4. What barriers are keeping Net-Zero out of mainstream home production?
5. Should every home in Canada be Net-Zero?
6. What about homes that are already standing?
7. So what?





# #1: Why is housing R&D important?



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**12 million Canadian homes**

150,000 new homes are built every year



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**\$37B/year**  
New homes



**\$56B/year**  
Renovation



**\$26B/year**  
Utility bills

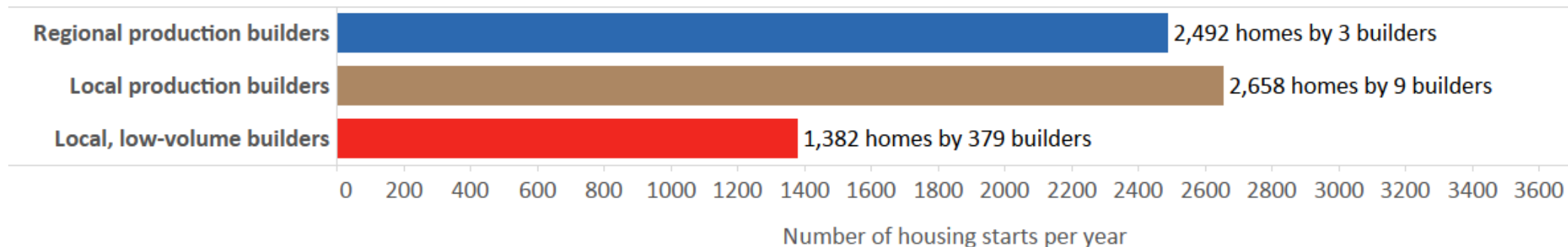


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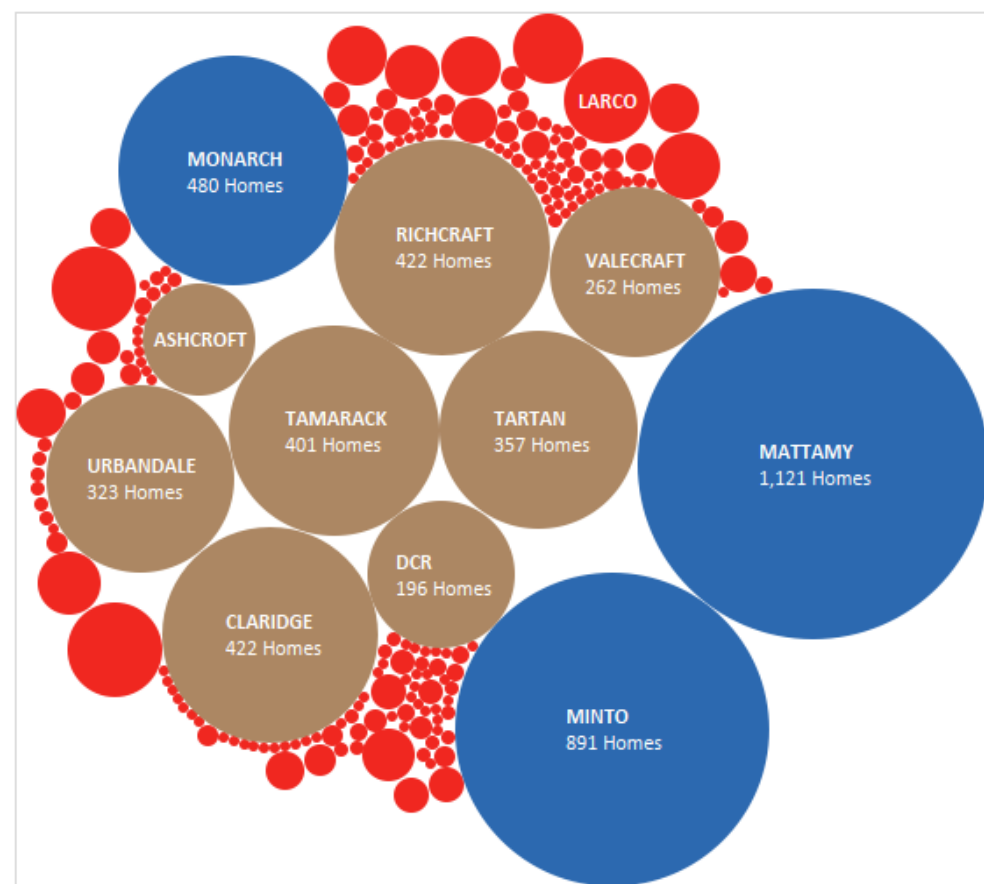
Ottawa-area housing starts since 2011



**The housing industry is too fragmented to do R&D.**

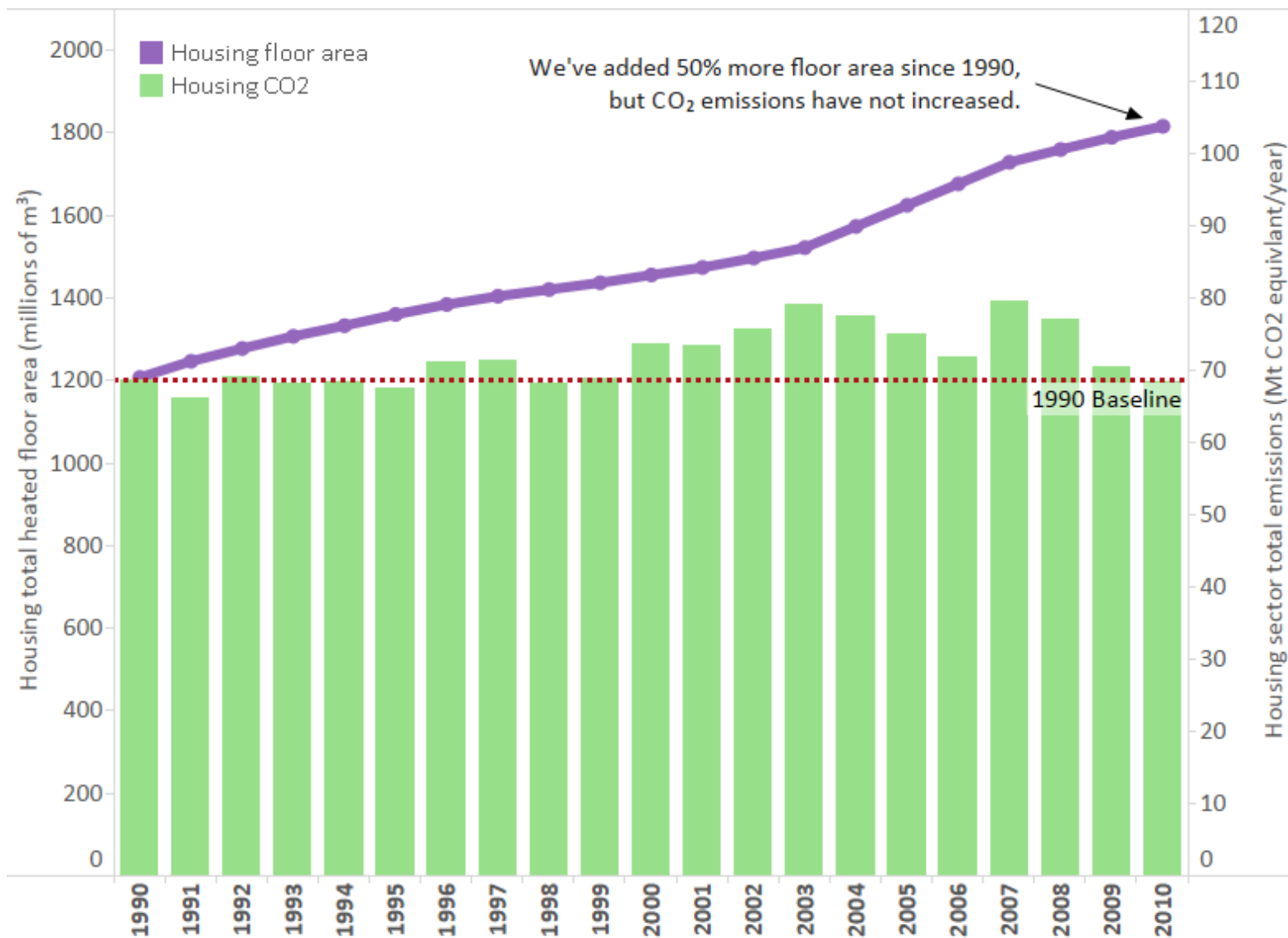
We spend \$37B on new housing every year, but that money is split a lot of ways. Ottawa alone has nearly 400 home builders.

(data from <http://data.ottawa.ca/en/>)



Each dot represents a home building company. The size of the dots correspond to the number of homes they have built since 2011.





We've added 50% more floor area since 1990

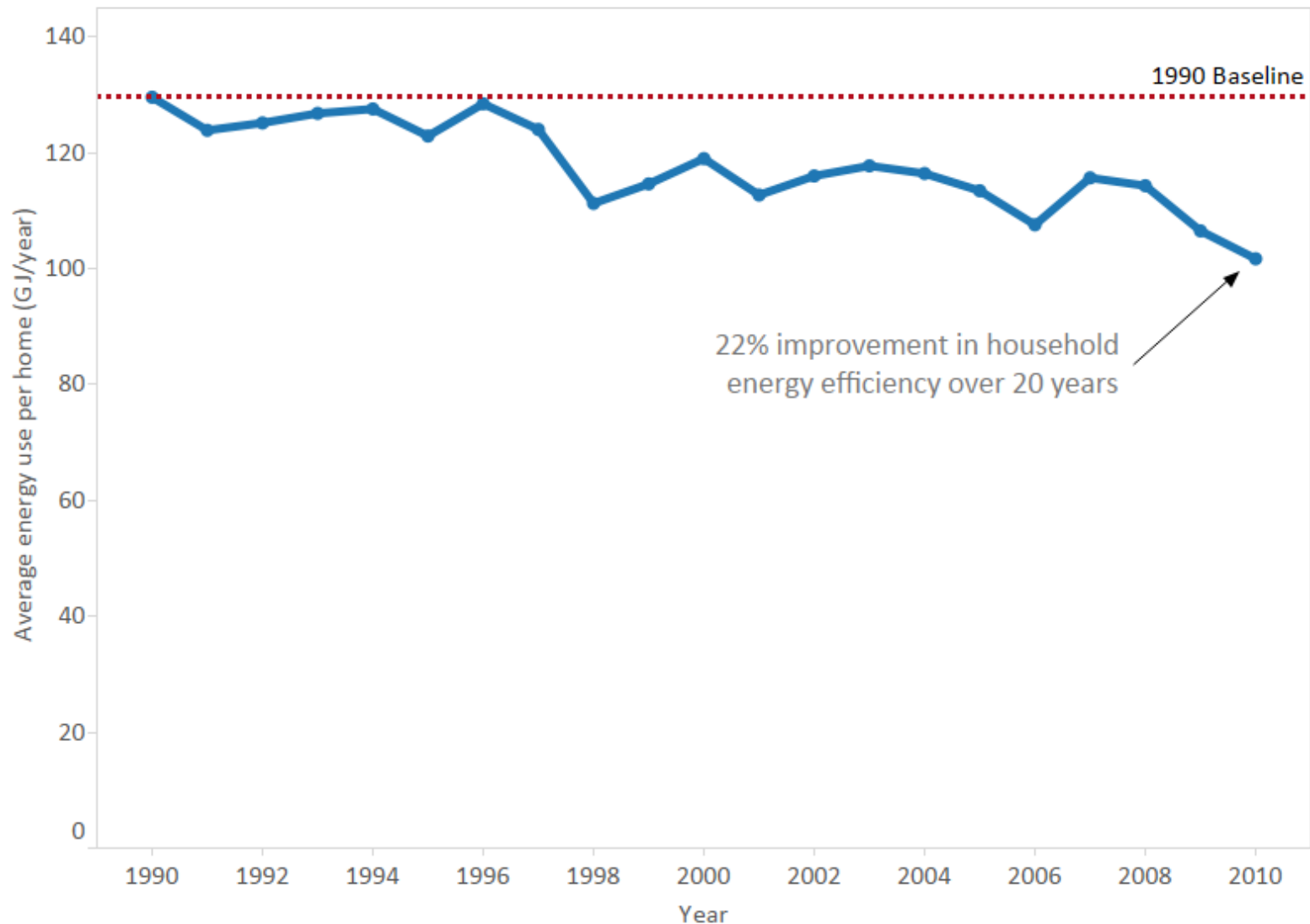


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Average Household Energy Use: 1990-2010



**Canadian housing is  
more efficient than ever before**



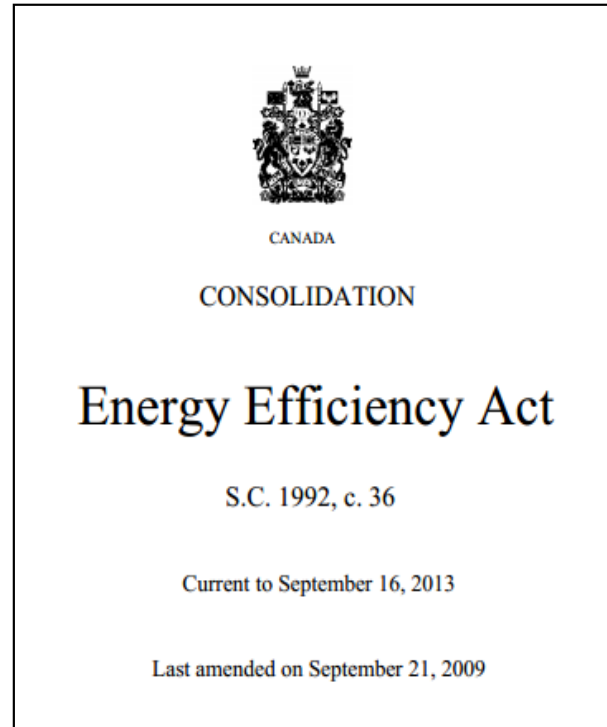
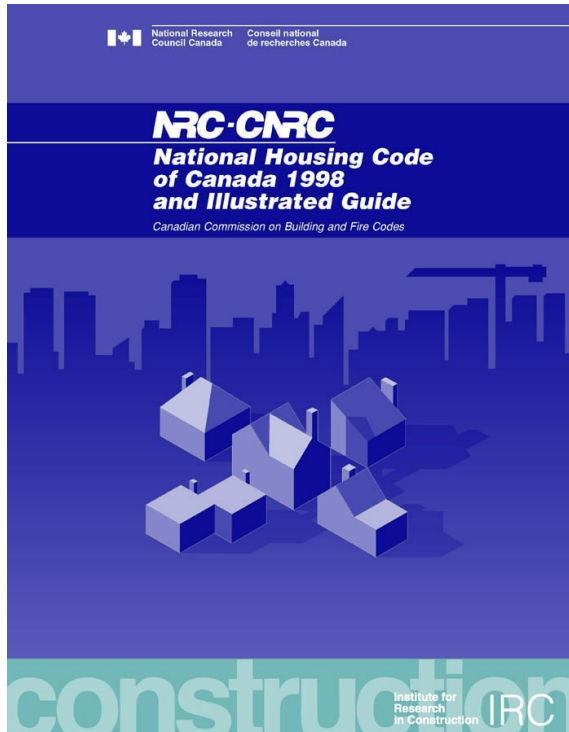
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# These improvements stem from 30 years of legislation, regulations and programs

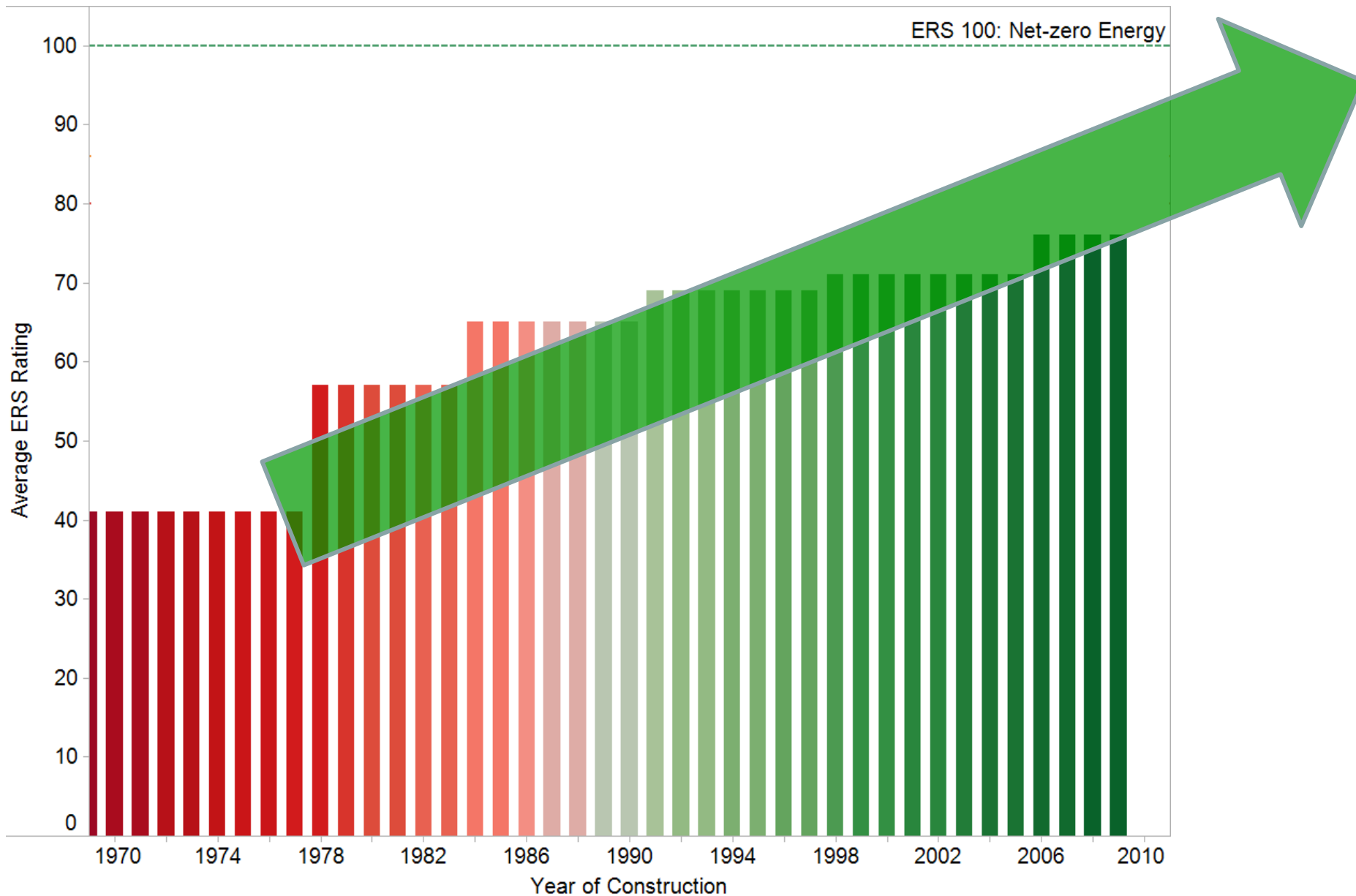


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# Progressive changes to the building code





# Potential unintended consequences of regulation



- prove too expensive or risky to adopt



- prohibit traditional building methods



- conflict with other regulations



- introduce health and durability risks



Our building codes will not move forward,  
**unless industry has clear, pragmatic  
solutions to achieve those objectives**



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# Canadian R&D partners create the solutions industry needs



University  
research



Government  
labs



Leading-edge  
homebuilders  
& CHBA



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## **#2: What is a Net-Zero Energy Home?** **Conservation + Generation**

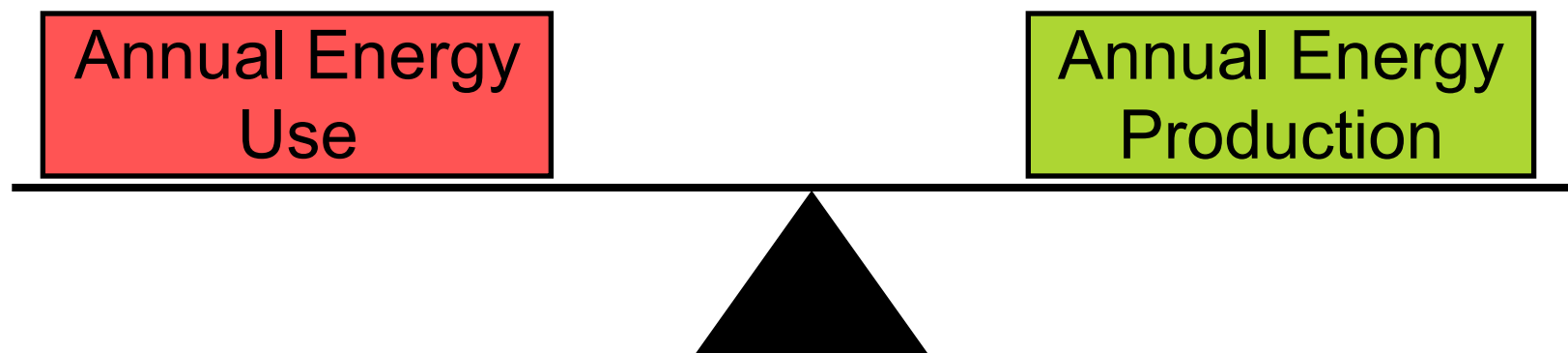


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# Why not build zero-energy homes?



The mismatch between solar resource and load makes zero-energy homes much less practical in Canada.







# Can you build net-zero in Canada?



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## Equilibrium Homes



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Events Calendar



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## EQuilibrium™ Sustainable Housing Demonstration Initiative

EQuilibrium™ is a national Sustainable Housing Demonstration initiative, led by CMHC, that brings the private and public sectors together to develop homes that combine resource and energy-efficient technologies with renewable energy technologies in order to reduce their environmental impact.

[Learn more about the CMHC EQuilibrium™ Housing Initiative](#)



## The EQuilibrium™ Housing Demonstration Projects

▶ [Abondance le Soleil](#)

Montreal, Quebec

▶ [ÉcoTerra™](#)

Eastman, Quebec

▶ [Avalon Discovery 3](#)

Red Deer, Alberta

▶ [EchoHaven](#)

Calgary, Alberta

▶ [Riverdale NetZero Project](#)

Edmonton, Alberta

▶ [The Laebon CHES Project](#)

Red Deer, Alberta

▶ [Urban Ecology](#)

Winnipeg, Manitoba

▶ [Harmony House](#)

Burnaby, British Columbia

## ▶ EQuilibrium™ Housing Virtual Tours

- [Inspiration — The Minto ecohome](#)
- [The Laebon CHES Project](#)
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# EQuilibrium:

- **Innovative**
- **Efficient**
- **Comfortable**



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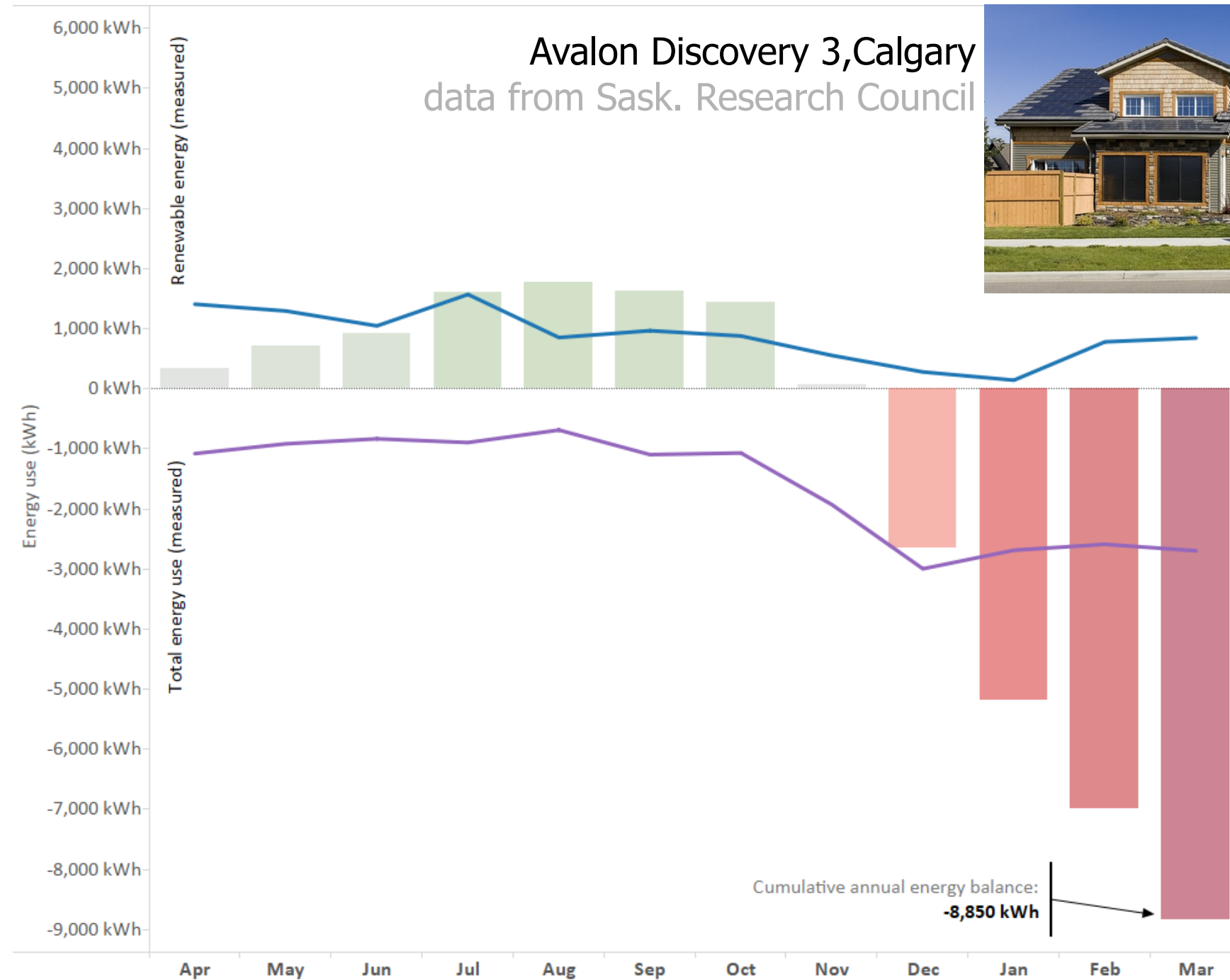
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# Avalon Discovery 3, Calgary

data from Sask. Research Council



70 % less  
than code!



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**Issue #1:**  
**Electric**  
**Load reductions**  
**are too optimistic**

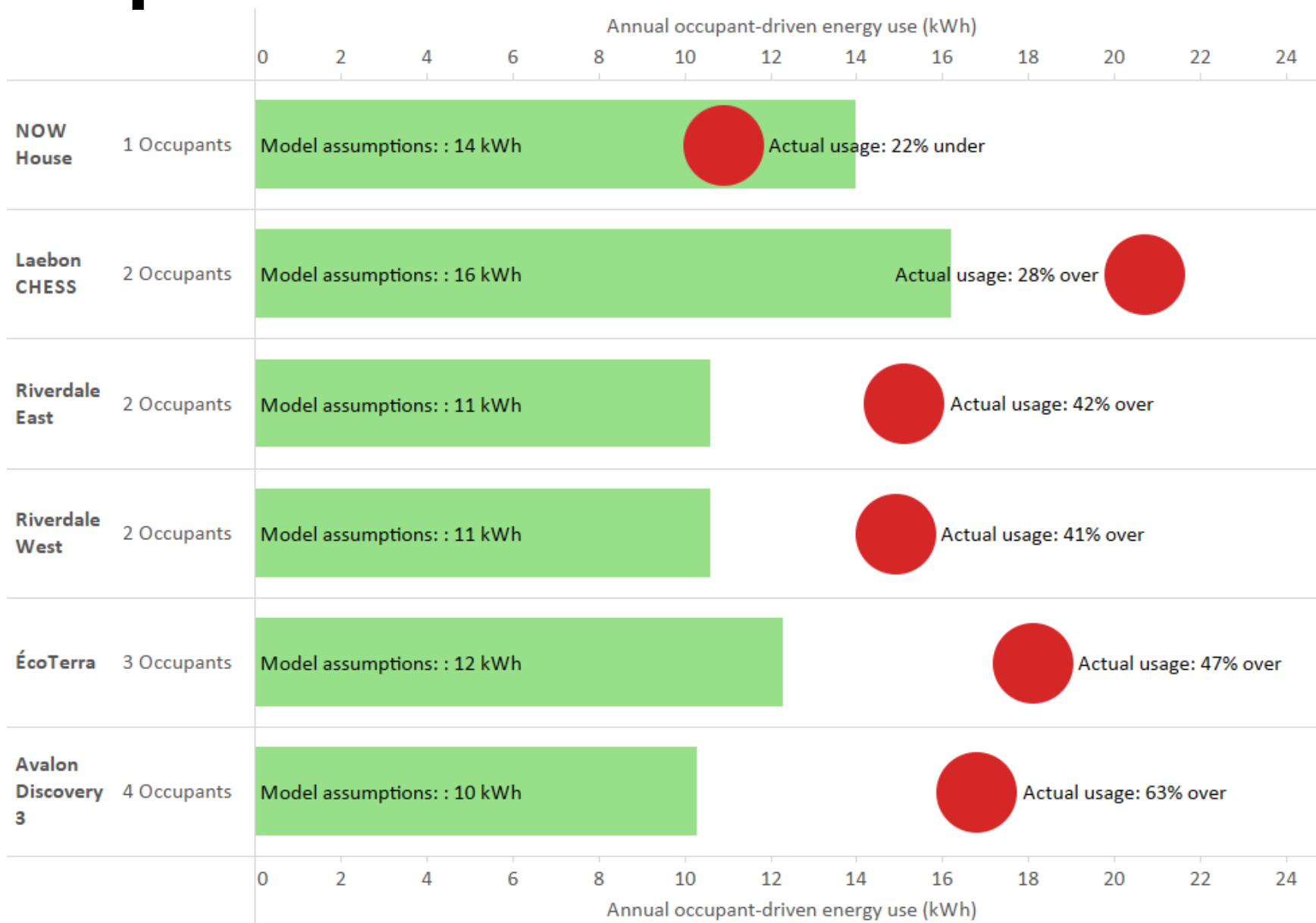


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# Expected vs. Actual use



# **Issue #2:** **Solar-thermal** **under-performed**



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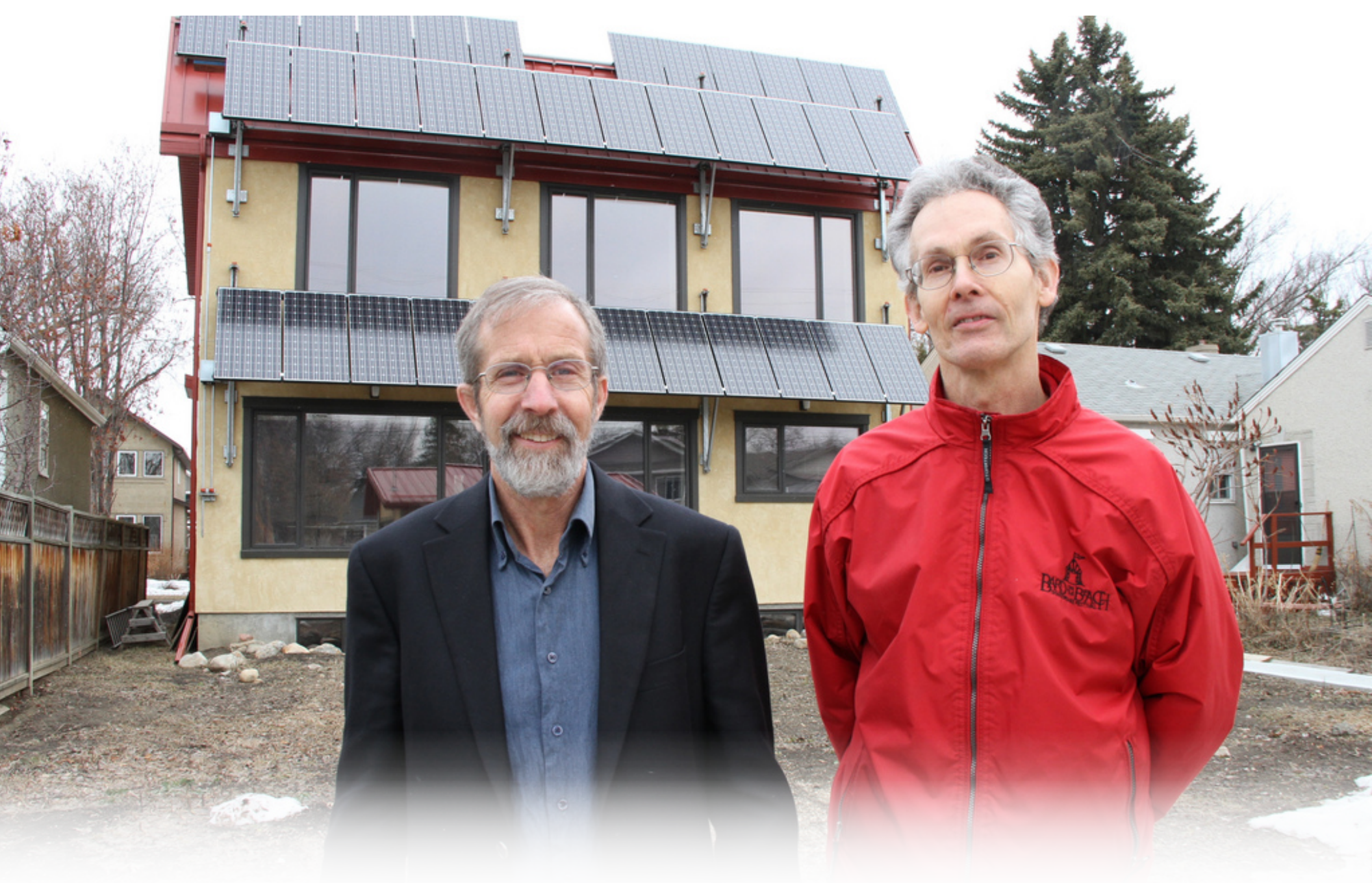
## Avalon Discovery 3, Calgary



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# There is at least one NZEH in Canada



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# #3 How do we define Net Zero?

*zeph·yr* \ˈzef-ər\ *n* [M] : a breeze from the west **b** : a gentle breeze **2** : any of various weight fabrics and articles of clothing

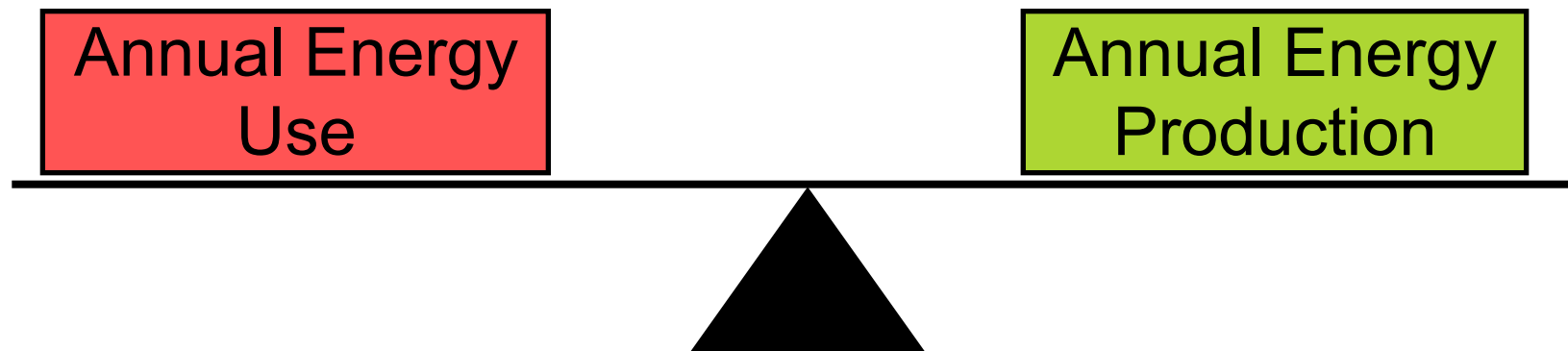
*Zeph·y·rus* \ˈzef-ə-rəs\ *n* [L] : the Greek god of the west wind

*zep·pe·lin* \ˈzep-(ə-)lən\ *n* [Count Ferdinand von Zeppelin] : a rigid airship consisting of a cylindrical trussed and covered framework supported by internal gas cells; *broadly* : AIRSHIP

<sup>1</sup>*ze·ro* \ˈzē-(,)rō, ˈzi(ə)r-(,)ō\ *n, pl zeros also zeroes* [F or It; F *zéro*, fr. ML *zephirum*, fr. Ar *ṣifr*] (1604) **1 a** : the arithmetic symbol 0 or Ø denoting the absence of all magnitude or quantity **TIVE IDENTITY**; *specif* : the number between the set of all negative numbers and the set of all positive numbers **c** : a value of an independent variable that makes a function equal to zero < +2 and -2 are







**Annual purchased energy** = **Annual exported energy**



# **Definitions**

**Net-Zero Energy**  
**Carbon**  
**Electricity**  
**Lifestyle**



See <http://task40.iea-shc.org/>

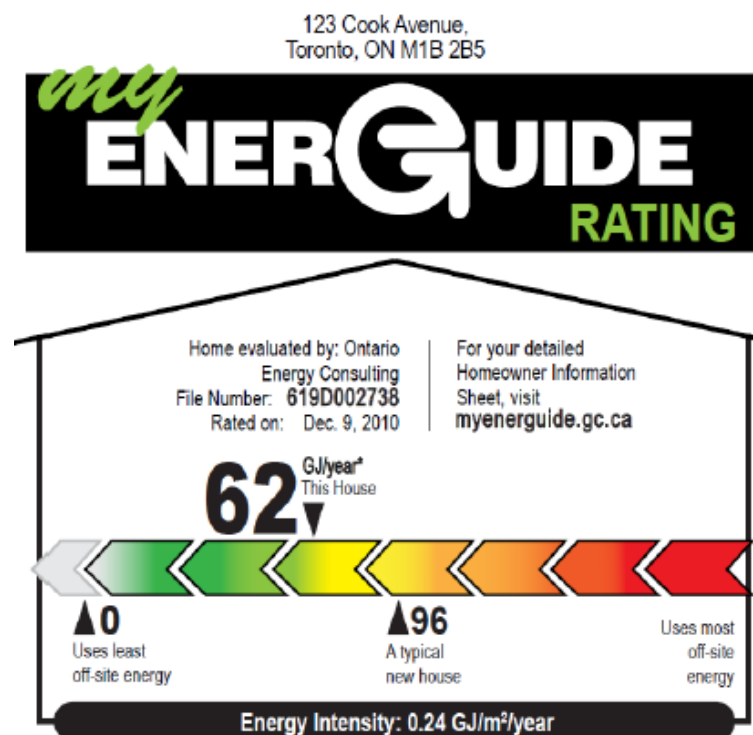
**Primary, or site?**

**As designed, As built, As operated?**



# When will NRCan recognize a Net-Zero Home?

**Build a R-2000 home... that also uses zero energy.**



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