

---

**ADOPTING ENERGUIDE 80 AS A CODE  
COMPLIANCE REQUIREMENT FOR  
NEW HOMES**

---

Prepared for:

**Canadian Home Builders' Association**

By:

**Don Buchan  
Buchan, Lawton, Parent Ltd.**

**June 2007**

## **Adopting EnerGuide 80 as a Code Compliance Requirement for New Homes**

### **Executive Summary**

The EnerGuide for New Houses (EGNH) program has been proposed in a number of jurisdictions in Canada as a regulatory means of evaluating the energy efficiency of new homes. Specifically, an EnerGuide 80 rating is being proposed as a mandatory energy performance requirement.

Application of a specific performance requirement, based on an EGNH evaluation has serious negative implications.

- The development and updating of the EGNH rating system is not backed by a consensus process normally associated with the development and updating of standards.
- EGNH ratings are calculated using software that is continually being revised. A house may at one point meet the EGNH 80 level, but later fail, due to software changes and updates.
- EGNH ratings do not represent the actual energy performance of a building in a number of areas.
- Builder decisions could be seriously skewed by credits given for certain design decisions irrespective of the long term implications of those decisions.
- The EGNH scale is from 0 to 100, with all new homes falling within a very small part of the scale. The rating given homes with significantly different actual energy performance could be misinterpreted by home buyers as being very close in performance.
- Mandating energy performance level at EnerGuide 80 may have a negative impact on innovation in building design and construction.

## **Background**

The EnerGuide for Houses (EGH) program was developed by Natural Resources Canada (NRCan) as a tool for the comparative evaluation of the energy consumption of homes in Canada. Based on the EGH program, NRCan subsequently developed an evaluation process aimed specifically at new houses called the EnerGuide for New Houses (EGNH) program.

An EnerGuide 80 rating for a home has become accepted in some areas in Canada as an achievable energy performance target defining how a new home should perform under various labeling programs.

The EnerGuide 80 rating is compared to meeting the energy efficiency target of the R-2000 Standard. A home with an EnerGuide 80 rating, however, does not necessarily meet the indoor air quality or environment criteria required of a home labeled as R-2000, which takes a more rigorous 'house-as-a-system' approach.

Recently a number of provinces have announced an intention to use EnerGuide 80 as a regulatory instrument.

## **Purpose**

This discussion paper does not address all of the specific technical issues related to the EnerGuide rating system. It is intended to examine several major concerns related to the application of EGNH ratings as a building code compliance instrument.

The development of a specific EGNH rating for a particular home requires the application of very sophisticated computer modeling techniques. As with any computer modeling technique, outputs are entirely reliant on the assumptions built into the computer model. EGNH ratings are based on using NRCan's HOT2000 modeling software.

## **Absence of Consensus Process**

As was noted above, the EGNH program was developed by NRCan and EGNH ratings are based on using NRCan's HOT2000 modeling software. There is no other method for determining compliance with a specific EGNH rating requirement other than the use of HOT2000.

The National Building Code of Canada (NBCC), which is adopted by legislation in some the provinces and is the basis for the legislated provincial building codes in others, is developed through a consensus process with wide industry, government and public representation. Standards referenced in the NBCC are subjected to the same rigorous consensus process.

The HOT2000 program is owned, controlled and updated by NRCan. Changes to the HOT2000 program are not subject to the normal consensus process to which national standards are subjected. Changes are made, on an ongoing basis, by NRCan staff.

Very minor adjustments in the HOT2000 calculation methods and technical assumptions can have significant effects on the calculated energy consumption of a home, and hence the EGNH rating produced for that home.

Essentially, the energy design requirements for homes could be altered at any time, without oversight or consultation with the affected parties.

### **Variables That Affect an EGNH Rating**

While there are a number of modeling anomalies associated with the production of EGNH ratings, the concern with the way EGNH ratings are determined can be broken into two broad categories:

- Those that misrepresent the way buildings actually perform, and
- Those that skew design decisions in an inappropriate manner.

EGNH ratings misrepresent the actual performance of a building in a number of ways.

With respect to building size and form, the way electric loads, hot water usage and occupancy factors are applied, favours smaller homes and multi-unit buildings.

Infiltration and ventilation rates are viewed in a way that can misrepresent the actual effect of using an HRV, favouring HRVs over other ventilation strategies.

The skewing of the decision-making process can lead to the design and construction of buildings that may not be in the best interest of home buyers or the environment in general.

Builder decisions can be seriously skewed by credits given to certain design decisions irrespective of the long term implications of those decisions. No distinction is made between systems and components built into homes that may have significant variations in longevity. It is clear that once a home is constructed, some design components are essentially there for the life of the building, while others have significantly shorter life expectancies. The ease and economic viability of future energy upgrades is affected by this factor.

If one was to list different building components and systems, from highest to lowest, in order of the likelihood they will have energy-related upgrades, the list might include:

- Heating and ventilation systems
- Attic insulation
- Basement wall insulation
- Windows and doors
- Cathedral ceiling insulation
- Above grade wall construction (insulation levels and air sealing)

When EGNH ratings are calculated, they are done without consideration of these factors.

A prime example of the concern in this area would be the specification of a ground source heat pump for heating. An EGNH rating of 80 is achievable using a ground source heat pump in a home with virtually no insulation, poor air sealing and substandard windows.

The building resulting from this approach would be considered highly sub-standard in all respects except for its EGNH rating. It may meet the energy target that is desired, at the expense of producing a home without comfort, durability, indoor air quality standards and long term energy performance.

### **Average Versus Specific Compliance**

The EnerGuide rating system assumes that an “average” family will be living in the home. Actual energy performance could be expected to vary if the family is not average in both size and behaviour.

Builders must be extremely careful in providing specific energy performance predictions where issues beyond the control of the builder can dramatically effect the actual energy performance of the home.

An EGNH rating is based on the characteristics of a particular building. This includes not only the specific model of home the builder may offer, but

variable factors such as orientation and exposure of the particular home. The exact same model of a home, built on opposite sides of the street, with different solar exposures and shading factors, can have significantly different EGNH ratings.

A specific homebuyer does not expect to buy an “average” home, but rather the specific home, with all of the unique characteristics of that particular home.

### **Market Confusion**

The EGNH scale is from 0 to 100, with a 0 rating representing a very inefficient home and 100 representing a home with essentially no net energy consumption. The scale is intended to be independent of home size and geographic location so that homes with the same rating could have very different energy bills depending on how large they are and where they are located.

With respect to new homes, the “working part” of the scale is very small. A typical new home built in compliance with current code requirements is likely to have an EGNH rating of approximately 70. An EGNH rating of 80 is compared to the a home meeting the minimum energy efficiency portion of the R-2000 Standard.

It is unlikely that a homebuyer will understand the difference between a 70 and 80 rating on a home. A change from a rating of 80 to a rating of 70 could represent a 100 percent increase in space heating and domestic water heating consumption. The energy consumption change is dramatic, without the change in the EGNH rating appearing to be that significant.

### **Innovation**

Setting a mandatory energy performance level at EGNH 80 may well have a negative impact on innovation in building design and construction, as builders and designers manipulate simulation inputs to meet that artificial target in the most cost effective way possible. Innovations, not anticipated by the HOT2000 program, and not properly dealt with in the simulation process will be ignored or discounted because they will not affect the EGNH rating obtained.

## **Conclusion**

Currently the EnerGuide for New Houses ratings system fails to meet the principles that underpin the disciplined approach of Canada's codes and standards system. These principles include:

- Rigorous scientific assessment and peer review,
- Full consultation with affected parties
- Cost benefit analysis, and
- Consensus based decision making.