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**AN ASSESSMENT OF ENERGUIDE AS  
A REQUIREMENT FOR  
NEW HOMES**

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Prepared for:

**Canadian Home Builders' Association**

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## **Executive Summary**

A number of jurisdictions in Canada have proposed using the EnerGuide for New Houses (EGNH) rating system to regulate new home construction.

The use of the EGNH rating system in this way is seriously flawed, and is likely to have unintended negative consequences.

- The development and updating of the EGNH rating system does not involve the type of transparent, consensus-based process that governs development and updating of Codes and Standards in Canada.
- EGNH ratings are calculated using software that is continually being revised. A house that attains a specific EGNH level at one point, may later fail to achieve this level due to software changes and updates.
- EGNH ratings do not represent the actual energy performance of a building in a number of areas.
- Builder and customer decisions could be seriously skewed by credits given for certain design decisions irrespective of the long term implications of those decisions.
- Within the 100-point EGNH scale virtually all new homes fall in a very small range, seriously under-communicating the performance differences between newly built houses. This can lead consumers to conclude that a very energy efficient home is only slightly different than a relatively inefficient home.
- Mandating a specific energy performance level using EGNH may have a negative impact on innovation in building design and construction.
- Because of on-site testing and other EGNH requirements, if EGNH is used to regulate new home construction, it will create increased liability for new home builders, EGNH evaluators and municipal and provincial regulators.

## **Background**

The EnerGuide for Houses (EGH) program was developed by Natural Resources Canada (NRCan) as a tool to evaluate the energy efficiency of **existing** homes in Canada.

Based on the EGH program, NRCan subsequently developed an evaluation process aimed specifically at **new** houses called EnerGuide for New Houses (EGNH).

A number of industry-supported, voluntary new home labeling programs, such as Built Green™ and EnergyStar™, use EGNH ratings as a tool to quantify energy performance. However, the EGNH rating is only one component of these programs.

As technology and building practices have continued to improve, the energy efficiency achieved by builders participating in these programs has trended upwards. Both Built Green™ and EnergyStar™ will soon encompass homes with an EGNH rating of 80, the current minimum energy efficiency requirement of the R-2000 Standard. Moreover, these programs also include additional requirements that address both environmental and occupant health and comfort.

It is important to note that a home that achieves an EGNH rating of 80 does not necessarily meet the indoor air quality or environmental criteria required of the R-2000 Standard, which takes a more rigorous 'house-as-a-system' approach.

Recently, a number of provinces have announced an intention to use EnerGuide for New Houses as a regulatory instrument, citing an EGNH rating of 80 as a proposed regulatory requirement.

This discussion paper does not address all of the specific technical issues related to the EGNH rating system. However, it examines 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 NRCan's HOT2000 modeling software.

## **Absence of Consensus Process**

As was noted, the EGNH rating system was developed by NRCan and it is based on NRCan's HOT2000 modeling software. There is no other method for determining an EGNH rating other than by using HOT2000.

Both the EGNH rating system and HOT2000 are owned, and maintained, by NRCan. Changes to the rating system, the on-site testing procedures or the underlying software can be made by NRCan at any time, without consultation or oversight from outside parties. So long as EGNH was simply a component within other industry-led labeling programs, this has not been a major concern.

However, should EGNH-ratings become an element in provincial Building Codes, significant issues arise.

The National Building Code of Canada (NBCC), which is adopted by legislation in some 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.

No similar process exists in relation to EGNH, so Code adoption or reference of EGNH ratings would represent a radical departure from established Canadian practice.

As noted, the HOT2000 program is owned and controlled by NRCan. Changes to the HOT2000 program are not subject to an open, transparent or accountable consensus process. Changes to HOT2000 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**

There are a number of modeling anomalies associated with the production of EGNH ratings that can skew design decisions in an inappropriate manner.

This can lead to the selection of materials and equipment that may not be in the best interest of home buyers or the environment in general.

For instance, if a ground-source heat pump is used, an EGNH rating of 80 is achievable in a home with virtually no insulation, poor air sealing and substandard windows.

Such a home would be far below current industry practice in all respects except for its EGNH rating. It may meet the EGNH energy target, but at the expense of comfort, durability, indoor air quality 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 either size or lifestyle.

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

The EGNH rating is based on the characteristics of a particular building. This includes not only the specific model of home the builder may offer. It also includes variable site-specific factors such as orientation and exposure of the particular home and variable customer-choice factors such as siding and roof colours. The exact same model of a home, built on opposite sides of the street, with different solar exposures and other factors, can have significantly different EGNH ratings.

To obtain economies of scale, tract builders would have to design for the worst case for these variable factors. For the minimum rating for any house in a subdivision to be 80, the average rating would be higher and the additional costs would have to be borne by the homeowners.

### **Market Confusion**

The EGNH scale is logarithmic and runs from 0 to 100, with a 0 rating representing a very inefficient home and 100 representing a home with essentially no net purchased energy consumption.

The scale is intended to be independent of home size and geographic location, hence 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 rating scale is very narrow. 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 meets the minimum energy efficiency portion of the R-2000 Standard. Many R-2000 homes being built today achieve a rating of 85 or higher.

The nature of the rating scale is logarithmic, and therefore seriously under-represents comparative energy performance within this rating range.

For instance, consumers comparing a new home with an EGNH rating of 67 and one with an EGNH rating of 80 might reasonably assume that this represents only about a 13% difference in performance. In fact, the home with the lower rating would consume approximately 100% more energy.

At the upper range of currently built houses, a new home achieving an EGNH rating of 86 will appear to consumers to be about 6% “better” than a home rated at EGNH 80. In this case, the more efficient home will use only 50% as much energy.

When used outside of an effective new home labeling program such as Built Green™ or EnergyStar™, EGNH ratings have the perverse effect of seriously underselling the value of energy efficient homes.

## **Innovation**

Setting a mandatory energy performance level using the EGNH rating system may well have a negative impact on innovation in building design and construction, as builders and designers manipulate the 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.

## **Liability**

The EGNH rating procedures require that a worst-case spillage test be done in homes that contain appliances that are susceptible to spilling combustion products. This test differs from that specified in current Building Code requirements. This will create conflicts, and potentially significant liability, that the builder will not be able to resolve.

Should the Authority Having Jurisdiction accept the label provided by an EGNH Evaluator as evidence of compliance, rather than conducting the Code-specified tests, considerable additional liability will accrue to the builder, evaluator and regulator.

The EGNH Guidelines allow the rating of a house with a "severe condition" (such as appliances which spill combustion products) as long as the concern or "severe condition" is specified with a warning on the EGNH label, and is included in the homeowner's report.

There is no requirement that the condition, which could have serious health consequences, be corrected prior to occupancy – only that the homebuyer be advised that the potential problem exists. This would create undefined liabilities for the builder, evaluator and regulator.

## **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.