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TAKING THE MYSTERY OUT OF GREEN RENOVATIONS

BY ROY NANDRAM

"Green" has been a buzzword over the last few decades. We are bombarded with reality TV shows, websites, magazines and product descriptions that often give conflicting information about their green claims.

For builders, sorting through these conflicting claims can be challenging. For home owners, it's worse. It can be both confusing and discouraging.

What's more, we are faced with green words and phrases that further compound this problem – words such as environmentally friendly, no- or low-VOC, renewable, eco-this and eco-that, LEED® compliant, and sustainable.

Some of these terms are being misused. This is "greenwashing": where companies are promoting the perception of being environmentally friendly by making environmental claims that are misleading and inaccurate.

Consumers must understand what a product is actually offering.

Buildings, including homes, account for 30-40 per cent of total energy consumption (see http://www.economics.ualberta.ca/en/EventsandSeminars/EMEE2013/~/media/economics/EventsAndS/EMEE-2013/A3-Alberini-Gans-Towe.pdf). The energy consumption of homes is a major contributor of greenhouse gas emissions that are causing the environmental deterioration we are seeing today.

Green renovation is the integration of: comfort, energy efficiency and environmental responsibility.

Comfort – A home that offers an indoor climate which promotes good health, adequate daylight and views as well as thermal and acoustic comfort.

Energy – A home that minimizes the demand for energy through good building envelope design as well as reducing air leakage, space heating/cooling, electrical loads, and water usage (both hot and cold).

Environmental – A home which minimizes the negative impact on our land, air and water due to the way it is renovated and operated.

THE FIRST STEPS

When you are planning a major green renovation, start with an energy assessment (audit) of your home, which includes a blower door test. This will reveal the current EnerGuide rating of a home and include the air leakage rate. This report can help prioritize green renovations based on the most beneficial upgrades and the best payback for your budget.

We need to protect construction workers during the renovation process as well as everyone who will enjoy the home afterwards.

Renovations that involve demolition work of an older home require a mandatory designated substance report (DSR). This report may reveal any possible presence of mould, lead paint, asbestos and materials which have now been found to be detrimental to our health.

In addition to a DSR, a radon gas test should be performed. The cross-Canada survey of radon concentrations in homes found that 4.6% of homes in Ontario have high radon levels (http://www.hc-sc.gc.ca/ewh-semt/radiation/radon/survey-sondage-eng.php). Long-term exposure to radon can cause serious health concerns, such as lung cancer (http://www.cancer.gov/cancertopics/factsheet/Risk/radon).

DESIGN

Green renovations are complex because of your home's existing conditions, such as its construction type, orientation, age, possible heritage status, and whether it is occupied or vacant during the renovations. This is why it is simpler to design and build new green homes than it is to do green renovations to older homes.

BUILDING ENVELOPE

Conservation of energy and thermal comfort are the essence of improving your building envelope; the payback is also the greatest.

The most important way to significantly improve the energy efficiency of a home is to reduce air leakage. Air leakage represents 25-40% of heat lost from an older home (http://www.turnbackthetide.ca/at-home/house-envelope/sealing-air-leaks.shtml).

It is unlikely that your home will become air-tight unless one chooses a renovator who understands and has experience in green renovations.

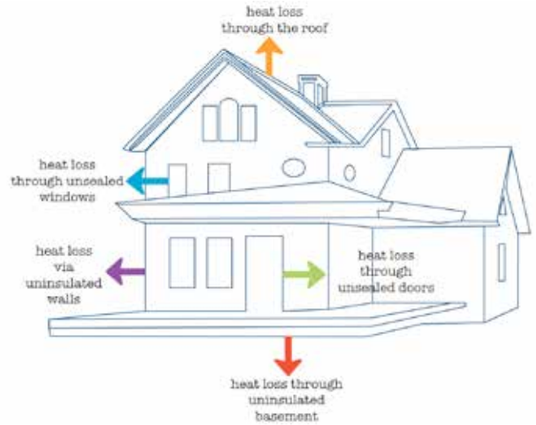

Illustration Credit: turnbackthetide.ca

Insulation in walls, exposed ceilings, and attics must be addressed in order to improve the R-value (measurement of thermal resistance) of your home.

In addition to the walls, replacement of windows and exterior doors may be essential in improving the energy performance of your home.

When replacing windows, it is important to have the right type of glazing for each façade depending on its solar orientation. The U-factor measures the thermal quality of a window, exterior door or skylight. The U-factor is the inverse of the R-value, i.e., the lower the U-value, the more energy-efficient the window, door or skylight.

HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

Now that your home is air-tight, there may be a need to address mechanical ventilation. The best way to do this is to install an HRV (Heat Recovery Ventilator) or better yet, an ERV (Energy heat Recovery Ventilator); the latter helps maintain a balanced humidity level in the home, resulting in better indoor air quality.

Once heat loss has been addressed, the HVAC equipment may

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be adequate; although they will be oversized. Depending on its age, fuel, type, etc., the existing HVAC system may have to be replaced to achieve substantial energy savings and efficiency. The ideal situation is to heat and cool as efficiently as possible. The choice of heating system will depend on the available fuel types in your area and their cost.

The choice of HVAC systems and combination of the components can be overwhelming. However, this provides an opportunity to choose and size the components to suit the demand of your more efficient home (after improving its building envelope).

If improving the building envelope is not possible, a suggestion is to look at a geothermal system which provides heating, cooling and hot water preheat with a minimal impact on the environment.

It is also important to note that HVAC equipment can be rented on a monthly basis. The energy savings of a new, more efficient unit can help offset its rental cost and the cost savings can then be used towards other energy efficiency measures.

BUILDING MATERIALS

The extracting, manufacturing, processing and delivery of products to your home all have a major impact on energy use.

Recycle and repurpose materials as much as possible from the demolition process. Wherever possible, donate reusable materials to foundations/charities, because this will divert them from landfills.

Also, choose building materials with a high recycle content. Choose locally produced material/products (LEED® recommends materials that are produced and transported by truck within a 500 mile radius of your home).

Choose materials/products that will not add Volatile Organic Compounds (VOCs) to your home's interior air. Opt for wood products from sustainable forests – for example, Forest Stewardship Council (FSC).

DURABILITY

It is essential to choose materials that will minimize waste over your home's lifespan. A lot of energy is required to replace short-lived building materials.

Consider a product's lifespan. For example, don't buy the cheapest asphalt shingles for your roof, because they will need to be replaced sooner, therefore doubling your waste and costing you more in the long run.

Avoid trendy finishes which can become outdated. They might make you want to replace them before their actual lifespan ends.

WATER USE

The easiest and least expensive method of saving energy, the environment and your money is to conserve water. Water supply and sewer facilities account for more than 30-35 per cent of municipal energy use in most communities (http://thegreenists.com/going-green/why-its-important-to-conserve-water/316).

Conservation of water isn't only saving the resource itself. When potable water is being wasted, all the energy that goes into processing and delivery to your home is being wasted as well. Therefore, minimizing hot water consumption not only saves processing and delivery costs, but also the energy required to heat it.

There are also many ways to reduce water consumption through simple upgrades. Installing low-flow shower heads and faucets as well as replacing toilets with dual-flush units can provide significant cost savings. Another great water-saving strategy is to install a rain barrel for watering your garden in the summer.

FUTURE-PROOFING

Electric vehicles are here to stay. Make provisions for charging outlets inside garages and/or on the exterior of homes. Solar-ready conduits should be installed from the mechanical/electrical room to the attic in preparation for the possible future installation of solar panels.

Design your renovation so you may be able to "age in place". Add provisions for a future elevator, ramps, stair lift, accessible bathrooms, wider doors, hallways, etc. This will avoid unnecessary additional renovations to accommodate these accessibility features in the future.

HOME OPERATIONS

Now that all the major green renovations have been addressed, it is more important than ever that the HVAC system is operating as designed.

These are a few small changes that, once implemented, will go a long way in helping not only with cost savings, but also the environment:

- Install a programmable thermostat
- Reduce peak energy demand http://www.ontarioenergyboard.ca/OEB/Consumers
- Maintain the HVAC for peak performance and change filters regularly
- Upgrade to energy efficient appliances (such as Energy Star®) for kitchen and laundry
- Purchase your electric power from a green energy provider such as Bullfrog Power
- Install low wattage bulbs (including LED) and dimmers.

FINAL WORDS

Green home renovations can substantially minimize or even eliminate negative environmental impacts through good design, construction and operation of your home.

The added benefits of green renovations are reduction in energy and water bills and increased home marketability, as well as improved indoor thermal comfort and air quality.

All these principles also apply if you are just renovating a basement, kitchen or bathroom. Take the opportunity to upgrade your windows and insulation before installing those beautiful finishes.

The ecoEnergy retrofit grants (max $10K) were terminated in 2012 by the federal and provincial governments. It is time to write to your MP/MPP to reinstate these grants. We need their reintroduction to energize green renovations and start making a positive impact on the environment.

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