

# Big Ideas. Smaller Houses.

Why Build a Smaller Home?

There are three powerful arguments for building a smaller home:

1. To unlock funds to increase the energy efficiency of the home, thus reducing carrying costs and better withstanding fluctuations in energy costs and supply.
2. To attract future buyers should you wish to resell the home.
3. To reduce the imprint on the environment.

In the following pages, you'll learn about the details of each of these benefits.

Census bureau data in the US reports that in 1975 the average square footage of a single family home was 1,645 square feet. In 1998, that average was up to 2,190 square feet – a 33% increase. In Canada, the average d

welling was 1,100 square feet in 1975. Today it's 2,125 square feet according to Home Builders Association data.

## **1. Unlocking Funds for Energy Efficiency**

The construction of a home (any home) must conform to Provincial Building Codes and local requirements. Nominal requirements for a building differ from region to region on various points relating to climate zone, snow

loads and other factors. The code also specifies nominal structural and insulating requirements.

The Ontario building code, for example, is a good code and much diligence has been invested to achieve the proper balance of performance and affordability. Still, it is minimum code dealing with health and safety and does not incorporate higher-performance sub system options that have a major impact on GHGs, heating efficiency, energy requirements, air quality, or even space utilization.

To illustrate how the nominal building code stacks up from a performance perspective, consider the following data.

The carrying costs of a home built to different construction standards.

For our study, we used a standard 1,500 square foot bungalow, designed and built to 5 different standards.

**Heating & Cooling Costs, 1500 square foot bungalow**  
**Zone: Ottawa Valley. Ambient temperature 72 degrees.**

Construction/Code Standard	Cost/Yr	Reduction	Savings/Yr	Delta (%)	Delta(\$)
Pre-World War 2 Standards	4,525	-	-	-	-
Pre-Opec, early 70's	3,623	20%	902	-	-
Ontario Building Code, current-	3,036	33%	1,489	-	-
ENERGY STAR Standard	2,110	53%	2,416	31%	926
R2000 Standard	1,292	71%	3,233	57%	1,744
Envirohome Standard, nominal	1,098	76%	3,427	64%	1,938

The table clearly shows that while construction to today's nominal code will provide for significant savings vis-à-vis older standards, the savings pale in comparison to the optional standards available for today's new home construction (such as R2000, ENERGY STAR and the Envirohome standard). Building a home to one of these new standards will significantly reduce the home's energy carrying costs. And, the longer the owners live in the home, the more money they will save.

**So ... What's the Catch?**

Perhaps at this point you are thinking that this is all too good to be true. After all, if homeowners could unlock such savings, why isn't everyone building ENERGY STAR standard or better? For many homeowners, the upfront cost associated with building a better house is the sole consideration. Long-term value is often set aside so that the new home can be better appointed. But, as Paragon Homes has experienced across numerous "smart" residential projects, by reducing a home's footprint by just 15% and better using the space that is built, that gap is easily closed.

There is certainly a cost associated with building a better house. For example, enviro materials are more expensive than conventional materials, and the additional labour associated with building to ENERGY STAR, R2000 and Envirohome standards is greater than what is required for conventional building code construction.

As a rule of thumb, any investment in environmental or energy efficient solutions will require three to five years to payback. The question is then, "How do I fund the ante costs associated with this type of construction?"

The answer lies in building a smaller house – but not much smaller. By building smaller, you can unlock funds to finance the additional cost of energy efficient construction, securing both

shortterm and long-term affordability for your new home. Using the rule of thumb that an average home will cost 150.00 per square foot of finished space, then every 100 square feet of space that you reduce can potentially unlock \$15,000 towards building a better home.

At Paragon Homes, we have witnessed that, in most home designs, a 15% reduction in space is possible without creating discomfort. Consider that today's average house size is 2,125 square feet; reducing that by 15% is equivalent to reducing the size of the home down to about 1,800 square feet. Through proper design and space planning, an 1800 square foot provides more than adequate space for a growing family.

### **What Are My Other Options?**

If you've already committed to a smaller footprint but the numbers still don't work within your budget, there are still ways of unlocking funds. The answer lies below ground.

In Canada, most basements are an integral part of the building structure, yet most go unused. This is the by-product of pouring a foundation wall and slab system that is below the frost line to accommodate our cold climates – and these basements tend to be cold, dark, and musty. Depending on the type of house style built, such basements are typically sized at 1/3 to 1/2 of the square footage that is above ground. Thus, up to 50% of the structural floor area of the house that is paid for goes unused. Yet, that space must still be heated, cooled, and maintained.

Through better space planning and construction methods, basement areas can be designed to be fully functional, as comfortable as main-floor living areas, and filled with natural light. All this can be done at a fraction of the cost associated with adding a second floor to a house. This is possible thanks to the advent of new materials and systems that are designed to make basements comfortable and pleasant places to live. Some of these new technologies include:

- \* Integrated concrete foundation (ICF) systems
- \* Radiant heated slabs
- \* Clear-span floor joists that add headroom rather than bulkheads
- \* Super energy-efficient windows
- \* Decorative light and drainage wells
- \* Advanced framing techniques and engineered materials to reduce waste management

Thus, the basement can be a fully usable space within a home, a space that is well integrated with the main floor and that offers the same comfort and air quality. By exploiting this space, you can unlock an incredible amount of funds for building a more efficient home, as the total aboveground square footage requirements are reduced substantially.

## **2. Attracting Future Buyers**

The profile of home buyers is changing rapidly from three perspectives: age, environmental awareness, and interest in energy carrying costs.

### **Age Profile**

Our population is getting older, and the size of the average family in Canada has been flat for almost 20 years now. It's no secret that Canada's population is getting older. By 2011, more than 20% of the total population will be over the age of 60. If you are building a custom home in 2006, your home's "sweet spot" for future buyers (i.e. those in the 30-49 age bracket) is projected to be the most competitive market segment over the next several decades, because it's the age bracket that is dwindling fastest.

Simply put, there won't be many Canadians shopping for 2,500 square foot homes in 10 years' time.

### **Environmental Awareness**

There is a growing awareness of individuals' environmental responsibility and of energy efficiency. At Paragon we notice this because we are continuously challenged by clients to build greener solutions into their new homes. Examples include:

- \* Construction using enviro materials
- \* Grey water management
- \* Green roofs
- \* Healthy materials for the structure and finish materials
- \* Alternative energy sources
- \* Construction to R2000, ENERGY STAR and Envirohome standards
- \* Passive solar gain<sup>2</sup>

In anticipation of these changing buyer demands, we abandoned construction to nominal building code standards in 2005 and instead standardized on ENERGY STAR compliance as a minimum standard for all our turnkey constructions. This has not adversely affected our business, reinforcing the fact that, to reach out to the custom home buyer of today and tomorrow, an environmentally oriented solution is now a basic requirement.

While we don't profess to have the answers to global warming, we do understand that a smaller, more energy efficient home reduces the environmental impact that a new home construction creates. The table on the following page shows the net effect on Greenhouse Gas Emissions (GHGs) as a result of more energy-efficient design and construction of a new home. The figures are staggering – the gains are substantial enough to beat the "One-Tonne Challenge" over and over again.

## **Emissions Imprint, 1500 square foot bungalow**

**Zone: Ottawa Valley. Ambient temperature 72 degrees.**

Construction/Code Standard	GHG's per Yr	Reduction %	Reduction in Kg's	Delta to OBC	Delta in Kg's
Pre-World War 2 Standards	25,490	-	-	-	-
Pre-Opec, early 70's	17,329	32%	8,161	-	-
Ontario Building Code (OBC), Current	14,377	44%	11,113	-	-
ENERGY STAR Standard, 2005	10,280	60%	15,210	28%	4,097
R2000 Standard, 2005	6,632	74%	18,858	54%	7,745
Envirohome Standard, 2005, nominal	5,637	78%	19,853	61%	8,740

Global warming and GHGs are just one element in the environmental profile of a home. Healthy materials, a reduction in physical footprint, elimination of construction-site waste and several other issues make up the total environmental profile of a home. That said, 90% of the energy and environmental imprint of a home occurs during its lifecycle – through heating and cooling. The message? The initial design period is the best time build environmental responsibility into a new home – make it part of the initial design and budgeting exercise.

### **3. Reducing Environmental Imprint**

In Ottawa-Carleton, the average increase in electricity in 2006 will be 12%. Fuel prices have risen approximately 25% in the last two years. As energy prices continue to fluctuate, then settle with increasingly higher baselines, the cost of carrying a home will be of greater importance in the resale market. The house that sells above-list-price on your block will not necessarily be the one that has "gleaming hardwood floors" and "pride of ownership ". Rather, it will be the one that has the better energy conservation envelope.

The chart below shows the impact of an average energy-cost increase of 5% over the average ownership (8 years) of a home built to nominal code. It assumes a 225,000 fixed term mortgage.

## Impact of Energy Cost Increase of 5%

	<b>Mortgage Cost</b>	<b>Energy Costs</b>	<b>Energy as % of Total</b>	<b>\$ Increase by year</b>	<b>Cumulative Increase</b>
Year 1	16,200	3,036	15.8%	-	
Year 2	16,200	3,188	16.4%	152	152
Year 3	16,200	3,347	17.1%	311	463
Year 4	16,200	3,515	17.8%	479	942
Year 5	16,200	3,690	18.6%	654	1,596
Year 6	16,200	3,875	19.3%	839	2,435
Year 7	16,200	4,069	20.1%	1,033	3,467
Year 8	16,200	4,272	20.9%	1,236	4,703

The energy conservation profile of a house will figure much more prominently in the resale market in years to come. Building a smaller, more energy efficient home will help ensure your home competes well in future markets, because it will offer a better energy conservation envelope.

### **Summary Recommendations: the 15% Challenge**

If you are considering buying a new custom home, Paragon Homes challenges you to buy less house, and to get it built better. Based on our experience in designing and building custom homes that meet ENERGY STAR, R2000 and Envirohome standards, we know that these general objectives and guidelines will serve you well as you plan your new custom home:

\*Design to optimum energy-efficiency standards, like R2000 and Envirohome. ENERGY STAR should be the absolute minimum.

\*Incorporate ENERGY STAR compliant appliances, motors and fixtures into your home.

\*Integrate the basement, or a portion thereof, as finished living space – build down rather than up or out.

\*Establish an upper limit for square footage then challenge your designer to beat that by 15% or more – while still giving you the living space you need.

\*Aim for an ideal above-ground target of 1,350 square feet for a single family home, and less than 1,000 square feet above-ground for empty nesters, with the balance of living areas designed below ground.

Building a smarter home is about building a home with reduced environmental imprint, one with lower energy requirements, and one that relieves pocketbook in terms of long-term carrying costs. It's about building a home that will serve you well for years to come and perform well on the day when it's time to sell.

Today's new construction standards, materials and systems make it all possible, and there are many novel and practical ways to unlock funds within your budget for building that better home without having to sacrifice the comfort or usability that you seek.

Are you ready to take the 15% challenge? For more information, contact us.