



BuiltGreen™



BuiltGreen™



Summit 2006
June 9th, 2006

The Greening of New Home
Construction in Alberta



Presented by David Bengert
President,
BuiltGreen™ Society of Canada



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Today's Agenda

- What is BuiltGreen™ and how was it developed?
- How does the program work?
- What are the benefits?
- Examples of initiatives.
- Statistics on program to date
- Summary



***“Study nature, love nature, stay close to nature, it will never fail you”
Architect Frank Lloyd Wright***

***“Nothing says more about an animal than the way that it builds its nest”.
Architect Peter Pfeiffer***



BACKGROUND

- The BuiltGreen™ program promotes construction of **residential** buildings that are:
 - **healthier for the occupants**
 - **healthier on the pocketbook** and
 - **healthier for the environment.**
- The program is owned and managed by the BuiltGreen™ Society of Canada.
- All five Home Builders' Associations in Alberta and the CHBA-BC offer BuiltGreen™ homes.
- Participating membership includes representatives from builders, trades, suppliers and manufacturers from the home building industry.



BACKGROUND

BuiltGreen™ focuses on four broad areas of environmental concern:

- Energy Efficiency
- Indoor Air quality
- Resource use (including waste management/reduction and using recycled components)
- Overall environmental impact



BACKGROUND

- The program includes mandatory Builder Training and third party verification and testing.
- The mandatory Energy Efficiency component is the EnerGuide for New Houses rating and labeling initiative.
- The Built GreenTM Checklist provides the foundation and offers a wide variety of items to choose from.



Why are we doing this?

- 1. Energy Conservation:** Canadians use more energy per capita than any other country in the world. Energy consumption has increased 10% since 1990.
- 2. Water Conservation:** Every six months, a household of four people taking daily five minute showers consumes a lifetime supply of drinking water for one person. Franklin Roosevelt said, “water is worthless until the well runs dry”



Why are we doing this?

3. Waste Management: Canadians generate more garbage per capita than any other country in the world. The average new home generates 5 tonnes of construction waste.

4. Indoor Air quality: The average Canadian spends 90% of their time indoors. Poor indoor air quality in homes and buildings is cited as a likely contributor to Asthma. Asthma is the number one reason for hospital visits in children, affects 13% of school aged children in Alberta and is Alberta's most common chronic disease.



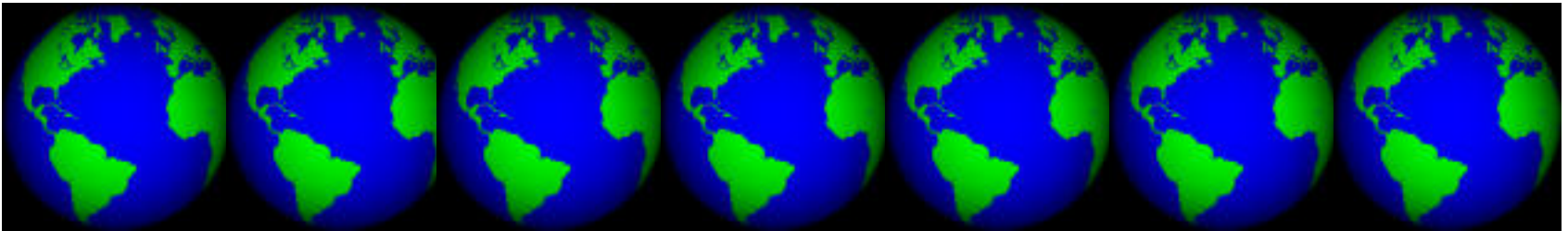
Why are we doing this?

5. Public Awareness and Demand: Environmental stories are in every form of media on a continuous basis. Hybrid vehicles are becoming mainstream and have waiting lists. All of this results in increased consumer awareness.

6. Industry Leadership: Home Builders and the entire home building industry need to show leadership. By raising the level of professionalism in the industry we can attract young people to see us as a viable career choice

Industry Opportunity

If everyone on Earth consumed as many resources per capita as Albertans we would require 7 planets to sustain ourselves.



We can choose to build green now, or be legislated to do so later.



Program Genesis

- July 2000, Introduction to Built Green Colorado.
- October, 2002, SAIT conducts feasibility study for the CRHBA on developing a green building program.
- The CRHBA board, with Jay Westman as President approves the development of a program that would be available only through the Home Builder Association and be voluntary, flexible and verifiable.
- January 2003, formation of a development committee.
- Input from CMHC, SAIT, NRCAN and the Alberta Research Council.



Program Genesis

- Review of the Built Green Colorado program, Built Green of King County, Austin Energy Program, Wisconsin Green Building, R2000 and several others.
- Adoption of R2000 Builder training as mandatory education program for builders
- We started looking for a third party testing and rating system as we wanted someone other than the builder rating and testing the homes
- Agreed with NRCan to adopt the EnerGuide for New Houses rating system as part of our program..
- Every home would be tested for air tightness.



Program Genesis

- On October 8th of 2003, the program was launched to the CRHBA and the media.
- March 2004, incorporation of the BuiltGreen™ Society of Canada as a not-for-profit corporation.
- The Board of Directors of the Society now has representatives from all five of the local Home Builder Associations in Alberta. We also have two sub-committees, Standards and Marketing.
- The current structure also provides for expansion outside of Alberta. We now have representation from BC on both committees and on the Board of Directors.



How does the program work?

Step1, is successful completion of the Builder Training.

- All builders must have at least one person take the R2000 builder training and HOT2000 software training
- This comprehensive program delivered in Alberta by Enervision, teaches builders both the building science and practical techniques needed to design and construct homes to the Built Green achievement levels.
- Builders must pass an exam following the course. Successful completion qualifies the company as a BuiltGreen™ Trained Builder and an R-2000 Trained Builder.



How does the program work?

- **Step 2 is benchmarking and modeling of the builders' current plans and specifications.**
- Measuring existing trade practices and construction techniques will give a benchmark of;
 - How tight are the homes that are built?
 - Are there ventilation, makeup or combustion air opportunities to be aware of?
 - What level of energy efficiency are the homes currently built to?



ENERGUIDE RATING:

- **Step 3, The home must be computer modeled using the HOT 2000 NRCAN software.**
- This rates the energy efficiency and energy consumption of the home using the *EnerGuide* for New Houses software.
- Home orientation, home dimensions, insulation values, type of heating system, construction materials, window type and window location are input into the software in order to calculate a rating.



Step 4 is to select specification items from the seven sections of the checklist.

Points are awarded based on the minimum *EnerGuide* rating with additional points selected from each of the seven other areas of the checklist to give a cumulative total.

Checklist			Bronze	Silver	Gold
I.	EnerGuide Rating		72	75	77
II.	Operational Systems	min 15/90	75 points	80 points	85 points
III.	Building Materials	min 15/50			
IV.	Exterior & Interior Finishes	min 10/84			
V.	Indoor Air Quality	min 15/74			
VI.	Waste Management	min 7/24+			
VII.	Water Conservation	min 7/25+			
VIII.	Business Practices	min 6/24+			



BuiltGreen™ Checklist Section II

OPERATIONAL SYSTEMS: Select a minimum of 15 points from 32 items

This section awards points for construction methods and types of products that contribute toward lower energy consumption as well as alternative heating and electrical systems.

- Install active solar hot water heating system (solar fraction > 50%)
- 50% (2 points) or 100% (4 points) of electricity used by homeowner during first year of occupancy is generated by wind power or equivalent green power certificate. (prepaid by builder)



OPERATIONAL SYSTEMS: Sample of items

- Programmable thermostat with dual set back and fan only switch, thermostat to be programmed by builder prior to occupancy
- Appliances are *Energy Star* labeled
- Minimum 25% (1 point), 50% (2 points) or 100% (4 points) of light fixtures are L.E.D., fluorescent or have compact fluorescent light bulbs installed
- Install ground source heat pump system, either radiant or air ducted for space heating and cooling.
- Install high efficient, sealed combustion heating appliance (minimum 90% steady state efficiency)
- Install instantaneous “tankless” hot water heater.



BuiltGreen™ Checklist Section III

BUILDING MATERIALS: Select a minimum of 15 points from 34 items

This section deals with building components that make up the structure of the home. Items involve alternatives to using large dimensional lumber, products with a recycled component, utilizing wood products that come from sustainable managed forests and reducing the overall amount of lumber used.

- Install manufactured insulated rim/band joist or build on site by setting back joists to allow rigid insulation filler of a minimum R10
- Use of two stud corner framing with drywall clips or scrap lumber for drywall backing instead of studs



Building Materials: Sample of items

- Dimensional lumber from a third-party certified sustainable harvested source used for roof or wall framing
- Engineered products for all load bearing beams
- All insulation used in home is certified by a third party to contain a minimum recycled content: 40% (1 point), 50% (2 points)
- Advanced sealing package, non HCFC expanding foam around window and door openings and all exterior wall penetrations
- Insulated Concrete Forming system (ICF's) used for foundation walls



BuiltGreen™ Checklist Section IV

EXTERIOR and INTERIOR FINISHES: Select a minimum of 10 points from 36 items

This section focuses on the finish materials used both inside and outside of the home. The items listed include using longer lasting products, products with recycled content and products that are harvested from managed forests.

- Domestic wood from reused/recovered or re-milled sources – 500 square foot minimum for flooring or all cabinets or all millwork



Exterior and Interior Finishes:

Sample of items

- Recycled and/or recovered-content siding (minimum 50% pre- or
- Deck or veranda surfaces made from recycled materials: 50% (1 point), 75% (2 points), 100% (3 points)
- Minimum 35 year roofing material with 35 year manufacturers warranty
- Minimum 25% recycled content roofing material
- Bamboo, cork or hardwood flooring used in home, minimum of 300 square feet installed. Products must be third party certified to be from managed forests or from certified sustainable sources



BuiltGreen™ Checklist Section V

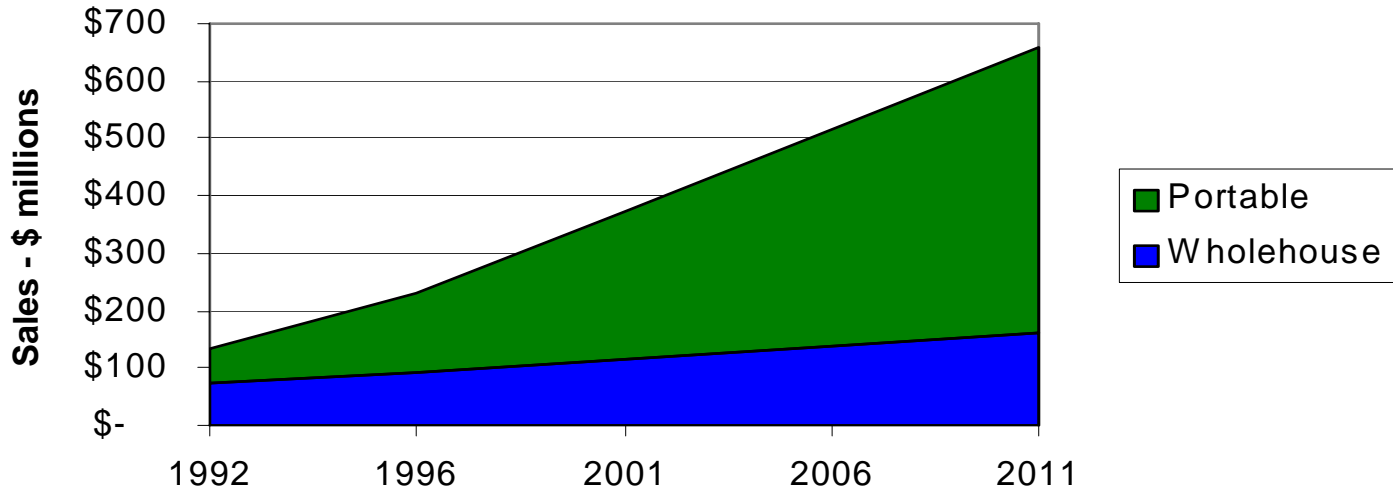
INDOOR AIR QUALITY: Select a minimum of 15 points from 37 items

This section focuses on the quality of the air within the finished home. Products listed here include materials that are low in VOC's, products made from all natural materials as well as various air cleaning and ventilation systems.



Market Size

U.S. Consumer Air Cleaning System Demand





INDOOR AIR QUALITY:

Sample of Items

- Install hardwired carbon monoxide detector outside main sleeping areas
- Install pleated media air filter on HVAC system
- Power vacuum all HVAC ducting prior to occupancy by homeowner
- All ceramic tiles are installed with low VOC adhesives and plasticizer-free grout
- Water-based lacquer finishes are used on all site built and installed millwork, including doors, casing and baseboards.
- Low formaldehyde particle board/MDF used for cabinets or shelving (Standard is ANSI A208.2-1994 concentration 0.3 ppm)



BuiltGreen™ Checklist section VI

WASTE MANAGEMENT: Select a minimum of 7 points from 13 items

This section deals with the handling of waste materials on the construction site and encourages recycling.



Waste Management: Sample of Items

- Minimum 25% (by weight) of waste materials collected from construction site are diverted from waste stream
- Trades working on the construction site remove their own waste materials and recycle a minimum of 10%
- Install built-in recycling center in kitchen, laundry or garage with two or more bins
- Use of recycled materials derived from local construction sites.



BuiltGreen™ Checklist Section VII

WATER CONSERVATION: Select a minimum of 7 points from 12 items

This section contains products and conservation methods that will reduce the amount of water used in the home for personal and landscaping uses.



WATER CONSERVATION:

Sample of items

- Install CSA approved toilet averaging 1.6 GPF or less in one bathroom.
- Install CSA approved double flush toilet in one bathroom. Full flush to use no more than 1.6 GPF or less. Add 2 points for each additional toilet (3 points for first toilet)
- Builder supplies a minimum of 8" of Topsoil as finish grading throughout site.
- Install front loading clothes washer
- Builder installs water barrel to downspout. (One point per barrel to a max of 3 barrels)



BuiltGreen™ Checklist section VIII

BUSINESS PRACTICES: Select a minimum of 6 points from 11 items

This section deals with the environmental business practices of the home builder as well as the environmental practices of the manufacturers that the builder deals with.



BUSINESS PRACTICES: Sample of items

- Finished products used in the home are manufactured within 800 km in order to reduce the energy used in transportation. (1 point per product to a maximum of 5 points)
- Builder has written environmental policy which defines their commitment (which must include an office recycling program and energy efficient lighting)
- Builders company vehicles are hybrid or bio-diesel vehicles (1 point per vehicle to maximum of 3 points)
- Contracted trades and/ or suppliers have successfully taken BuiltGreen™ Builder Training. (One point per trade organization)



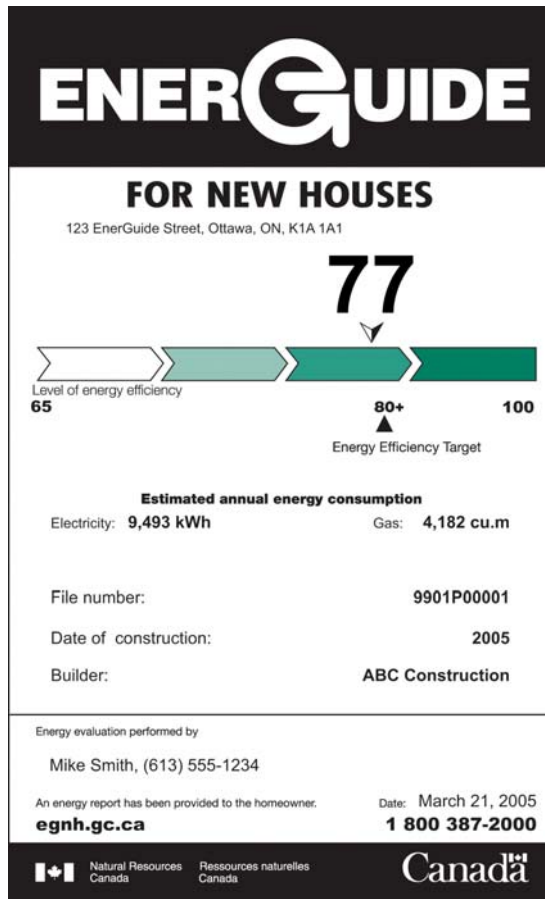
Blower Door Test & EnerGuide Label

- **Step 6. When the home is completed, the mandatory blower door test will be conducted.** The blower door is a fan mounted on an adjustable panel that can fit into any exterior door opening of your home. This test is performed on every home prior to occupancy by an independent company.





Step 7 is to deliver the Labels to the homeowner





What are the benefits to the homeowner?

- Lower monthly operating costs
- Increased level of comfort
- Lower maintenance costs
- Improved indoor air quality
- Increased market and resale value
- Overall lower environmental impact



What are the benefits to the municipalities?

- Every home uses less energy and produces lower greenhouse gas emissions
- Every home is tested and third party certified for energy efficiency and air tightness.
- Every builder must take R2000 training.
- Every builder must take steps to lower the amount of waste materials generated on the jobsite.
- Every home must lower water usage.
- Every home has to have improved indoor air quality



What are some of the results?

- Starting from February of 2005, Jayman is building all of their homes in Calgary and Edmonton to the BuiltGreen™ Gold Level. This will save over 3000 tonnes of greenhouse gas emissions each year.
- Jayman built a demonstration home for Alberta Eco-Trust in Calgary which opened last September. The home reached an Energuide rating of 85 and is both BuiltGreen™ Gold and R2000 certified.



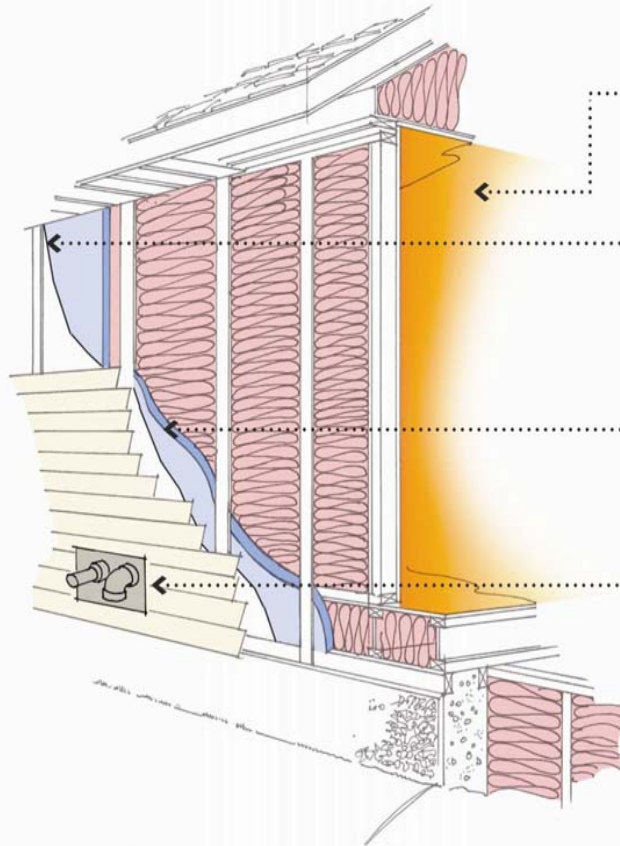
BuiltGreen™

QUANTUM PERFORMANCE™

Engineered into every Jayman Home



The System: What it Means?



The Quantum Performance™ Wall System

1-> Indoor Air Quality & Comfort

"Poor indoor air quality can cause or contribute to the development of chronic respiratory diseases. In addition it can cause headaches, dry eyes, nasal congestion, nausea and fatigue".
- The American Lung Association

Jayman's Quantum Performance™ initiatives add up to a more comfortable and healthier home.

2-> Moisture Control

Moisture is the #1 Enemy of most building materials and can be a major contributor to wood rot, reduced insulation value, warping studs, drywall cracking and the breeding of mold which can cause health problems including Asthma, Allergies, or Infections.

Moisture can enter the wall from the outside by means of wind blown rain and snow, and from within the home by means of dew point condensation of humid inside air.

The Quantum Performance™ wall uses building science to design against the potential of moisture in the wall cavity.

3-> Thermal Insulation

Wood framing is not a good insulator and the typical framed wall consists of insulated cavities between wood framing members that comprise 25 percent or more of the wall (the equivalent of one whole wall on a square house).

Jayman's Quantum Performance™ wall system wraps the entire frame with insulation and increases the thermal insulation value.

4-> Energy Saving Technology

Advances in building technologies and products have contributed to incredible gains in the energy efficiency of new homes over the last 25 years. Bathroom fixtures, appliances, lighting and design have all contributed to real savings.

Quantum gains from the latest technology built into every Jayman home lowers your operating costs and as a result of Jayman's superior processes and economies of scale mean you don't have to pay more to get the best.

5-> Environmental Impact

Environmental impact can be lessened through energy efficiency, conservation of water, energy and other natural resources and by the use of recycled or renewable products and materials. The selection of products that are non-toxic, resource efficient, produce less waste than typical products and that have a long life cycle, requiring less maintenance, all add up to responsible resource use.

› Jayman MasterBUILT™
Make Homes More Affordable

**The Kennedy Model
Annual Utility Cost Savings**

Quantum Performance™ Features		\$ Utility Savings 2002 vs. 2005
Natural Gas	(Quantum Performance™ wall system, insulated basement, Soft coat low E windows, furnace, hot water tank)	453.33
Electricity	(Fridge, dishwasher, lighting)	34.17
Water and Sewer	Low flush toilet	95.46
Total Annual Savings		582.96

Source: NRCan, Jayman Master Builder specifications from 2002 and Quantum Performance™ specifications for 2005 for The Kennedy (1903 Square feet, Two Storey)

"At today's energy costs, lower utility costs not only save you money today, but I believe, will ensure a higher resale value in the future."

Jay Westman, President & CEO

› Energy Facts



The Kennedy Model

- Sterling Homes is building 52 R2000 and Gold Level homes in Okotoks. The innovative solar heating system will use solar panels to collect thermal energy, store it in a common storage area under the park and then deliver it to the homes via hot water through underground insulated pipes. Each home will save 4-1/2 tonnes of greenhouse gas emissions per year





CITY OF
Lethbridge



- On August 15th the City of Lethbridge announced that they will be the first Canadian municipality to develop a complete “BuiltGreen™” neighbourhood. The new community of SunRidge will be dedicated to energy efficiency through the implementation of sustainable / green principles within the neighbourhood. To encourage this innovation all homes will be required to meet the BuiltGreen™ Alberta Bronze standard.
 - Phase II (being built first) 99 units (76 sold already and 7 under construction!)
 - Phase I (being built second) 125 units
- **Total Single Family Units = 224**
- Plus 2 Multi-Family Sites (one site can handle max. 72 units and the other can handle max. 58 units)



Lethbridge Sunridge Development

- Plus 1 Commercial Site (over 65 acres)
- Plus a park w. storm ponds and marsh lands, etc.
- All sites/buildings will have energy efficient components including the commercial!
- Homes must be registered w. HBA, present their plans to the modelers – must be a BuiltGreen™ Home, then sent to architectural control/design, then goes to the city (developer) for a quick look, then goes to the permit stage and modelers inspect the final product to ensure it has met BuiltGreen™.



Our vision is to build net zero homes
at no additional cost by 2015.

- Avalon Master Builder builds all of its homes in both Red Deer and Calgary to BuiltGreen™ standards and announced in July of 2005 that they will be building a Net-Zero energy demonstration home in Red Deer which opens later this month.
- In September **Melcor** announced that Phase 5 of their Ironstone development in Red Deer will require all homes to be a minimum BuiltGreen™ Bronze. There will be 131 single family homes and 36 Duplex homes, totaling 167 units in this phase of development.



Assured Developments, first BuiltGreen™ MURB project

- **WELL BUILT - BUILTGREEN**

At Assured Developments we are committed to providing homeowners with exceptional and efficient living spaces regardless of size or price. Before we build, we focus on designing spaces that will enhance the environment and compliment your lifestyle. That's why we have integrated BuiltGreen standards into the homes at Chorus Park. Our commitment to environmentally responsible development creates a home that is energy efficient and provides the warmth and comfort of utilizing natural materials and finishes throughout.

 **Chorus Park**
AT CHAPARRAL



- **Morningstar** Homes have announced that their new development in the Township of Langley will have all homes BuiltGreen™ Bronze and the Yorkson Willoughby Neighborhood development will also be a complete BuiltGreen™ community





Centron Construction has announced that their new hi rise project in downtown Calgary will be BuiltGreen™ . Kai Towers will comprise one tower of 29 stories, the other 33 stories and contain 472 units in total.





- The Adera Group of Companies announced that their new 62 unit stacked townhouse project called eNVy in North Vancouver will be BuiltGreen™ .
- In September, 2005, The BuiltGreen™ Society of Canada was presented with an **Energy Efficiency Recognition Award** by NRCan, OEE. It is a special award to pay tribute to organizations and individuals for their commitment and action on energy efficiency. Program staff felt that the BuiltGreen™ Society should be recognized for their leadership in energy efficient home building.



What are some of the results?

- At their strategic planning session in January of 2005, the CHBA Alberta asked for all homes built by members to be BuiltGreen™ certified by 2008
- CHBA BC voted to adopt BuiltGreen™ throughout the province by the end of the year. The first homes are now registered in BC.
- In July, CHMC recognized the BuiltGreen™ Gold level for a 10% rebate of fees on energy efficient mortgages.
- In March of this year, the Society Board voted to work with CMHC to add a new level to BuiltGreen, Net Zero.
- We are currently developing a BuiltGreen™ labeling system for major home renovations.



Current Statistics

- The first home was registered in Calgary in February of 2004.
- By the end of June 2005 we had registered 1000 homes. As of today total home registrations are 2991.
- There are 250 members of the Society in Alberta and BC, of which 145 are builders.
- 350 Individuals from more than 55 companies have taken the R2000 builder training and 101 Individuals from over 30 companies have taken the HOT2000 plan evaluation training.



Summary

1. BuiltGreen™ is owned and managed by the BuiltGreen™ Society of Canada. The Society has volunteer representatives from local HBA's in Alberta and BC that have adopted the program
2. The BuiltGreen™ program was developed by a volunteer committee representing builders, trades, suppliers and manufacturers from the home building industry.
3. Every builder must have at least one person take the R2000 builder training and the Hot2000 software training



Summary

4. Every home is modeled for energy efficiency, then tested for air tightness and depressurization. The final results are certified by Enervision for NRCAN
5. The EnerGuide software can model options for energy efficiency and show the savings in energy consumption. The cost of the option can then be compared to the savings to calculate the payback time or the lowering of monthly operating costs.
6. 5% of all BuiltGreenTM homes will be randomly tested by an independent firm to verify the checklist items

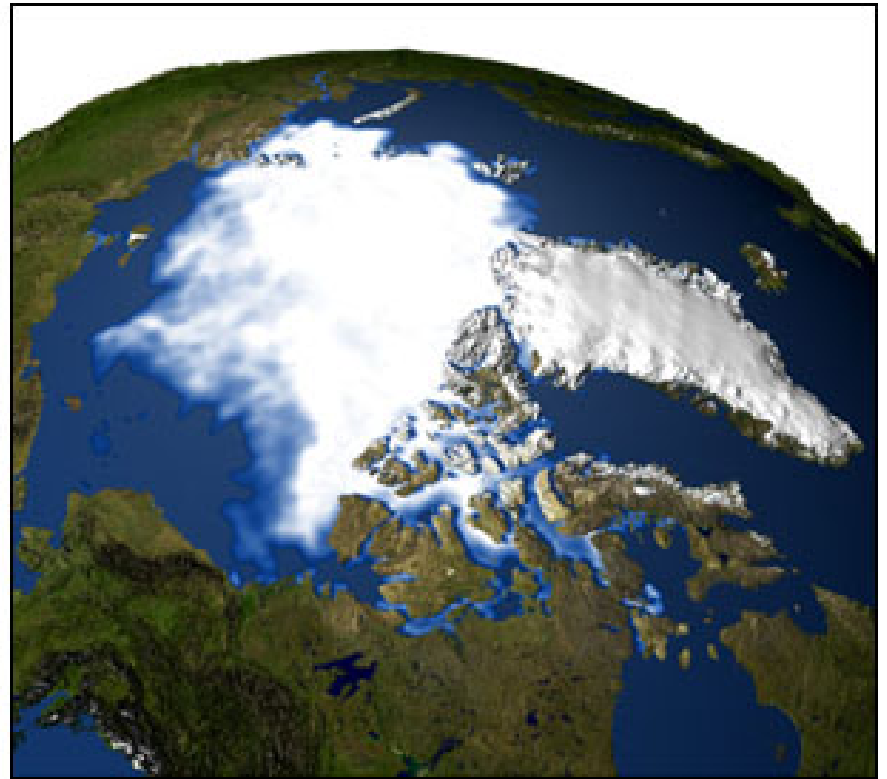
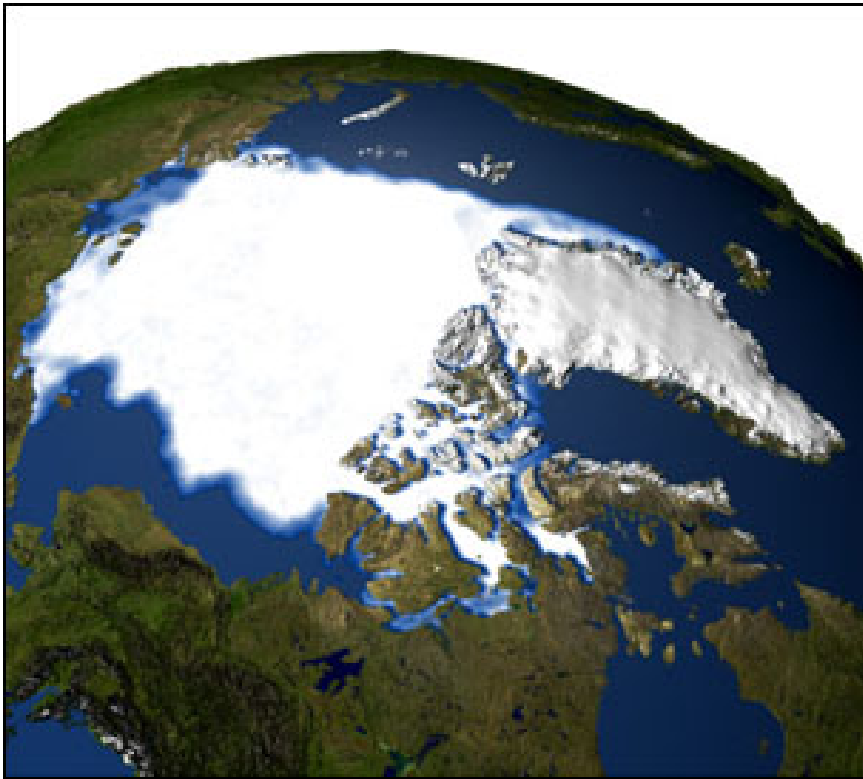


What is Happening Worldwide?

- World population is predicted to grow from 6.2 billion to over 9 billion by 2050
- Today, global consumption of oil is 84 million barrels per day.
- By 2010 it is predicted that there will be 940 million registered autos. We will use 38 billion barrels of oil, 210 trillion cu ft of natural gas and generate 860 million tons of municipal waste in just one year.

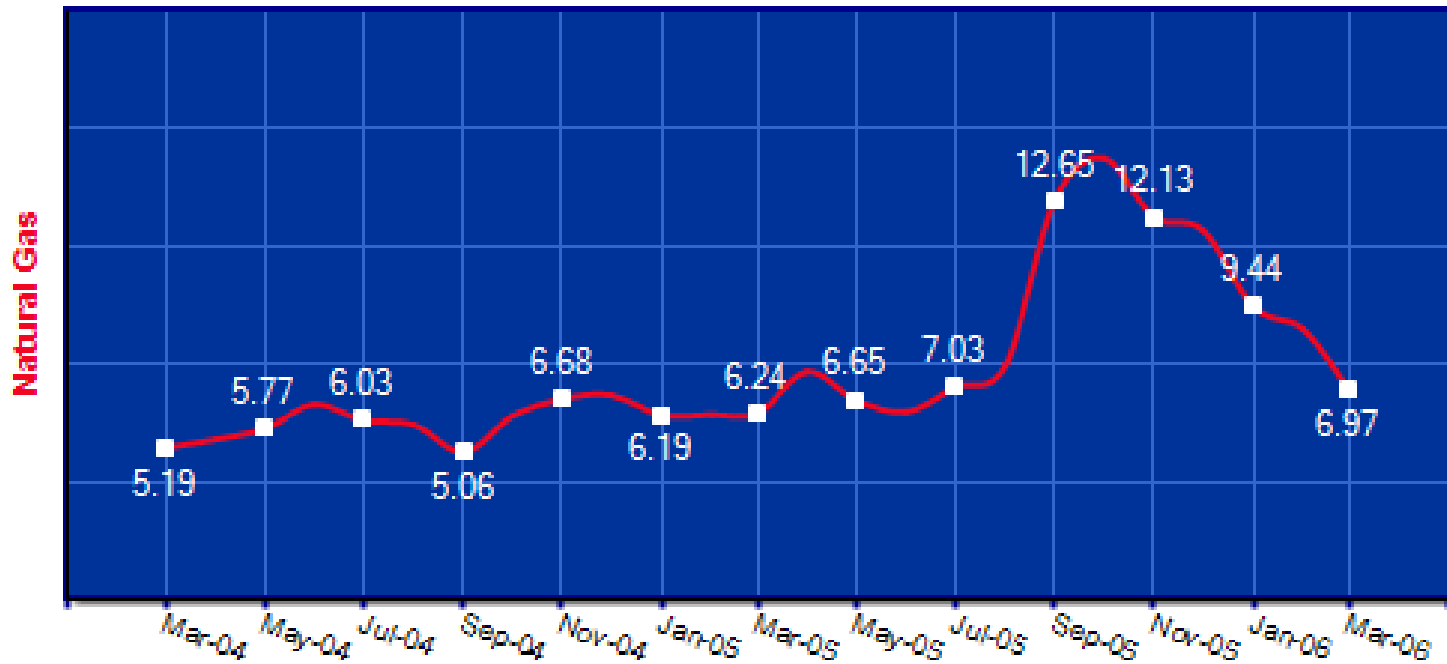
Arctic Ice

July 1979 (left) 7 million sq km vs.
Sept 2005 (right) 5.31 million sq km



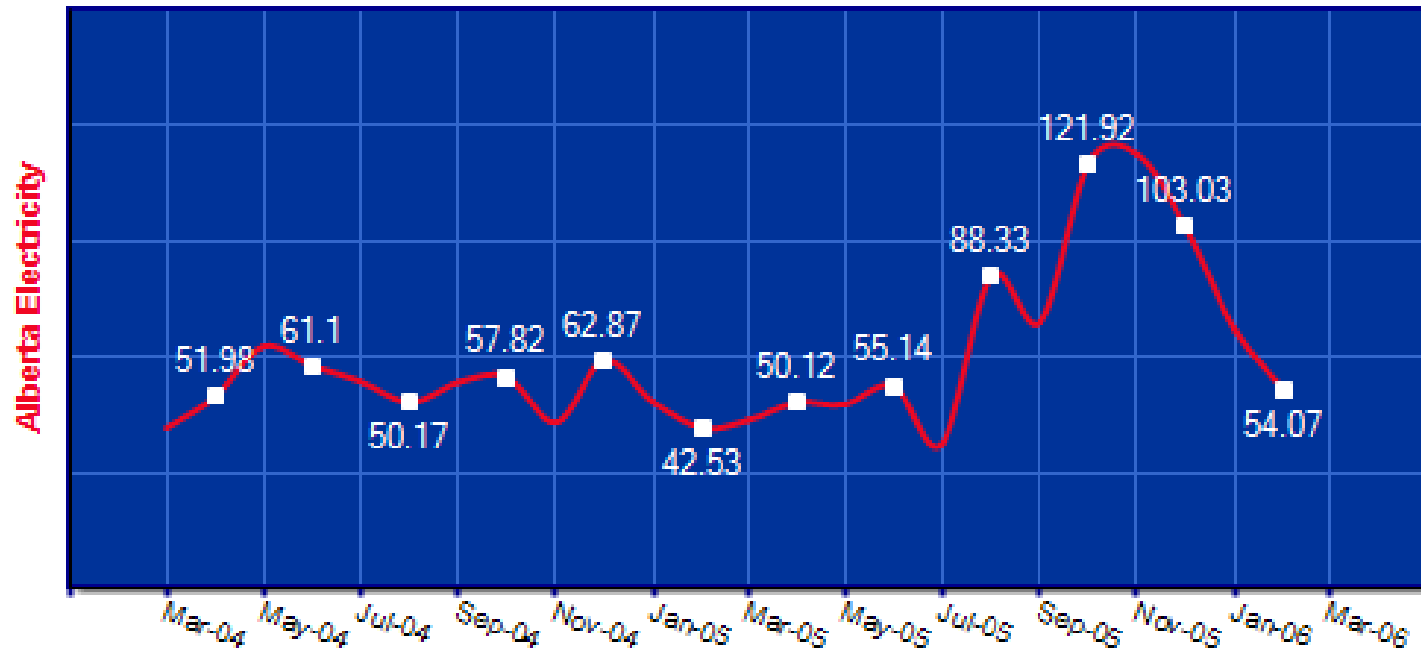


Natural Gas up 34% over 2 years



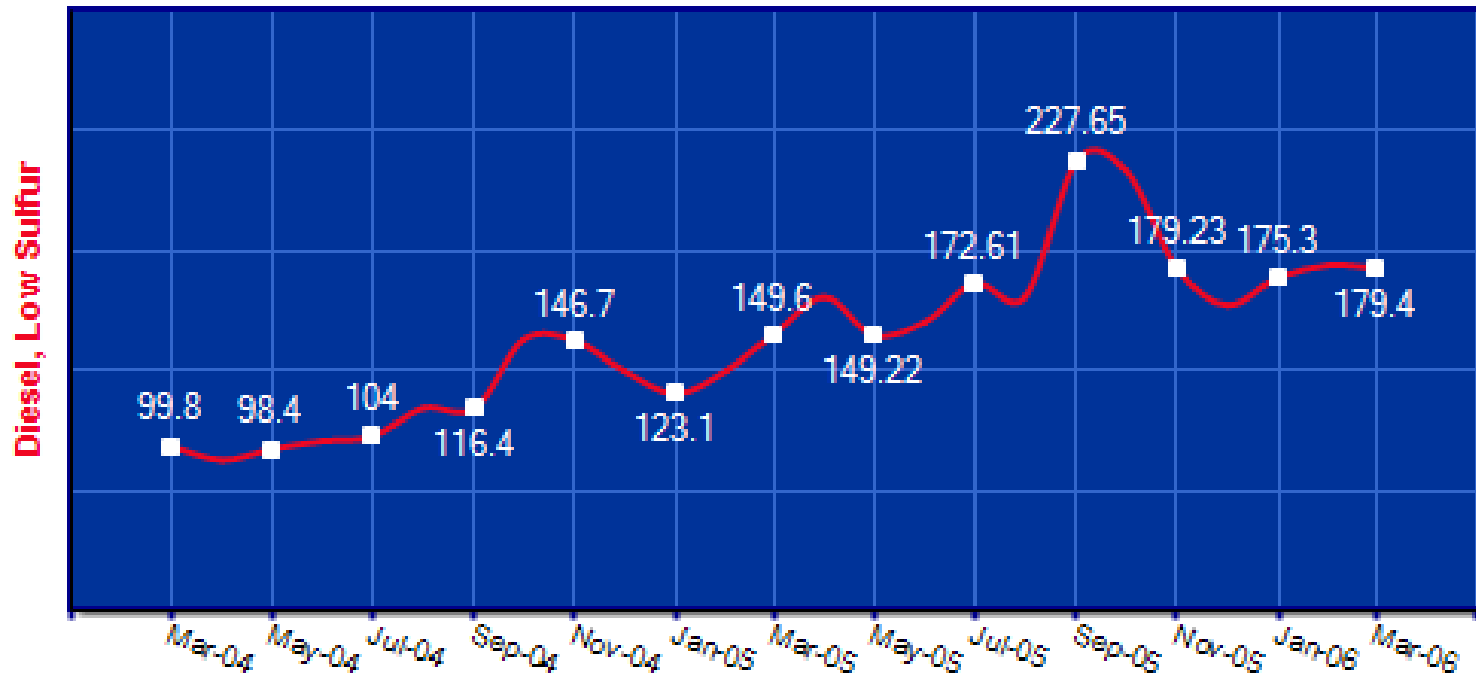


Electricity up 27% over 2 years





Diesel Fuel up 79% over 2 years

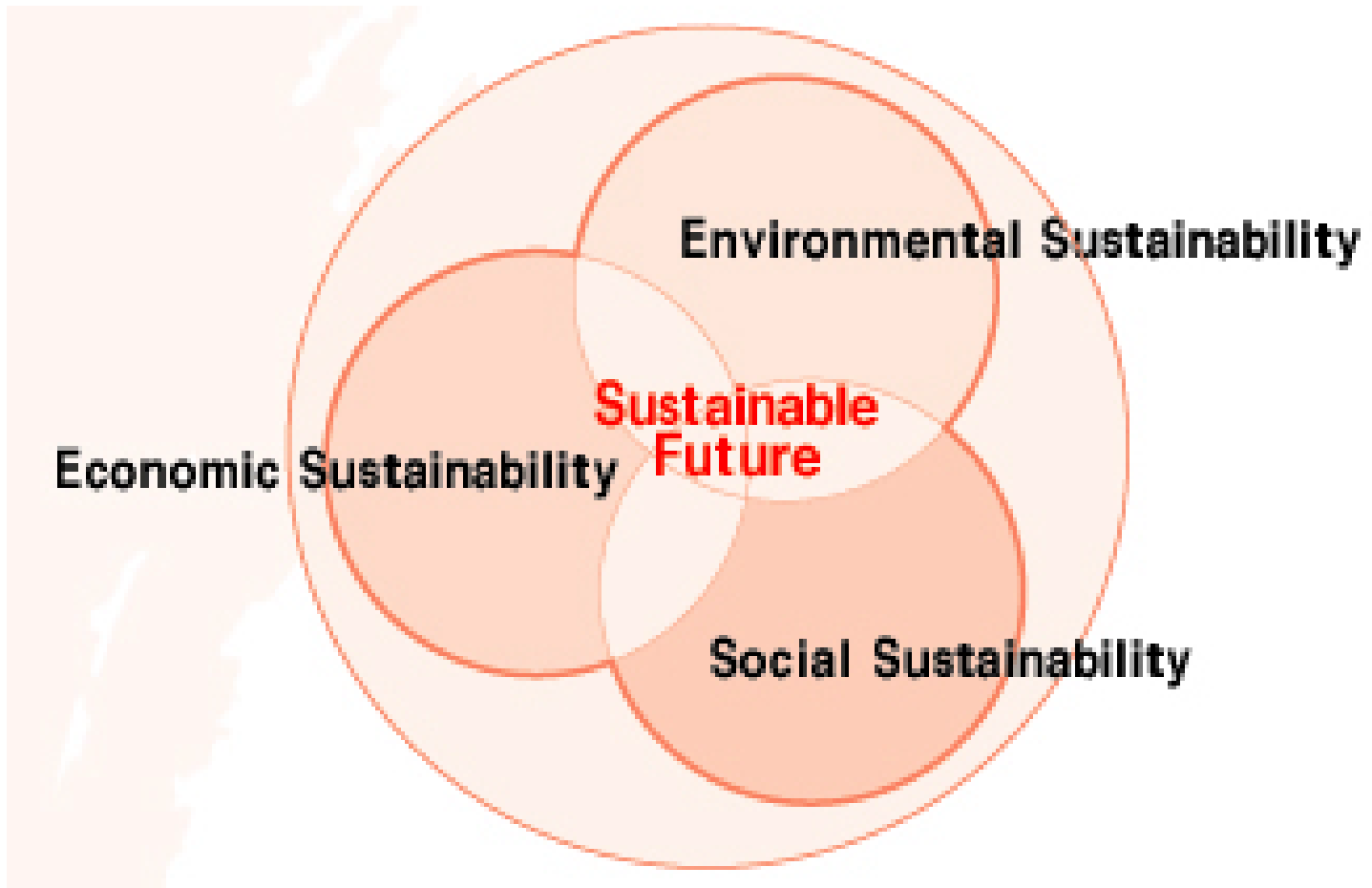




We set the patterns

- The real questions
 - What kind of world do we want our children to live in?
 - What can we as homebuilders and business owners do to responsibly shape our world?
 - We need to start with incremental changes in what we build and how we build it.

A Sustainable Future?





What colour is *your* future?



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