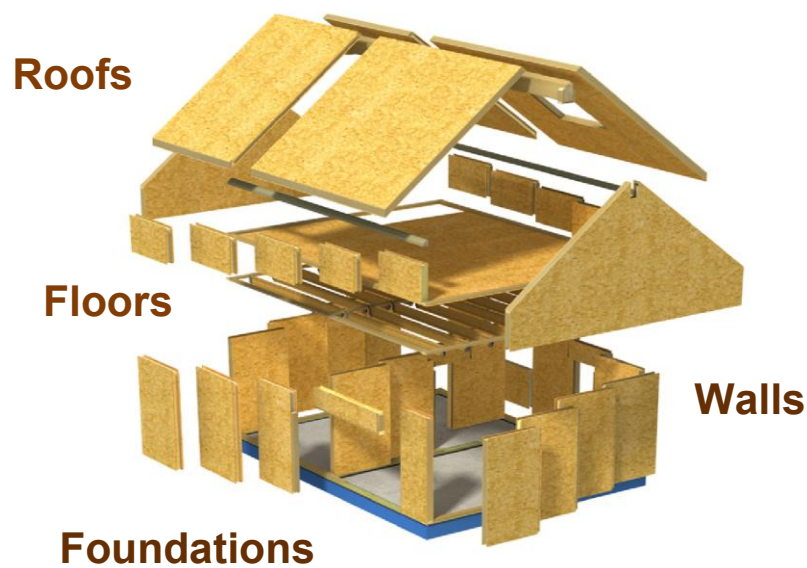


Greensmart SIPs Structural Insulated Panels



Easier...Better...Faster

AUTHORIZED RESELLER OF GREENSMART SIPs



www.shelterindustries.com

Not Just Rectangular Panels

SIPs are whole envelope components that have been fully engineered, independently tested, pre-cut to size and shape to eliminate field work.



Greensmart SIP Roof Panels
Fort St John BC



Greensmart SIP Wall System

Cost Effective

Building with SIPs offers cost advantages to the builder in terms of speed of construction and reduced labour requirements. Panels are pre-manufactured to exact specifications so they arrive ready to install and come together quickly. A team of 4 or 5 men can stand SIP components in 55% less time than it takes an experienced crew to frame the same sized home. A SIP roof can be installed in a fraction of the time required to install a truss roof system. The electrical rough-in saves labour costs by 11%. All this translates into major savings for the builder.

A recent Time & Motion study commissioned by BASF Corporation showed that utilizing SIPs reduced installation time by 130 labour hours. When compared to labour hours for a conventionally framed home, this labour requirement is equivalent to time savings of approximately 55 percent.

The house used for the study was a two-story, three-bedroom, 1176-square-foot, Cape Cod - style home with three dormers on a 12/12-pitch roof. Cost data was used to benchmark the time and cost for erecting conventionally framed stud walls, roofs and dormers using exterior sheathing and fiberglass batt insulation.

<Reference - http://construction.basf.us/files/resources/SIPs_Brochure.pdf

Thanks to this speed of construction, SIPs projects are dried-in sooner. There are fewer hand-offs between trades so crews are more productive – no more waiting for the insulation group to come in after the framers, or for the sheathers to come after the insulators. You are working inside an insulated, locked up shell in 4 to 5 days

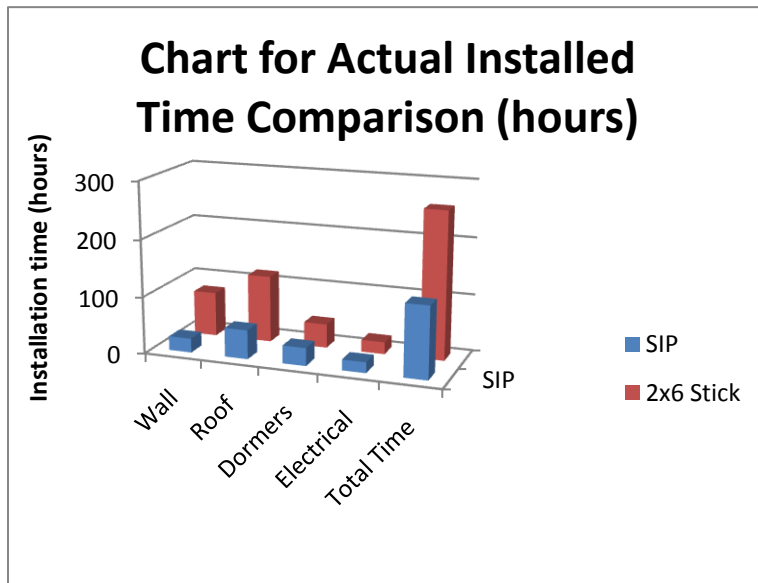
SIP walls are flat and don't warp, expand or contract, allowing doors and windows to go in quickly as designed. All wall intersections are true so cabinets install fast.

It all adds up to reduced special field adjustments and lots of saved time.

Most importantly, these technologies can help reduce call-backs, keeping crews moving forward to the next project and improving overall productivity.



Greensmart SIP Home, Calgary AB



Comparative Tables from BASF Study

<Reference - http://construction.basf.us/files/resources/SIPs_Brochure.pdf

Breakdown of labour costs and requirements

Component	SIP-Built	2"x 6" Stick-Built
Total Time (hours)		
Wall	24.8	78.12
Roof	50.8	117.48
Dormer	31.33	41.87
Electrical	18.76	21.11
Total Labour Hours	125.69	258.58
Total Cost (\$)		
Wall	\$1,372 (\$0.97/ft ²)	\$3,331 (\$2.37/ft ²)
Roof	\$2,816 (\$1.63/ft ²)	\$4,498 (\$2.60/ft ²)
Dormer	\$1,735 (\$2.86/ft ²)	\$1,765 (\$2.91/ft ²)
Electrical	\$870	\$979
Total Labour Hours	\$6,793	\$10,573

Then



NOW



Reduced overall costs

As construction leaders know, faster building cycle times significantly reduce interest payments on construction loans - an important factor in a healthy bottom line.

In a new elementary school built with SIPs, the Clark County School District (Las Vegas, Nevada) reduced close-in time by nearly 80 percent - from a typical 118 - 220 days to only 45 days. "The general contractor was shocked at how fast the panels installed," said Gary Radzat, President of Shell Building Systems, Sebastopol, California), the SIPs design and installation consultant for the Jacob E. Manch Elementary School. "He said he'd never seen that size of schedule reduction." Using SIPs saved the district approximately one million dollars in direct construction costs.

<http://ezinearticles.com/?Structural-Insulated-Panels-Help-Contractors-Meet-Challenges-of-Difficult-Building-Environments&id=3393309>

Additional Cost Cutting Benefits

SIPs play an important role in ensuring quality finishes. Because they are made in a controlled setting and come in large sections, they allow for straighter walls than is possible with wood stick-built framing. Their smooth and even surface can reduce finishing labor by helping eliminate the need to shim cabinets, windows and doors.

Waste and site cleanup are minimized using SIPs. Not always considered, material waste from an average sized wood framed house is considered to be approximately 10%. Imagine filling your car up at the station and pouring a litre of gas for every 10 pumped on the ground and then having to clean up the mess.

Also consider the labour and equipment required to deal with that wasted material. Whether it's piled and burned or hauled away it must be dealt with and there is further cost.



Commercial Plaza - Greensmart SIPs Dawson Creek BC

Higher Performance Envelope

A SIP envelope contributes to stronger, more energy efficient, more sustainable, comfortable and cost-effective homes and buildings. The continuous panel system provided by SIPs provides a nearly unbroken sealed interior. This air tightness is one of two factors that lead to energy efficiency. The other factor; insulation, is provided by the EPS foam core in the SIP. EPS provides better insulation than the same thickness of fiberglass batt insulation. This means less air changes per hour, a warmer interior in winter and cooler interior in summer. Is it any wonder



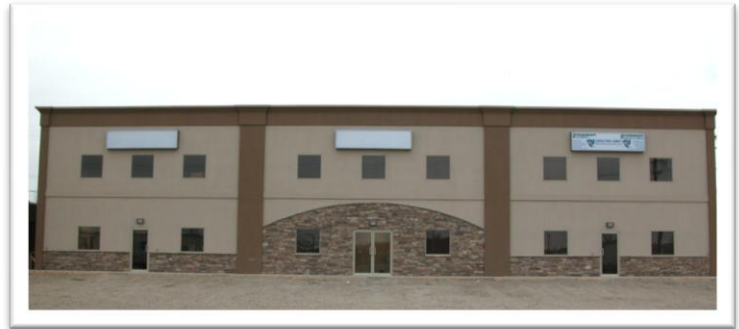
Commercial Shop, Dawson Creek BC
Greensmart SIPs

that Structural Insulated Panels (SIPs) are rapidly gaining in popularity within the new construction market?

What are SIPs?

SIPs are walls, roofs, floors and foundations made of panels consisting of a rigid foam insulation core sandwiched between two structural skins. Panels are fabricated to be a large component of the system they are used for, i.e., a wall panel could be 6' wide and 8' high. The seamless, closed cell rigid foam core of Expanded Polystyrene (EPS) helps reduce air leakage and thermal bridging through the panels by providing a continuous span of insulation. The exterior and interior skins give the panel its strength and sheathing.

Standard panels are available up to 8' x 24' size configurations. Thickness of the panel ranges from 4 ½" to 12 ¼". Custom sizes are also available. Once manufactured, the panels are shipped directly to the construction site for fast and easy installation.



Greensmart SIPs Office Complex in Fort St. John BC

Stronger

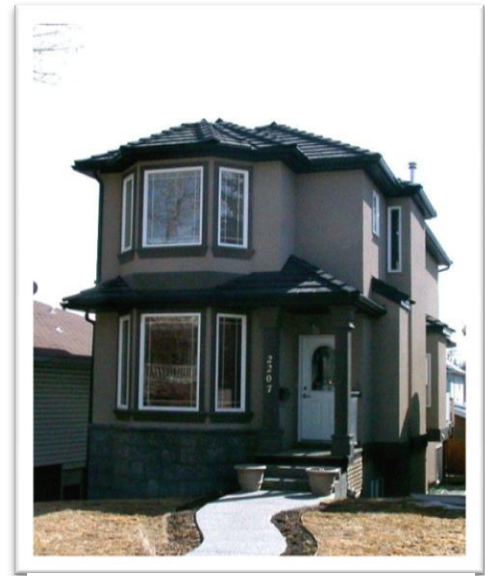
SIPs are very strong and in most applications are structurally self-sufficient. Designers can use them in wall, roof and floor systems in place of other structural elements.

While frequently used in one- or two-story buildings, they have been successfully utilized for taller structures. In Western Wyoming the Community College (Rock Springs, Wyoming), used SIPs for a 28,000-square-foot housing complex with 48 bedrooms spread throughout four stories - the tallest self-supporting SIP structure built to date.

SIPs help improve structural strength for resistance to natural disasters. SIPs provide:

- Structural characteristics similar to a steel I-Beam
- Superior structural stability with stiffness, strength and predictable performance.
- Lower maintenance requirements

SIPs make it easy to build a home that is resistant to adverse weather. In fact, the *Fortified...for safer living* program, an insurance industry initiative in the United States, considers use of SIPs when designating homes as safe. Anecdotal evidence suggests that SIPs can withstand earthquakes and tornados intact.



Multi-Storey Infill Home, Calgary AB
Greensmart SIPs

More Versatile Applications

In walls, SIPs can bear high loads and offer great strength in racking diaphragm shear capacities. These capabilities enable the panels to be used in typical exterior walls, as well as shear walls to resist earthquakes and high winds. Extensive testing on SIPs has proven them for use in high-risk earthquake areas, including seismic zones D, E and F.

In roofs, SIPs can be used in place of engineered truss systems and can span long distances - up to 20 feet based on design parameters. SIPs make complex roofs simpler than 2 x built and as a result they can help create open interior spaces by reducing the need for intermediate structural supports.

Designers can also incorporate SIPs into areas where additional thermal or sound insulation is required.

Rounded roofs, arched windows and other complex designs are made simple with engineered SIPs. The manufacturing process means that no design element is too hard to accomplish:

- CNC cutting machines capable of cutting almost any shape or size of panel
- Reduced complexity of measurement and mathematics
- Open and airy feeling with no need for false ceilings
- Ability to maximize daylighting design techniques

Even interior decorators get added freedom. Hang a picture anywhere on the wall. No more searching for – and being confined to – a supporting stud to secure the nail. Instead, just pick the spot that looks best.



Friedenstal Hall, Fairview AB – Greensmart SIPs

A Total Home Building System

Not only does Greensmart build walls, floors and roofs with SIPs, but by combining the superior insulation performance of structural insulated exterior wall panels with the strength and protective properties of pressure treated wood they form Permanent Wood Structural Insulated Panel Basement or Foundation walls.

Greensmart Preserved Wood Foundation (PWF) SIP foundations have an insulation performance R-value of R-35. Traditional concrete basements require “furring”. Furring is the brackets and wood frame necessary to hold the required fiberglass insulation for the interior wall sections added to a concrete basement wall. Furred and insulated basement walls give about an R-12 insulation performance. This insulation space also takes away from the total living area in the basement – a surprising amount when added up. Sometimes the area saved would equal the size of a small room.

Greensmart Preserved Wood Foundations create a completely dry, comfortable living space below finished grade with no musty odors or smells. The basement is just like any room in the home above grade.

Greensmart’s PWF SIPs used in a foundation are engineered to safely support and withstand the building loads they are designed for. It is a common misconception that the kind of material determines the strength of the structure. Strength is determined by engineering and an 8¼” thick PWF SIP can withstand 30,000 lbs of loading, and are approved by every jurisdiction’s Building Code.

How are SIPs made?

Greensmart panels begin life in our 140,000 sq. ft. factory in Dawson Creek, BC. Fabricated to the job's specifications using 8' X 24' sheets of 7/16" APA OSB and whichever thickness of EPS foam is required. The Greensmart Panel department plans the optimal material use for the project to minimize waste. Large sheets of Expanded Polystyrene (EPS) foam are glued to the OSB skins and then pressed together as the glue cures. Once cured, assembled panels move a short distance to our computer numerical control (CNC) machine where window and door openings and electrical fixture locations are automatically and precisely cut into each panel from downloaded CAD drawing information.



Dawson Creek Home - Greensmart SIPs

Wire channels (chases) are then cut into the foam to allow for the electrical wiring. The insulation core is then recessed around the edges to accept the connection splines or dimensional lumber used during construction.

Quality Assurance

Information from each press is recorded for quality assurance purposes. These records indicate proper amounts of glue are used and batch quality.

Greensmart uses only APA stamped OSB to ensure the dimension and strength properties required for SIPs.

Our EPS is supplied by leading Canadian foam suppliers.

Every building plan must be converted to a SIPs construction plan and sealed by an independent Engineer to assure its overall capability.



Calgary Residence – Greensmart SIPs

Structural Insulated Panels and Fire

Manufacturers across North America have proven the fire performance of SIP systems through some of the most extensive fire assembly testing in the construction Industry.

Tested under these rigorous standards, panels perform very well due to the lack of oxygen in the rigid EPS foam core. Without oxygen, combustion cannot occur.

National standards like ASTM - E119, ASTM - E84 and UBC 17 - 5 have been met by protecting SIPs in a similar fashion as other wood based structures. Fire resistive assemblies are achieved through underlying structure in conjunction with Gypsum wall board.

In all the tests the panels passed the requirements.

The panels were tested under:

ASTMVE-119 twenty minute fire endurance load condition. The panels were loaded with the equivalent weight of a three storey building. The panel was then exposed for twenty minutes to the fire as required by the standards. After twenty minutes the gypsum board stayed in place and the wall did not bow or bend under the load. There was no melting of EPS foam core.

ASTMVE-119 one hour endurance load condition (for commercial and rated Construction), the panel was covered with two layers of 5/8th inch type X gypsum board and then the wall was put under the load equivalent to a three-storey building. After being exposed for sixty minutes to the fire as per standards, the gypsum stayed in place, the wall did not bow or bend under the load and the wall passed all the requirements of that test.

Under conventional fire testing, SIPs meet and exceed expectations for building materials with no more protection than a conventional wood structure. As mentioned above, SIPs do not burn readily because of the lack of oxygen to aid combustion.

As referenced by SIPA (Structural Insulated Panel Association, www.sips.org).



SIPs home damaged by fire

SIPs Benefits

For the Home Buyer

Superior Insulation

+ Tighter Air Envelope

= EnerGuide 80 Rating

EnerGuide 80 =

Lower Home Energy Costs

Higher Home Value

Better Resale Potential

Healthier Indoor Air Quality

Reduced Drafts

Warmer, Cozier Interior

Energy Efficiency

SIPs combine superior insulation with near-zero air leakage to maximize the performance of the building envelope and allow HVAC systems to operate more effectively.

Other energy saving advantages (according to the previously referenced BASF Study) include:

- Reduced energy consumption
- Lower energy bills
- 90% less air leakage as compared to stick-framed structures
- No thermal bridging or convection looping



Baldonnel Home- Greensmart SIPs

These positive factors are some of the reasons that SIP homes consistently test excellent (over 80 rating) in Natural Resources Canada's **EnerGuide** labeling system.

What is EnerGuide?



Pollock Home, Calgary AB - Greensmart SIPs

EnerGuide is a Canadian Government program to establish a benchmark rating system that applies to homes, new and old. The EnerGuide Rating Service was developed by The Office of Energy Efficiency of Natural Resources Canada to help Canadians improve the energy efficiency of their houses. EnerGuide dovetails with the R 2000 and Energy Star programs.

EnerGuide Rating System

The EnerGuide rating is a standard measure of a home's energy performance. The home's energy efficiency level is rated on a scale of 0 to 100. A rating of 0 represents a home with major air leakage, no insulation and extremely high energy consumption. A rating of 100 represents a house that is airtight, well insulated, sufficiently ventilated and requires no purchased energy. Very soon every person involved in home construction, owning and selling a new home will have to know about the EnerGuide rating system. How soon? In BC it takes effect in 2011.

How is the EnerGuide system used for housing?

Before the home is built; a Certified Energy Advisor will assess the blueprints of your home and input the details into a modelling software called Hot2000. This software provides the **baseline EnerGuide rating** for the energy efficiency of the home you intend to build. The EnerGuide rating is on a scale between 1 and 100 where the higher the number, the more efficient your home. Certified Energy Advisors will then use the software modelling to input selected upgrades for your home and show you how you could increase your home's **potential EnerGuide rating**. Target areas include increased insulation, house envelope air tightness, types of windows and doors, high efficiency heating, passive solar gain (window placement and size) and so on.

After the home is built the Certified Energy Advisor will complete an on-site blower door depressurization test and input the final construction components. Using the Hot2000 software once again, a **final EnerGuide rating** label will be produced for that specific home. This label is affixed to the Home's electrical panel.



LeTourneau Residence, Hudson Hope Rd. –
Greensmart SIPs

EnerGuide Report Example



Energy Efficiency Evaluation Report

File Number: 9900N99999

Year Built: 2007

Date of Evaluation: Oct. 16, 2008

Builder Name: 00000 NRCan

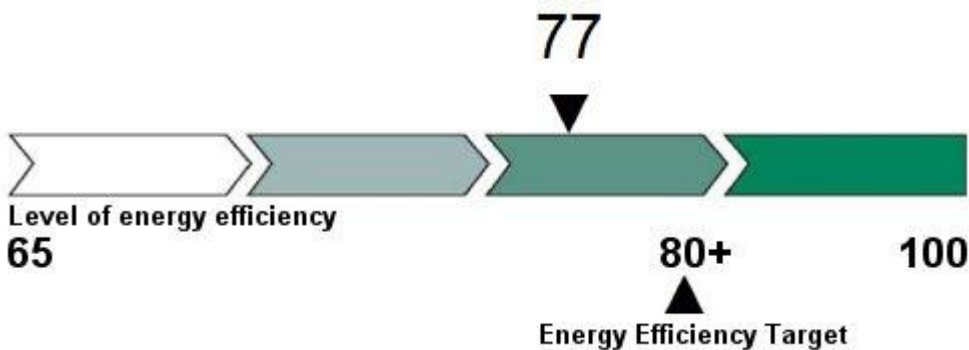
Smith,Bob
123 Happy Lane
Ottawa,Ontario K4K4K4

Congratulations on the purchase of your new house!

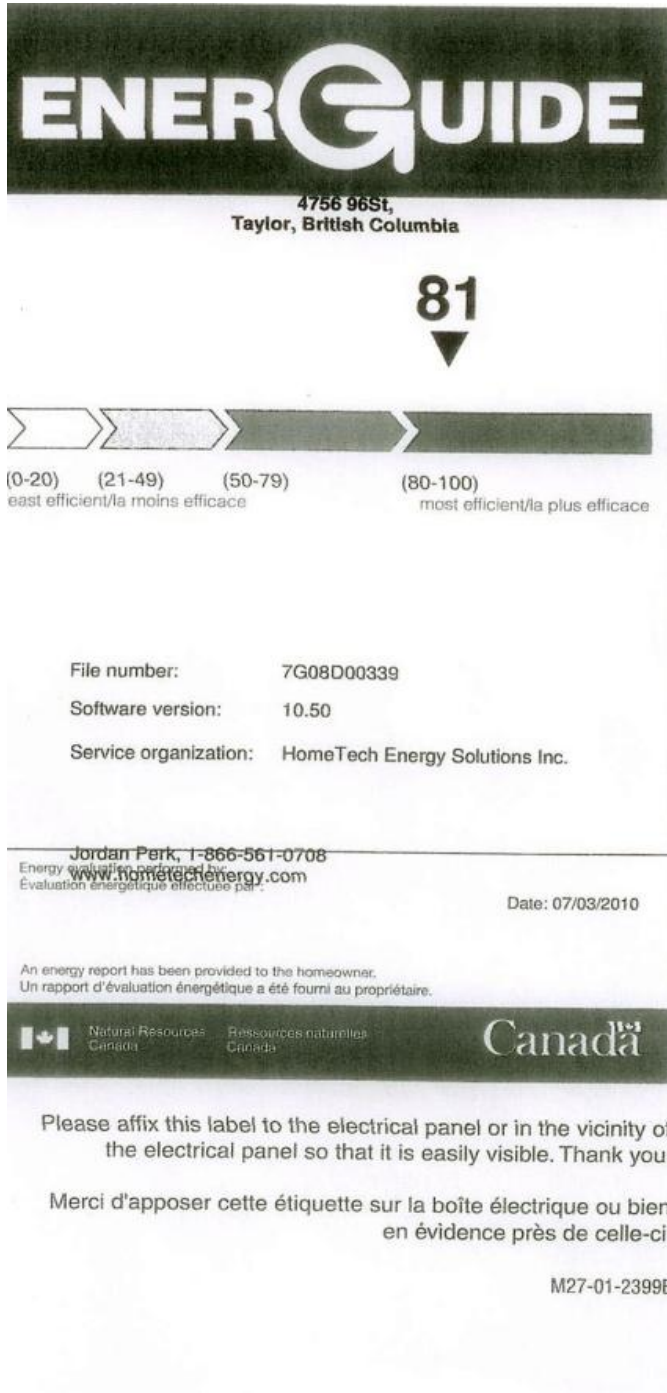
This report contains information on how your new house will consume energy. Anyone can claim that a house is energy efficient, but the EnerGuide label and this report shows how efficient your house is. Any energy efficiency upgrades that you and your builder decided to include in your house will reduce energy consumption for years to come and will help protect our environment.

Your House's Energy Efficiency Rating

A qualified energy advisor has assessed the energy efficiency of your house by using Natural Resources Canada's EnerGuide Rating System procedures. **Based on this evaluation, your house has an energy efficiency rating of 77.**



EnerGuide Label Sample



Look Familiar?

You've seen this same label before on major appliances.

In late 2011 a label like this one will be affixed to the electrical panel of every new home.

This label belongs to a Greensmart SIP home located in Taylor, BC.

EnerGuide Case Study

A 2006 case study of a home in Fort St. John, BC conducted by the BC Homeowners Office indicates that the cost to renovate and upgrade an existing home with an EnerGuide rating of 68 to an EnerGuide rating of 80 would be over \$21,000.

An upfront investment of two to three thousand dollars for upgrades to a new home; such as Energy Star windows, doors and HVAC systems when combined with the air tightness and superior insulation of a new home built with SIPs will save the home owner hundreds of dollars a year in energy costs. Pay back for these upfront costs are realized in a short period and continues for the life span of the home.

These cost savings are now recognized and considered by lenders and realtors to the benefit of buyers of energy efficient homes with respect to buyer qualifications and favourable mortgages.



Williston Greensmart SIP Modular, Tumbler Ridge BC

How Does This Affect The New Home Buyer?

More and more buyers are becoming aware of EnerGuide and its importance to them and their bottom line. Informed home buyers realize that purchasing a high energy use home will cost them decades of ever worsening energy bills. EnerGuide informed buyers know that at best purchasing a low rated home now will mean a lower home value as EnerGuide 80 is established as the standard. And at worst if provinces push for 80 as the standard a homeowner may have to pay for expensive retrofits in order to reach 80.

Lenders are also becoming informed about EnerGuide and how an energy- efficient home can lower a homeowner’s monthly energy payments, enough in some cases to qualify a borrower for a more expensive home with slightly higher payments. TD Canada Trust has the most well known Green Mortgage for Canadians.

It’s not just buyers and lenders getting into the game – now Realtors have the option of being a Green Realtor. They learn about energy efficient home performance and the things they need to look for.

Greensmart SIPs R Value

SIP Assembly R-Value Calculation

Using Combined Components @ 25 degree Fah. or -4 degrees Celsius



<p>Assembly Name: Greensmart 4 5" SIP List Of Construction</p> <table border="1"> <thead> <tr> <th><u>Components</u></th> <th><u>R-Value</u></th> </tr> </thead> <tbody> <tr> <td>Inside Air Film</td> <td>0.69</td> </tr> <tr> <td>OSB Sheathing</td> <td>0.70</td> </tr> <tr> <td>3 5/8 " Polystyrene Insulation (Type 1)</td> <td>15.77</td> </tr> <tr> <td>OSB Sheathing</td> <td>0.70</td> </tr> <tr> <td>Outside Air Film</td> <td>0.17</td> </tr> <tr> <td style="text-align: right;">Subtotal</td> <td>18.03</td> </tr> </tbody> </table>	<u>Components</u>	<u>R-Value</u>	Inside Air Film	0.69	OSB Sheathing	0.70	3 5/8 " Polystyrene Insulation (Type 1)	15.77	OSB Sheathing	0.70	Outside Air Film	0.17	Subtotal	18.03	<p>Assembly Name. Greensmart 6.5" SIP List Of Construction</p> <table border="1"> <thead> <tr> <th><u>Components</u></th> <th><u>R-Value</u></th> </tr> </thead> <tbody> <tr> <td>Inside Air Film</td> <td>0.69</td> </tr> <tr> <td>OSB Sheathing</td> <td>0.70</td> </tr> <tr> <td>5 5/8" Polystyrene Insulation (Type 1)</td> <td>24.47</td> </tr> <tr> <td>OSB Sheathing</td> <td>0.70</td> </tr> <tr> <td>Outside Air Film</td> <td>0.17</td> </tr> <tr> <td style="text-align: right;">Subtotal</td> <td>26.73</td> </tr> </tbody> </table>	<u>Components</u>	<u>R-Value</u>	Inside Air Film	0.69	OSB Sheathing	0.70	5 5/8" Polystyrene Insulation (Type 1)	24.47	OSB Sheathing	0.70	Outside Air Film	0.17	Subtotal	26.73
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Assembly Calculations does not include any lumber, this is SIP only.

Occupant Comfort, Health and Safety

SIPs help make indoor environments healthier, safer, more comfortable and more enjoyable:

- Increased control over temperature and humidity levels – the upstairs of a SIP house is rarely more than one degree warmer than downstairs.
- Significantly reduced drafts, SIP home owners always remark on how warm and cozy their homes are.
- Improved sound transfer control – even near airports, highways and inner urban areas.
- Improved indoor air quality with low VOCs or infiltration of allergens or pollutants (the American Lung Association and the Environmental Protection Agency [EPA] both recommend that houses be built airtight to improve indoor air quality)



Ambrose Residence Fort St. John BC- Greensmart SIPs

SIPs help reduce the risk of mold growth by stopping condensation and moisture movement within the walls. Foam core materials like polyurethane and polystyrene are almost water impermeable and do not offer a food source for mold.

Environmental Sustainability

SIPs help raise the social, economic and environmental responsibility of homes and buildings, making a significant contribution toward true sustainability.



Schram SIP Addition, Swan Lake BC

Eco-efficiency Analysis' recent evaluation of residential insulation systems showed that SIP-built structure made with EPS cores and OSB facers was the clear winner over both 2 x 4 and 2 x 6 stick construction with fiberglass batt insulation.

Key Contributors to the environmental sustainability performance of SIPs are:

- Reduced energy use because of High R-Value and Low air leakage rate
- Low environmental impact of materials.

- Use of rapid growth trees,
- Low maintenance requirements,
- Lightweight materials that reduce transportation fuel use,
- Lower landfill fees through reduced construction waste.
- Reduced crew labour days with its incremental reduction of environmental impact.

SIPs make such a large contribution to energy efficiency that two of the first three LEED platinum homes in the United States were built with SIP envelopes. ENERGY STAR exempts SIP-built homes from the 17-point thermal bypass insulation inspection and blower door tests required for qualification in the program in the United States.

It's interesting to note that in North America emissions from buildings is roughly 50% of all emissions. Cars are 25% in North America. The reduced energy consumption achieved by SIPs, up to 50%, also contributes to a healthier environment for us all.

How does EnerGuide 80 affect the Builder / Developer?

All of the Provinces have signed on with the federal government to use EnerGuide as the new standard and to reduce energy use and air emissions. To date the leading provinces are BC and Ontario and they are racing to be the Canadian Leader with BC making it the building code standard in 2011. It's not clear when Alberta is set to legislate its upcoming energy efficient building code but it is clearly coming. Currently there is up to \$10,000 in government incentives available for achieving EnerGuide 80 rating and above with a new home built in Alberta. Yukon and NWT have initiated many related programs throughout their jurisdictions.

More and more people are becoming aware of the significance of home energy-efficiency and its direct relationship to short and long term savings related to energy costs.

Now as EnerGuide 80 comes into play; savvy new home buyers are beginning to realize that their new home equity value will also be affected if they don't factor in and prepare to meet the EnerGuide 80 standard when they build.

Certainly a structure's envelope is only a portion of these important factors when considering the challenges of meeting EnerGuide 80 specs but we want you to know that the high performance building envelope required by EnerGuide 80 is more easily met by using Structural Insulated Panels (SIPs) than any other method. Considering the cost of alternative solutions it's certainly worth considering prior to your next build.

SIPs provide many benefits for the builder. Give us a call and we'll tell you how we can help you save building costs while increasing your profit.

In Summary: EnerGuide For New Homes

EnerGuide For New Homes is a national program to standardize energy related building codes across Canada. The program identifies and measures the elements required to make a new home energy-efficient, such as insulation performance and air tightness,

Superior insulation and air tightness are major factors in achieving energy efficiency in a home. Under the EnerGuide rating system a home rated at 80 or higher is considered to be very energy efficient. SIP wall, SIP floor and SIP roof components are recognized for their capability to achieve EnerGuide 80. Present day construction methods using fiberglass insulated 2 X 6 inch walls are not capable of achieving the EnerGuide 80 rating.

EnerGuide audits carried out on Greensmart built homes demonstrate that SIP components were key elements in the home's ability to meet the EnerGuide 80 rating.

Up-coming Changes to Canada's Building Codes

The EnerGuide program is administered by Natural Resources Canada (NRCan). NRCan also sets Canada's National Building Code which is followed by BC, Alberta and the Territories.

Present EnerGuide programs tend to be informational and suggestive, but previews of up-coming changes to Building Codes across Canada indicate that these voluntary actions directed at becoming energy self-sufficient will be mandatory with code changes coming in the next two to three years.

EnerGuide Funding Incentives

Federal and provincial funding programs calling for EnerGuide 80+ achievement are available across Canada. Presently grants and awards are available to homeowners, builders and First Nation organizations.

EnerGuide and Lenders

Lending institutions now recognize that energy efficiency means energy saving. Money not spent on a heating bill can go to higher mortgage payments, qualifying some individuals not previously eligible to purchase a new energy efficient home.

For More Information Contact:

Shelter Industries Inc.

1-800-561-3822