

Energy Savings

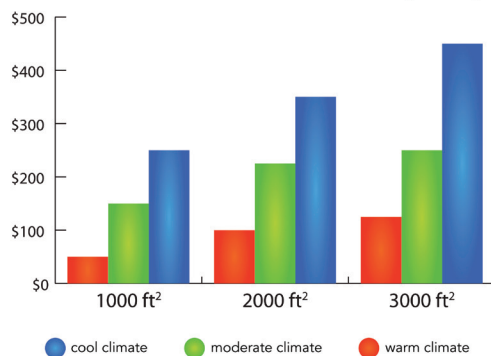
Building with ARXX Insulating Concrete Forms (ICFs) saves energy and money. The greater insulation, tighter construction and temperature-smoothing mass of the walls conserve heating and cooling energy much better than conventional wood frame walls. This reduces monthly heating and cooling bills. It also allows use of smaller heating and cooling equipment, saving money in construction.

Based on materials by the Insulating Concrete Form Association (ICFA).

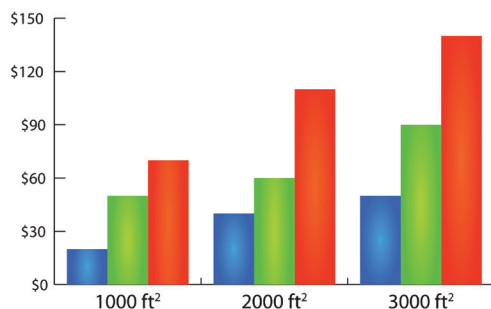
How much will I save?

Houses built with ICF exterior walls require an estimated 44% less energy to heat and 32% less energy to cool than comparable wood frame houses.¹ A typical 2,000 square foot home in the center of the U.S. will save approximately \$200 in heating costs each year and \$65 in air conditioning each year.^{1,3} The bigger the house, the bigger the savings. In colder areas of the U.S. and Canada, heating savings will be more and cooling savings less. In hotter areas, heating savings will be less and cooling savings more.

ARXX ICF House - Estimated Annual Heating Savings:



ARXX ICF House - Estimated Annual Cooling Savings:



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Smaller heating and cooling equipment needed for such an energy-efficient house can cut construction costs by an estimated \$500 to \$2000.^{2,3} The biggest equipment savings come with houses that have the most energy savings.

How do we know all this?

The energy savings estimates come from a study of single family houses spread across the U.S. and Canada.¹ Researchers gathered data on 58 houses. Half had exterior walls constructed with concrete using ICFs made of expanded polystyrene (EPS) or extruded polystyrene (XPS) foam. The other half were neighboring houses with walls constructed of wood frame. All houses were relatively new (less than 6 years old) and were built with modern methods.

The researchers compared the energy bill of each concrete house to its frame counterpart, carefully correcting for important differences to get an “apples-to-apples” comparison.

Estimates of equipment savings are actual numbers reported by contractors that build ICF houses.³

Now, let's take a real life example of the heating costs for a mid-size detached house located in the colder climate of Toronto, Canada. The heating costs calculator from Canadian Ministry of Natural Resources* estimates the annual heating costs for such a house being around CA\$439 (US\$410) if you use natural gas as your heating fuel. Referring to the annual heating savings graph above, the estimated heating savings for a house this size in colder climate could be as high as \$320. Even if we take a more conservative number of \$250, it still gives us a reduction of 61% in annual heating costs.

Where do the savings come from?

Insulating value for ARXX ICF walls using expanded polystyrene foam are R-22, compared to wood frame's R-9 to R-15. So ARXX ICF walls are expected to cut the conduction losses through foundation and above grade walls by about half. And ICF walls are tighter. In tests, ICF houses averaged about 1/2 as much infiltration (air leakage) as wood frame houses.³

Energy Loss Reduction

ARXX ICF walls do more than cut down on the biggest types of energy loss. The concrete gives them the heat absorbing property, “thermal mass”. This is the ability to smooth out large swings in temperature. It keeps the walls of the house a little warmer when the outdoor temperature hits its coldest extreme, and keeps the house a little cooler when the outdoor temperature is hottest.

* Heating costs calculator, by the Ministry of Natural Resources of Canada, @ 33.64 c/m³ fuel cost (<http://oee.nrcan.gc.ca/residential/personal/tools/calculators/heatingcalc/compare-current-heating.cfm>)

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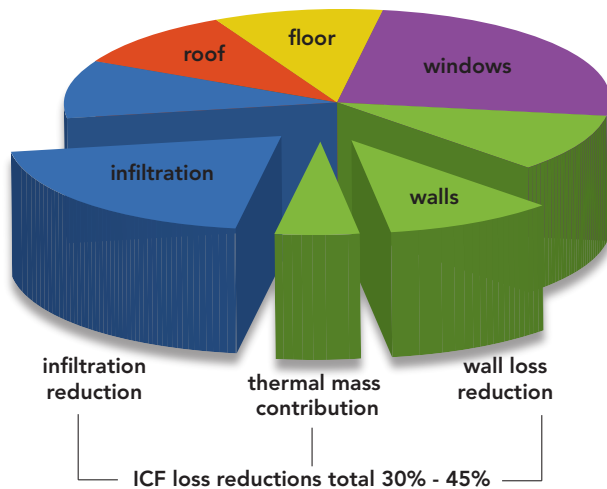
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The walls themselves “add back” heat or cooling to the house when it needs them most. This contributes about 6% of the needed energy to the house for free³.



References

¹ Energy Comparison Concrete Homes to Wood Frame Homes, by VanderWerf, RP119, PCA

² HVAC Sizing Methodology for ICF Homes, by US Department of Housing and Urban development

³ Energy Savings, by ICFA (www.forms.org)

The energy-effectiveness of an ARXX wall is due to three important factors: continuous R-value, reduced air infiltration and thermal mass moderation.

Reduced equipment costs result from the energy savings. Since the energy needed is less, the furnaces and compressors that heat and cool can be smaller. And the more the energy savings, the greater the possible reduction in equipment size — and the equipment cost.

What's the bottom line?

In planning a new house you can estimate that building walls of concrete using ARXX ICFs will save you hundreds of dollars per year in energy costs. As shown in the graphs, the bigger the house then the greater the savings. Heating savings are highest in cold climates, and cooling savings highest in warm climates. You may also save hundreds or thousands of dollars in construction costs for heating and cooling equipment.

Call us at 1.800.293.3210 for help with an estimate and for a list of examples.

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