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A Little Energy Saves a Lot

By American Chemistry Council

According to some opinion surveys, many Americans harbor the misconception that plastics are an unwise use of energy since most are made from raw materials derived from fossil fuels. Surely if plastics are made from fossil fuels, they must be a net drain on our nation's energy resources, right?

Could the reality be different? What if plastic products actually *save* more energy than is used to make them? Let's take a look at the use of plastics in building materials to illustrate how plastics, even those sourced from fossil fuels, can actually conserve our nation's energy.

Now that it's summertime, many of us are experiencing spiking energy bills as we try to keep cool. Most of the money we spend on home cooling (or heating in the winter) pays for energy that is derived from fossil fuels: The U.S. Energy Information Administration calculates that fossil fuels—coal, oil, natural gas—are used for approximately 82% of U.S. energy demand. And we use a lot of that energy in our homes and buildings, where nearly 40% of our nation's energy is consumed.

Unfortunately, much of this energy is wasted, due to many causes: inefficient heating/cooling systems, outdated building practices, construction based on older building codes, wasteful personal habits—and (the big one)—low-tech insulation. Wasted energy hurts our environment, hurts our wallets... and hurts our country.

Congress is debating legislation that (among other things) would boost energy efficiency in our homes and buildings, which are great places to look for significant energy and cost savings through more energy-efficient building materials. In fact, boosting energy efficiency is one of the cheapest and quickest ways for our nation and households to save energy and money.

What does this have to do with plastics? While it may sound like a contradiction to some, improving energy efficiency in buildings hinges on increased use of materials derived predominately from fossil fuels: plastics. That's because using a little bit of energy (inherent in plastics) can save a whole lot of energy over the lives of our homes and buildings.

Studies that look at the entire life cycle of various building products demon-

strate that plastic building and construction materials save *lots* of energy. The energy saved by using plastic building and construction materials compared to alternative materials is approximately 467.2 trillion BTUs of energy a year—that's enough to meet the average annual energy needs of 4.6 million U.S. households.

The most obvious example of an energy-saving plastic building product is, of course, insulation. Most of us are familiar with the concept of "R-value"—roughly speaking, how efficient a material is at "insulating" or (more specifically) the measure of resistance to heat flow of a given thickness of insulation. All kinds of plastic foam insulation have excellent R-values. In addition, a whole host of other plastic building products—such as house wraps, foam sealants, caulks, coatings, and so on—work together with plastic foam insulation to improve its ability to keep heat where it belongs.

And these products do their job well: Foam insulation can make a home *much* more energy efficient. A 2000 study for the entire country found that the annual savings in energy cost would be $2.58 billion—or $128.6 billion over 50 years—if all houses were insulated with plastic foam insulation.

Of course, it takes raw materials and energy to make insulation and other building products. But the small amount of energy inherent in plastics saves a huge amount of energy over time. Plastic insulation materials, for example, save as much as 40 BTUs of energy for every one BTU of energy consumed to make the material. House wraps save even more: 360 BTUs of energy for every one BTU used to make the material. That's huge.

And innovative new products made with plastics continually push the energy efficiency envelope. For example, a new tough, long-lasting LED bulb made with plastics can reduce energy use by up to 90% compared to an incandescent bulb. And new plastic roofing tiles incorporate solar cells in the tiles themselves instead of installers having to buy and install separate panels.

Beyond homes and buildings, plastics are delivering energy savings in lots of other applications:

- Today's autos are approximately 10% plastics by weight but approximately 50% by volume. These plastics contribute to improved safety and design—and also to lightweighting, which helps cars achieve increased fuel efficiency and create fewer emissions.

- Lightweight plastics are used to package more than 50% of typical consumer goods, but plastics make up only 17% of all packaging by weight. And plastic packaging consumes much less energy to make than alternative materials, and weighs considerably less. (One example: Planters® reduced the weight of its peanut jar by 84% when switching from glass to plastics. The plastic jar saves energy in manufacturing and reduces fuel use in transportation.)

"Building products made possible by plastics can conserve much more energy than is used to make them."

So... building products made possible by plastics can conserve much more energy than is used to make them, actually conserving fossil fuels.

But the job isn't done. Companies up and down the supply chain are constantly seeking materials and products that achieve even greater energy efficiency, and many are pursuing and utilizing alternative energy resources. And many companies also are decreasing their use of fossil fuel-derived feedstocks to make plastics; for example, one of the world's largest chemical companies recently announced plans to produce more than half of its plastics portfolio using renewable resources within 15 years.