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Energy Efficiency & Environmental News: Facts on Energy and Energy Use[1]

Florida Energy Extension Service and Gary Cook[2]

FACTS ON ENERGY AND ENERGY USE

What is lighting efficiency?

Answer: Lighting efficiency is usually expressed in lumens per watt (lumen = about 1 candle). Edison's light bulb produced about 0.6 lumens per watt. A modern 60-watt incandescent bulb produces 14.8 lumens per watt. A 13-watt twin tube fluorescent produces 56.3 lumens per watt. How much do I save using a compact fluorescent light? Changing incandescent to compact fluorescent lighting benefits everyone. A compact fluorescent light using 16 watts of energy replaces a 60-watt incandescent bulb. The life of this bulb is 10,000 hours or approximately 10 times longer than an incandescent bulb, saving $35 worth of energy over the life of the bulb. This eliminates the emission of 1300 pounds of carbon dioxide and 26 pounds of sulfur dioxide from a coal fired plant producing electricity. Considering 10 incandescent bulbs would have to be replaced at an average cost of 50 cents, the typical net savings using compact fluorescents would be $25 per bulb. The logic and economics in environmental savings are difficult to ignore. (Cook)

Should I turn off fluorescent lights when leaving the room for only a short period of time?

Answer: Both energy and money are saved when turning off fluorescent lights, even for a short period. When fluorescent lights were first introduced, starters were required along with ballast systems that required a heavy amount of start-up energy. Life was severely shortened by repeated on-off switching. However, beginning in 1976, fluorescent bulbs and ballasts became much more efficient. Consequently, both energy and dollars are saved when fluorescent lights are switched off even for a relatively short period, such as when going to the bathroom or getting coffee. Although bulb life is shortened slightly, the savings in energy more than compensate.

High Intensity Discharge (HID) lights, such as mercury, sodium vapor and metal halide, should not be turned off for periods less than 20 minutes because of the long cool down and warm up times required. (Cook, FEO)

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How much energy does it take to produce aluminum, copper, steel and other building materials?

Answer: Virtually all materials have intrinsic energy. It takes about 94,000 BTUs to produce one pound of virgin aluminum. Five thousand BTUs are needed to produce one pound of aluminum from recycled aluminum. It takes about 55,500 BTUs to produce one pound of virgin copper, 22,700 BTUs for one pound of virgin steel, and 40,640 BTUs of energy to produce an eight foot 2' x 4' stud. (Dr. Howard Odum, UF)

How does energy saving in the home compare to recycling energy savings?

Answer: Electrical energy savings in the home is almost 18 times greater than energy recovered through recycling in terms of the same percentage. For example, if a family of three reduce their waste stream by 10% through recycling, approximately 77,400 BTUs of energy could be saved. On the other hand, reducing electrical costs in the average home by 10% could mean a savings of 1,365,000 BTUs at the power plant. (Cook, Odum)

How much energy could be saved by using pine straw or wood chips for a driveway instead of asphalt?

Answer: Approximately 13 million BTUS. This is equivalent to the energy saved by a family of three recycling 3O% of their solid waste stream for almost five years. (Cook)

"...when you can measure what you are speaking about and express it in numbers you know something about it. . ." (Lord Kelvin, 1883)

What color asphalt shingle roof should I put on my Florida home?

Answer: Any color you like. Green is normally a better color for absorbing sunlight than black (Mother Nature can't be wrong). Dr. Eric Farbers research shows that color may not be the most important characteristic in determining absorption of heat. His research shows there are about 40 characteristics that determine absorption, one of which is color. Texture may play a more important role. This researcher has demonstrated that a smooth, black surface, when exposed to sunlight, will often be cooler than a white, rough surface. Interestingly, roof color and attic ventilation make little difference in determining temperatures in attics. Studies by T.S. Weatherington of Florida Power Corporation, Roger Messenger of Florida Atlantic University, and this writer have shown little variance in temperatures related to color, type of roof or ventilation methodology. These studies show that very seldom will attic temperatures exceed 11O°F for air just above insulation or ceiling level. However,the temperature within insulation on a summer day often exceeds the temperature of the air above it. The difference for this discrepancy comes from radiant heat being transmitted from the roof deck, which often gets as high as 140°F. Simulations by this writer show that it takes 17 1/2 tons of air conditioning to cool a small 1200 square foot attic to 78°F.

How much difference does attic ventilation make in reducing attic temperatures?

Answer: Not much. A study by this writer used temperature sensors placed above the ceiling insulation and on the conditioned side of the ceiling. The whole house fan, moving approximately 8,000 cubic feet of air per minute (a whole lot!), only reduced the attic temperature by eight degrees and the ceiling less than one degree. Conclusions: Turbine vents are not recommended for roof installation. Power vents for the attic are not recommended as they generally use more energy than they save. Other super-ventilation techniques may stir up the still air spaces within the attic insulation itself. The best strategy is the use of radiant heat barriers laid directly on top of the insulation with the foil side up. Seams should not be sealed; or, perforated radiant barrier materials should be used to prevent condensation.

Should vapor barriers be used in buildings?

Answer: Vapor barriers are not recommended for Florida homes and commercial buildings, particularly on the interior walls. Vinyl wallpapers serve as a vapor barrier and should be avoided, particularly where inside temperatures are expected to be below 75°F, otherwise, condensation could occur under the wallpaper. (Cook, Dr. Virginia Peart, UF)

Should I wash all my clothes in cold water using a cold water detergent to save energy?

Answer: No. According to Maytag studies, washing in warm water may be more energy efficient than washing in cold water. Oils emulsify better in warm water than in cold water, allowing less detergent to be used. Detergent is very energy intensive and tends to pollute the environment with phosphates. The other

alternative is to use a longer washing cycle, which is counter productive to energy use as well. The most energy efficient clean clothes are those washed with warm water. Of course, delicate clothes should be washed in cold water. Diapers, towels and most sheets should be washed in hot water for sanitary reasons.

What should I consider when choosing insulation?

Answer: Attics in new Florida homes should be insulated to R-26 or higher. Cellulose should be considered for attic insulation. Cellulose, designed to be blown or poured into the attic, is a recycled material made from finely shredded newspaper with boron and boric acid added to make it fire retardant and insect repellant. It covers the cracks and crevices in the attic much better than fiberglass batt insulation. Although more studies are needed, preliminary studies indicate that fiberglass particles used in fiberglass insulation used in the attic may cause cancer of the lungs in some situations. In the attic, fiberglass particles can be stirred by ventilation, bringing them into human contact through leaks in ducts when repairs are made to the wiring and other systems located in the attic, or when items in storage are accessed. Fiberglass is perfectly suitable as an insulation in the walls where it is encapsulated with the outside siding and inside sheet rock normally used in constriction. Cellulose can also be blown while wet, but should be allowed to dry thoroughly before covering with sheet rock. The equivalent insulation of cellulose insulation approximates that of fiberglass insulation. (Cook)

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