

Energy Lingo: What are these new Bio-words?

What happens when a bunch of brainy folks all study the same thing and become experts in their field? They come up with a lot of new words. In fact, in college, I think that most of my education was just learning the meaning of a lot of new words, like mycological and entomological (mushrooms and bugs). In our search for new sources of energy, other than petroleum (or is that “fossil fuels”), we have found a lot of new words.

For most of us it can be confusing. The meaning of a word often depends on the perspective of the person using it. For example, the phrase “alternative energy” would seem to mean a form of energy that is different than what is common. In the United States, we are looking for alternatives to oil. If I usually use wind for my energy source, then for me, alternative energy may be something other than wind. So, language can be an interesting and confusing tool. Just remember, the meanings of words must be understood from the perspective of how and where the word originated. My attempt here is to help you understand the new words being used to talk about energy. I thought that it would be entertaining to make up a song or poem to explain the new lingo, but I lack that talent. You have to suffer through a mundane narration of new words. These definitions are mostly my own understanding of the terms as I have seen them used, others are from two websites:

<http://matse1.mse.uinc.edu/home/.html> and

<http://www.easterntct.edu/depts/sustainenergy/education/glossary.htm>.

Because we are not happy with our current petroleum-based energy, we are looking for “alternative energy” - something that does not add carbon to the atmosphere; causes less pollution; something that is not traditional like oil or nuclear power; something that does not have so many adverse affects on our society and economy. We are looking for “sustainable” energy, something that is compatible with our society and ecosystem over a long time period - where our social fabric, communities, and our natural habitats will not degrade over time. Of course, a key to being sustainable is to use “renewable energy”. Sources of energy that either cannot be depleted or are replenished, like solar, wind, geothermal, ocean currents, and with good management biomass’ (wood, grass, oil-seed crops, plant and animal material). Depending on your perspective, biomass may include waste materials as well, such as animal manure, municipal and industrial wastes that are derived from plant and animal matter.

“Bioenergy” is a type of renewable energy, since it is organic matter from plant and animal matter. “Energy crops” are plants grown specifically for energy. Switchgrass is productive but only makes a fair animal feed, so it is grown primarily for energy. The entire plant is used for crops like grass and wood. Their organic matter has a lot of cellulose. Scientists are turning cellulose into ethanol, a “biofuel”. Biofuels by most folks are considered liquid fuels derived from plant and animal materials. Ethanol made from cellulose is sometimes called “cellulosic ethanol” to distinguish it from our traditional ethanol that is made from starch found in corn and other grains.

There is more than just cellulose in the biomass of grass and wood. “Biorefining” is a term used to describe the many processes to take apart biomass and separate it into its individual parts. Some of those parts are lignin, hemicellulose, various sugars, and other chemicals that naturally occur in the plant. Scientists have uses for each of these components.

Ethanol is not the only biofuel. “Biodiesel” is another. It is made from vegetable oils and animal fats. In this process, the glycerine is separated from the fatty acids in fats and oils. It is replaced by an alcohol (either methanol or ethanol). This biofuel called biodiesel can replace regular petroleum diesel fuel.

The biomass materials used to make biofuels are called “feedstocks”. Feedstocks are essentially the raw material which is processed into a different more usable product. Grass and corn are feedstocks for ethanol. Vegetable oil and fat are feedstocks for biodiesel. Biodiesel is often labeled as B5, B10, or B100. The “B” is for biodiesel and the number is the percent biodiesel in the fuel. So, “B10” is 10% biodiesel and 90% petroleum diesel.

There are other processes to turn biomass into biofuels. Gasification is a very old process, where organic matter is heated to hundreds of degrees Fahrenheit with little or no oxygen. This is often done under very high pressure. Because there is too little oxygen. The organic matter does not burn into carbon dioxide as in a normal fire, but it breaks down into gases which can be burned (methane, carbon monoxide, and hydrogen). These gases may be burned as fuel or run through chemical processes to turn them into liquid biofuels. Another much simpler process, is to simply make the biomass much more dense, by pelletizing it. The biomass is forced through a small hole under pressure to get a pellet, like wood and grass pellets for the common pellet stove.

Lastly, manure is another good feedstock to make a biofuel called “biogas”. Manure is put into a large tank called a methane digester, and anaerobic bacteria (bacteria that live without oxygen) consume the organic matter in the manure and give off methane. Methane is the same chemical as natural gas. Carbon dioxide, hydrogen sulfide, and water vapor are mixed with the methane in the digester and it is called biogas. Methane composes 50% - 60% of biogas.

These are just some of the new words that are becoming part of our everyday language.

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