Chemical decomposition of both biomass and crude oil is accomplished thermochemically by heating the raw matter or crude until it breaks down into component compounds. This is carried out in a pyrolytic reactor sometimes called a fractional still, tower or column in the oil refining industry.

When biomass is cracked in a pyrolytic reactor the four major fuels produced are charcoal, pyrolytic fuel oils, methanol and BTU gasses.

Charcoal is cleaner burning than coal and equal to it in BTU heat value per pound. About 50% of the coal consumed in the USA is used to generate electricity.

Pyrolytic oils are comparable to petroleum fuel oils in heat content on a volume basis. Secondary refining of pyrolytic oils can produce resins for chemical applications and diesel engine fuels.

Low and intermediate BTU gasses are also generated in the pyrolytic reactor. These pyrolytic gasses contain mostly hydrogen and carbon monoxide mixtures. They are not suitable for pipeline transport, but are good fuels for co-generating steam and electricity.

The pyrolytic reactor can be adjusted to produce BTU gas only. The BTU gas is then processed on site into syngas. The syngas is converted into methanol. Methanol is a primary resource or feedstock used by the chemical industry to synthesize numerous products essential to industry as a whole. And the methanol produced from syngas can replace gasoline fuels. Methanol burns cleaner, develops more horsepower and causes less engine wear than gasoline.

Biomass fuel production is a decentralized industry. Thousands of acres in energy crops are needed to supply one biomass refinery on a year round basis. In fact plans were projected to have one biomass refinery in every fifty mile radius in large energy farming areas. A decentralized energy industry strengthens the economy spreading the wealth to more people in more communities.

The fossil fuel industry is centralized with large production and refinery systems located near oil and coal deposits. These processing operations tend to be large for economic reasons. And the wealth is spread through corporate philosophy.

The Reagan and Bush administrations have done nothing to help develop the biomass fuels industry, instead fully promoting and defending the centralized oil industry. The Arab oil embargo of the mid-1970's inspired government under the Carter administration to investigate alternatives to fossil fuels. Biomass conversion was the most promising. Perhaps now that America is under new leadership, government may yet be brought again to consider the stability, and benefits of civilization's oldest renewable energy resource — biomass.

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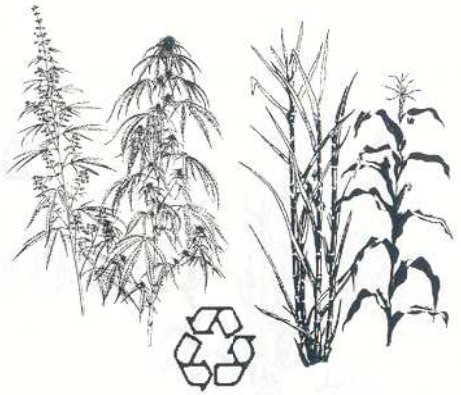
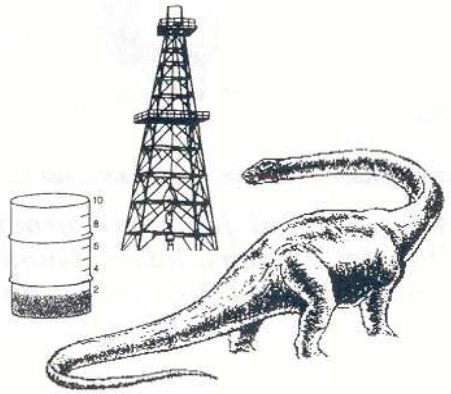
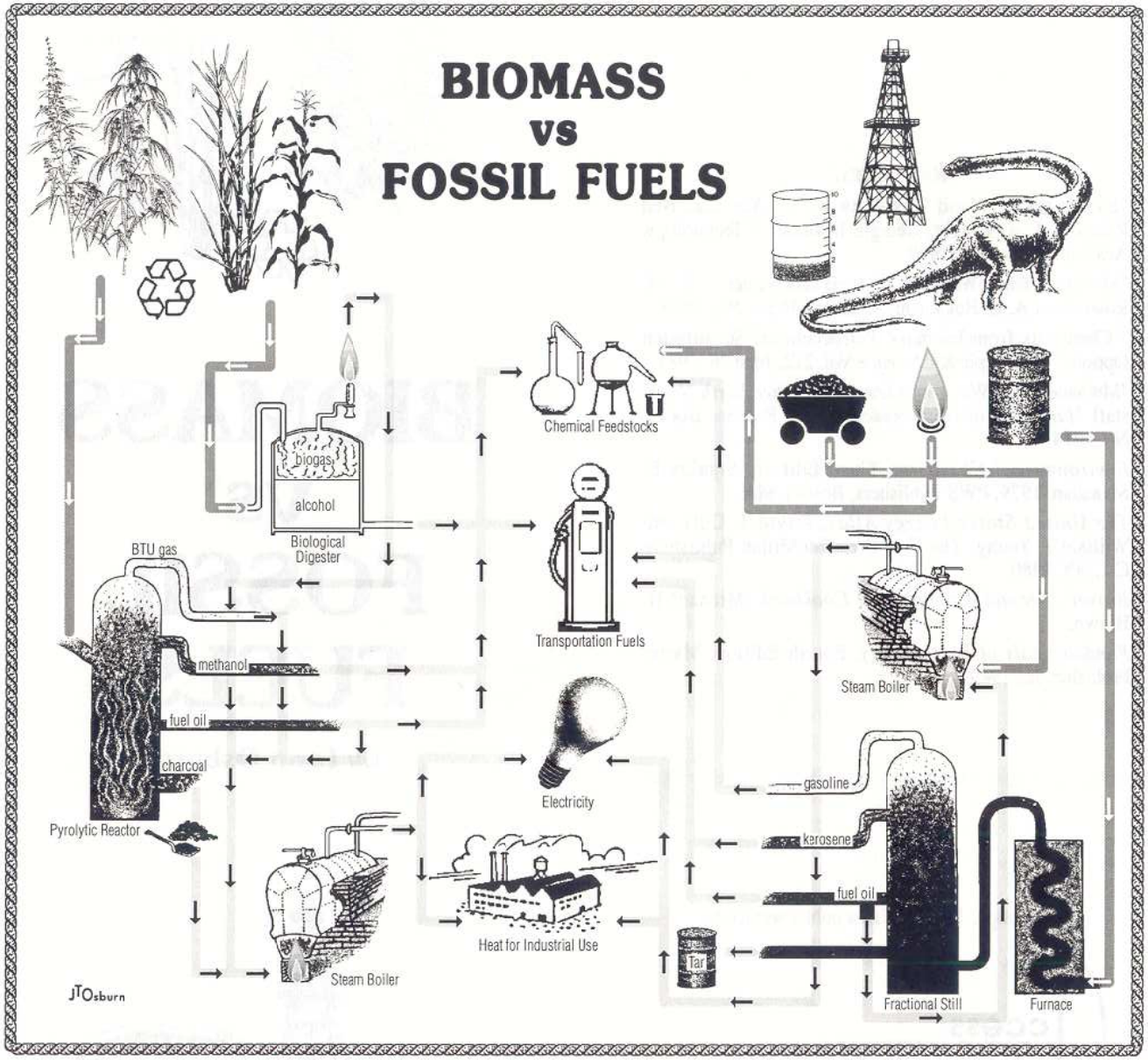


BIOMASS vs FOSSIL FUELS

by Lynn Osburn





Biomass derived fuels can provide all U.S. energy needs currently supplied by fossil fuels. America has consumed 80% of her known oil and gas reserves. The use of biomass derived fuels will reduce acid rain and reverse the greenhouse effect.

Fuels derived from biomass or fossil resources are refined using the same basic technology. The biggest difference is how these raw resources are gathered. Biomass resources are plants harvested from forest or field. Fossil resources are mineralized plant and animal deposits extracted from layers and reservoirs beneath the earth's surface.

Biomass is a renewable and virtually inexhaustible agricultural product. Fossil fuel materials are finite and limited to the volumes remaining in underground reserves.

The same thermochemistry technology is used to produce biomass and fossil fuels. The energy potential in both is extracted from hydro-carbon molecules. Hydrocarbon molecules can be chemically engineered into a multitude of fuels with diverse applications.

Biomass derived fuels are made by mechanical processing, biological digestion and chemical decomposition. Biological digestion is not employed to make any fossil fuels and remains unique to the biomass fuel industry.

Biomass crops once harvested are mechanically processed to reduce bulk before further refinement. Heavy farm machinery cuts, chips and shreds, then presses the energy crop into pellets for shipment to biomass refineries or industrial users. Biomass pellets are sometimes burned as boiler fuel in steam production. They cost less than other biomass derived fuels, but ash build up in the firebox and lower BTU per pound ratios make pellets a less attractive fuel.

High moisture plants like corn and sugar cane are good crops for biological digestion and have been used traditionally to make ethanol intoxicants. Ethyl alcohol is made by yeast fermentation of plants with high carbohydrate content. Other alcohols including methanol are made by bacterial digestion. Fermented alcohols are valuable chemical feedstocks.

Bacterial digestion of biomass can also produce methane rich biogas. Biogas is an intermediate BTU gas (300-400 BTU/standard cubic foot). Methane is a high BTU (1000 BTU/scf) gas and can be extracted from the raw biogas. Methane and biogas make excellent boiler fuels.

Chemical decomposition is the method used to make fossil fuels. Biomass fuels produced in this manner are capable of replacing all fossil fuels. The best plant crops for energy production through chemical decomposition are woody and dry herbaceous types. Hemp is a dry herbaceous type though it can be somewhat woody. Hemp is an ideal crop resource for chemical decomposition to produce energy fuels.