BIOLOGICAL FUEL GENERATION

The continual depletion of global fossil fuel energy has generated an ever-increasing need to seek out alternative sources of energy. These have so far included the harnessing of hydro, tidal, wave and wind power, the capture of solar and geothermal energy supplies, and nuclear power. There is now a growing appreciation of biological energy systems. Biomass such as forest, agricultural and animal residues and industrial and domestic organic wastes can now be converted by physico-chemical and/or fermentation processes to clean fuels and petrochemical substitutes. Photosynthetically derived biomass that exists in many available forms in the environment could well be transformed into storable fuels and chemical feedstocks such as alcohols and methane gas. Biomass can be considered as a renewable energy source, and can be converted into either direct energy or energy-carrier compounds by direct combustion, anaerobic digestion systems, destructive distillation, gasification, chemical hydrolysis and biochemical hydrolysis.
There are three main directions that can be followed to achieve biomass supply:

1) cultivation of so-called energy crops,
2) harvesting of natural vegetation;
3) utilisation of agricultural and other organic wastes.

The conversion of the resulting biomass to usable fuels can be accomplished by biological or chemical means or by a combination of both. The two main end-products are methane or ethanol, although other products may arise depending on initial biomass and the process utilised, e.g. solid fuels, hydrogen, low-energy gases, methanol, and longer-chain hydrocarbons.

1 *Read* Biological fuel generation *and make your own glossary choosing from the words underlined in the passage.*

a. ..... = always growing
b. ..... = cutting and gathering
c. ..... = raw materials
d. ..... = reduction in quantity
e. ..... = try to find
f. ..... = up to the present
g. ..... = utilization

2 *Answer these questions about* Biological fuel generation.

a. What does fossil fuel energy derive from?
b. What do alternative sources of energy include?
c. What does biomass consist of?
d. What methods may be used to convert biomass into an energy source?
e. How can an abundant supply of biomass be obtained?
f. What products may be derived from biomass?