Glossary of technical terms

Adsorption
Adsorption happens when a gas or liquid forms a film of molecules on the surface of a solid or a liquid.

Cation exchange capacity
The cation exchange capacity is the capacity of soil to allow exchange positively charged ions between soil and plant. This means that soil with a high cation exchange capacity can best make nutrients accessible to plants. It is used as a measure of fertility, nutrient retention capacity, and the capacity go protect groundwater from cation contamination.

Carbon Sequestration
Retention of carbon in ways which prevent or significantly delay its emission into the atmosphere as CO_2. Usually this takes the form of biomass, soil carbon or ocean storage, or using CCS technology stored underground in depleted oil and gas reservoirs, coal seams or saline aquifers.

Carbon Capture and Storage, or CCS
Capture of CO_2 emitted from large point sources, compression, transportation and injection into underground geological formations for long-term storage.

EJ
One exajoule or etajoule is 10^{18}Joules.

Fischer-Tropsch gasification
This is one of the 'second generation' or 'biomass to liquids' technologies being developed. It involves two different technologies: Gasification involves heating the biomass at high temperatures with a controlled amount of oxygen. This results in a mixture called synthetic gas or syngas. This syngas is then purified and, in a Fischer-Tropsch plant, carbon monoxide and hydrogen are combined in a catalytic reaction and turned into different liquid hydrocarbons.

Net Biome Production (NBP)
The net production of organic matter in a biome, which takes account of fire, forest clearance, erosion and harvests. NBP is the total carbon accumulated by the biosphere.

Net Primary Production (NPP)
The increase in plant biomass, or carbon in biomass, calculated over a set area. It is calculated as the total carbon taken up by the biosphere through photosynthesis, minus the carbon lost through autotrophic respiration, i.e. respiration by plants, including algae.

Planet Venus Scenario
This term is used to describe 'true' runaway warming where the ability of earth systems to stabilise temperatures has been invalidated. In such a scenario, warming would continuously reinforce itself as water from all freshwater and ocean sources evaporates into water vapour, a powerful green house gas. This extreme event is believed to have occurred on planet Venus, where temperatures today reach 480 degrees Centigrade.

Pyrolysis
Thermal degradation of waste without oxygen, to produce char, bio-oil and syngas. Biomass, ground into fine particles, is exposed to temperatures of 350 to 500 degrees C for short periods.

With fast pyrolysis, biomass is exposed to temperatures of 450-500 degrees C for 0.5-2 seconds.

With slow pyrolysis, biomass is heated more slowly to 350-450 degrees C. Slow pyrolysis yields more char and syngas and less bio-oil than fast pyrolysis.

Radiative forcings
Radiative forcing is the difference between incoming solar energy and the energy radiated out into space by the planet. At present, the Earth is experiencing strongly positive radiative forcings, largely because of an increase in greenhouse gases and, to a smaller extent, black soot and ozone. This means that the planet is absorbing more energy than it radiates back and is warming as a result. This situation is often referred to as 'radiative imbalance', implying that some degree of further warming is unavoidable.

Sorbents
Sorbents are materials which adsorb liquid or gases. Adsorption is a process in which gas or liquids accumulate on the surface of a solid or a liquid, forming a film of molecules or atoms. Sponges, for example, adsorb many times their own weight in water.

Syngas
Syngas is a gas mixture containing carbon monoxide, hydrogen and other trace gases. It is generated by gasifying fossil fuels or biomass. Gasification means breaking down hydrocarbons at high temperatures, by carefully controlling the amount of oxygen. Syngas from biomass is used as a fuel, for hydrogen production, or as a precursor to synthetic diesel.