Energy Summary

APES Energy Unit

Big bang: Hydrogen->fusion -> Helium ->iron stars (red giants)

Giant red giants ->supernova->all elements beyond iron

Hydrogen, Helium and other elements->our sun

Sun: Hydrogen fusion->helium (helios means sun in greek)

Direct solar energy:

Sun is source of photosynthesis

Photosynthesis: light + CO_2 + water->sugar (carbon based fuel)

Biomass is using this as renewable fuel (wood, sugarcane->ethanol)

Dead plants and animals (fossil fuels) + oxygen -> energy again

Fossil fuels are slow legacy solar energy, stored from eons ago

Sun is also source of **radiant energy:**

Solar thermal: capturing radiation, turn to heat, store this thermal energy

Solar photovoltaic: capture radiation, move electrons, create direct current electricity (plus and minus, just like batteries)

Wind energy: from solar radiation heating air, moves across the surface, moves blades, turbine, electricity

Tidal energy: caused by gravity from the sun (and moon) pulling on water, moving it through turbines, electricity

Uranium from those supernova is in the earth core:

Slow nuclear energy: geothermal (actually geo-nuclear-thermal) energy

Fast nuclear energy: dig up Uranium, create heat, make steam, move turbines, create alternating current electricity (like in your house)

Future energy: Use Hydrogen isotopes to create fusion: H + H ->He (like the sun)

issues: 1 million degrees, hard to ignite (pressure and temp like in the sun core)

Renewable Energy:

Direct solar: solar thermal, solar PV

Indirect solar: wind energy, tidal energy

Photosynthesis solar: biomass (wood, sugarcane, ethanol)

Non-renewable energy: (e.g. not from the sun each day)

Fossil fuels: coal, oil, natural gas

Nuclear fuels: uranium, thorium

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