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ALBEDO: GLOBAL WARMING & AN INTRODUCTION AND UNDERSTANDING ITS CONTEXT TO THE GREENHOUSE EFFECT.

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RADIATION BALANCE OF EARTH:- The sun radiates vast quantities of energy into space, across a wide spectrum of wavelengths. (Image no-01) Most of the radiant energy from the sun is concentrated in the visible and near-visible parts of the spectrum. The narrow band of visible light, between 400and 700 nm, represents 43% of the total radiant energy emitted. Wavelengths shorter than the visible account for 7 to 8% of the total, but are extremely important because of their high energy per photon.The shorter the wavelength of light, the more energy is contains. Thus, ultraviolet light is very energetic (capable of breaking apart stable biological molecules and causing sunburn and skin cancers). The remaining 49-50% of the radiant energy is spread over the wavelengths longer than those of visible light. These lie in the near infrared range from 700 to 1000nm; the thermal infrared, between 5 and 20 microns; and the far infrared regions.

FROM THE SUN, THE ENERGY COMES IN FORM OF SHORTWAVE RADIATION

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EARTH'S SURFACE, HEATED BY THE INCOMING SUNLIGHT,EMITS RELATIVELY LONG-WA WAVELENGTH INFRARED PHOTONS. THESE IR PHOTONS MOVE UPWARD FROM THE SURFACE THROUGH THE ATMOSPHERE

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THIS ENERGY, REACHING TO EARTH IN FORM OF SHORT WAVE,HEATS THE EARTH

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HOT OBJECTS GIVE OFF IDGH ENERGY, SHORT WAVELENGTH PHOTONS; COOLER OBJECTS EMIT LOWER ENERGY, LONGER WAVELENGTH PHOTONS. ANY OBJECT WARMER THAN ABSOLUTE ZERO GIVES OFF ELECTROMAGNETIC RADIATION.

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A PART OF IT GETS REFLECTED BACK IN SPACE, PART OF IT GOES TO EARTH, AS OUR ATMOSPHERE IS TRANSPARENT TO THESE SHORTWAVE RADIATIONS.

The atmosphere, which is mostly transparent in visible light wavelength's is definitely not transparent at ir wavelengths. The portion of incoming sunlight that is absorbed by earth is re-emitted radiation. Some IR energy escapes directly to space, but most is absorbed by greenhouse gases in the atmosphere. This warm earth's atmosphere; our atmosphere would be roughly 30^0c (540 f) colder if it contained no greenhouse gases. It is these greenhouse gases that keeps the earth warm in the otherwise cold universe.

MAJOR GREENHOUSE GASES & THEIR OCCURRING · CO_2- Carbon Dioxide-Occurs naturally in nature. H_2O- Water-Occurs naturally in nature. · N_2O- Nitrous Oxide ·CH_4- Methane · Chlorofluorocarbon Each greenhouse gas differs in its ability to absorb heat in the atmosphere. HFCs and PFCs are the most heat-absorbent. Methane traps over 21 times more heat per molecule than carbon dioxide absorbs 270 times-REPEAT. 270 TIMES more heat per molecule than carbon dioxide. Often, estimate of greenhouse gas emissions are presented in units of metric tons of carbon equivalents (MMTCE), which weights each gas by its GWP value, or Global Warming Potential. Human industrial activities over last century have increased the content of THE GREENHOUSE GASES, thereby disturbing THE NATURAL GREENHOUSE EFFECT. The average temperature of

the globe has been observed increased, and this has started GLOBAL WARMING! Due to the global warming phenomenon, the ice over the Antarctic and poles has been melting. 'ICE IS THE KEY' and there is no argument to it.

ALBEDO :- The term ALBEDO-(latin for white) is commonly used to applied to the overall average reflection coefficient of an object. The albedo of an object is the extent to which it reflects light, defined as the ratio of reflected to incident electromagnetic radiation. It is a unit less measure indicative of surface's or body's diffuse reflectivity. The word is derived from a\bus, a latin word for "white". 'Albedo' is the fraction of solar energy (shortwave radiation) reflected from the earth back into space. It is a measure of the reflectivity of the earth's surface. Ice, especially with snow on top of it, has a high albedo: most sunlight hitting the surface bounces back towards space. Deeply shadowed cavities can achieve an effective albedo approaching the zero of a blackbody.

ALBEDO VALUES TYPICAL SURFACE ALBEDO	
FRESH 0.04	Worn 0.12
ASPHALT	Asphalt
CONIFER FOREST 0.08	Bare soil 0.17
(SUMMER)	Green 0.25
	Grass
	Desert 0.40
	Sand
	New 0.55
	Concrete
	Fresh Snow 0.80-0.90

OTHERALBEDOVALUESURBANAREAS:-
Urban areas in particular have very unnatural values for albedo because of the many human-built structures which absorb light before the light can reach the surface. In the northern part of the world, cities are relatively dark, and their average albedo is about 7% with only a slight increase during the summer. In most tropical countries, cities average around 12%.

TREESIFORESTS :- Because trees tend to have a low albedo, removing forests would tend to increase albedo and thereby could localized climate cooling.

CLOUDS :- Clouds are another source of albedo that play role into the global warming equation. Different types of clouds have different albedo values, theoretically ranging from a minimum of near 0% to a maximum in the high 70s. "On any given day, about half of Earth is covered by clouds, which reflect more sunlight than land and water. Clouds keep Earth cool by reflective sunlight, but they can also serve as blankets to trap warmth."

CONCLUDINGREMARKS

· It is clearly evident that the increased use of fossil fuels and other industrial activities have increased the amount of natural greenhouse gases in the atmosphere, thereby triggering something that is called GLOBAL WARMING! ·Though, a certain groups of people still claim and believe that GLOBAL WARMING is not a man made phenomenon, but it is the another climate change exercise initiated by the nature. They have their own, interesting arguments in contradiction to THE GREENHOUSE EFFECT and GLOBAL WARMING! ·In any case,ALBEDO immerges as a tool that can help us monitor the global warming process!

· Increase the ALBEDO of the planet!??? 4. Warren, S.G. ,(1982), ' Optical Properties of Snow,' Rev. Geopy Spare Phys.5. Albedo Map of Earth,' image courtacy NASA, USA. 6. Kajikawa, M.' (1989),' Relation Between New Snow Density and Shape of Snow Crystal, (in Japese with English abstract) seppgo. 7. Wang, W.C. & Stone,P.H. (1980), 'Effect of ice-albedo feedback on global Sensiticity in a one dimensional rediative-convective Climate Model,.

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