

Advisory Outlook

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Climate Change – Back to the Basics Why the SUN Matters (Part one)



Mories Atoki

“I'd put my money on the sun and solar energy. What a source of power! I hope we don't have to wait until oil and coal runs out before we tackle that.”

Thomas Alva Edison
Inventor and Businessman

“...the people who are crazy enough to think they can change the world are the ones who actually do.”

Steve Jobs

Climate Change Literacy

The Sun as the Primary Source of Energy for the Climate System

Identifying with the sun as the primary source of energy helps us lay the foundation for understanding the earth's climate system and its scheme for energy equilibrium. The sun warms the earth, drives the cycle of hydrology (transition of the earth's water from evaporation to precipitation in form of rain, snow, etc. back to evaporation) and provides photosynthesis for plants and organisms, thereby making it possible for life to exist on earth.

The amount of solar energy received by the earth is affected by the amount of solar radiation, the angle of the sun, the amount of energy reflected back to space, and the variations occasioned by the earth's cyclical orbit around the sun, which result in day and night as well as seasonal changes.

Five key concepts

- The sun's energy heats the earth, thereby warming land, water bodies and the atmosphere. However, some of the sunlight is reflected back to space without absorption. This reflectivity of the earth's surface, or “albedo”, commonly occurs from white surfaces such as ice and snow. Yet, only a portion of the sun's energy is reflected back globally as most of it is absorbed into the earth's atmosphere and surface.
- When the incoming energy from the sun matches the outflow of heat from the planet, the earth's energy budget is in balance and average global temperatures can remain constant. A heat retention imbalance would however result in global warming, as is currently observed.
- The earth's axis is tilted at 23.5 degrees. The earth's rotation on its axis relative to the position of the sun results in the predictable transition from night to day over a daily period. As it rotates on its axis, the earth also makes an orbit around the sun over a yearly period. During a part of this annual cycle, the Northern Hemisphere is tilted towards the sun, resulting in a Northern summer while the South experiences winter. At a different time of the year, the Southern Hemisphere is tilted towards the sun, resulting in, for instance, South African and Australian summers while North America and Europe simultaneously experience winter. This is responsible for other seasonal cycles and related temperature changes across the globe.

- Over time, gradual changes in the earth's rotation and orbit result in other climatic differences, such that in the last 1 million years plus, changes have occurred in cycles of 100,000 years or more, resulting in the so-called ice ages and other eras of long term reduction in the earth's average temperatures.
- Just as significant increase or reduction in heat retention on the surface of the earth will cause the earth to warm or cool, so would a significant increase or decrease in the sun's energy output also affect global average temperatures. Nevertheless, satellite measurements taken in the latter part of the 20th century have shown only a slight upward or downward change in solar energy output. As the impact of this to recent global warming is said to be negligible, human activity therefore remains a primary factor in global climate change.

Generating a Low Carbon Economy

Most forms of energy are derived one way or other from the sun. Fossil fuels, including coal, oil and natural gas, are the result of organic matter from once-living organisms, such as decayed plants and animals, being exposed to the sun's heat and other pressures within the earth's crust over hundreds of millions of years. Due to the exceedingly long amount of time required for the formation of fossil fuels, they are classified as a non-renewable form of energy. The use (burning) of fossil fuels results in the release of billions of tonnes of carbon dioxide every year, which has contributed to global warming and climate change. Any quest to generate a low carbon economy therefore emphasizes alternative/renewable energy sources such as solar energy, wind power, hydroelectricity, etc.

Amazingly, the total energy reaching the earth from the sun has been determined to be more than 10,000 times the amount of energy currently in use by human beings. Moreover, apart from solar power, the sun's energy finds presence in many other forms of renewable energy. For instance, the sun influences weather patterns that drive wind turbines for use in generating wind power. Also, sun-induced evaporation results in rainfall that finds its way to water bodies set up behind dams used for hydropower. The sun's place as a primary source of energy in a low carbon economy is therefore unarguable!

Look out for 'part two' of this series as examine solar power in Nigeria along the business Landscape more

closely, reflecting on where we are, challenges faced and the Nigeria legal framework

Our Responsibility

Climate change action is a responsibility of not just governments and businesses, but also us as individuals, right from our homes, offices and other spheres of operation.

Things We Can Do:

- Conserve energy by switching off lights and other electricity points when not in use.
- Unplug devices when possible, to avoid use of "phantom" energy. Using a power strip can enable switching off of multiple devices with one flip of a switch.
- Switch to compact fluorescent or LED light bulbs, which cost more but last longer and use only around a quarter of the energy consumed by conventional bulbs.
- Use more energy efficient devices and equipment.
- Use fuel efficient cars.
- Repair your vehicle and keep in good shape and where necessary use the mass transit bus system, car pool or cycle to work.
- Consider working from home or telecommuting with your office.
- Go Renewable! Use Photovoltaic systems (solar panels) and biofuels.
- Use natural ventilation and keep windows open for good ventilation.
- Dispose waste properly – separating, cans, bottles, nylons and food before disposing.
- Reduce, Reuse and Recycle necessary materials.
- Adopt waste to energy technologies.
- Consider the environment when printing papers
- Use fridges with tetraflouroethane, HFC, etc. refrigerants.
- For your cooking, use gas cookers.
- Plant a tree and reduce deforestation.
- Utilise agricultural waste for manure and energy.

About the author

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