

# RENEWABLE ENERGY AS THE KEY FOR ENVIRONMENTAL SUSTAINABILITY AND POVERTY REDUCTION

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# Introduction

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Renewable energy is generally defined as energy that comes from resources which are naturally replenished on a human timescale such as sunlight, wind, rain, tides, waves, and geothermal heat

Renewable energy replaces conventional fuels in four distinct areas: electricity generation, air and water heating/cooling, motor fuels, and rural (off-grid) energy services.

Energy poverty affects billions of people around the world - 20 percent of us live without basic energy services such as electricity and clean cooking facilities. Sustainable development depends on universalizing energy access to eradicate poverty , advance health, education and others.



# Present Energy Resources

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- Fossil fuels - coal, oil, gas are all of limited amounts. Cant be replaced.
- Nuclear fuels -limited amounts of uranium for nuclear fission reactors but reprocessing of fuel possible.



# What are the Renewable Energy options?

## ELECTRICITY

Wind turbines



Solar PV



Hydro power



## HEAT

Biomass



District Heating



Solar thermal





## Solar Energy (from the Sun)

- Solar heating panels/passive
  - are situated on roof of building.
  - absorb heat in the form of radiation from sun.
  - system works like a domestic central heating radiator painted black/insulated.
- Solar power generation
  - Mostly located in desert/high intensity/long sunlight hours
  - parabolic mirrors reflect/focus sun's rays onto metal water pipe located along focal axis of mirrors.
  - High temperature produced - steam - electrical power generated



- Solar cells / photovoltaic cells
  - convert light into a small electrical output – milli-watts output.
  - need a bank/array of cells for useful output.
  - cost of cells is high but reducing.
  - efficiency of cells is up to 23%/ improving.

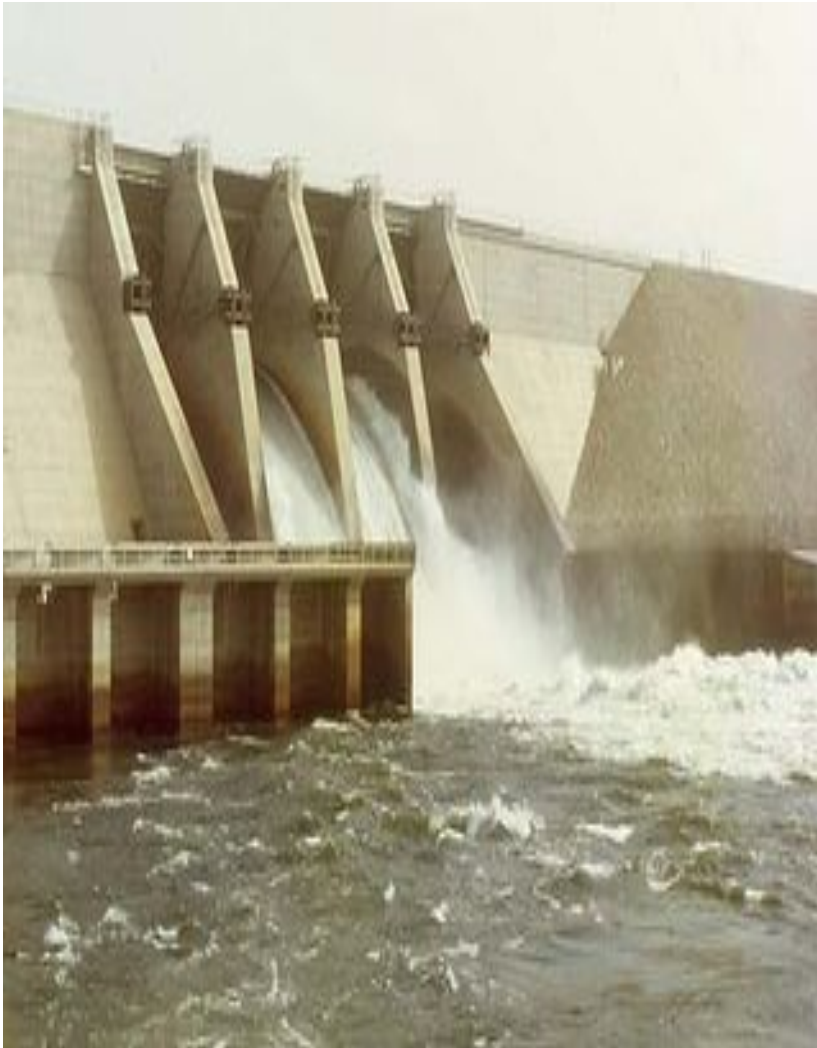




# Wind Turbines



- Wind energy is the electrical energy obtained from harnessing the wind
- Simply stated, a wind turbine works the opposite of a fan. Instead of using electricity to make wind, like a fan, wind turbines use wind to make electricity.
- The wind turns the blades, which spin a shaft, which connects to a generator and makes electricity.
- Wind farm needs to be located where there is a relatively high average wind speed.



- Currently largest source of electricity from renewables.
- Needs guaranteed supply of water.
- Kinetic energy of water rotates turbines which generate electricity.
- Hydroelectric have been a source for generating electricity in Nigeria since the 1970s



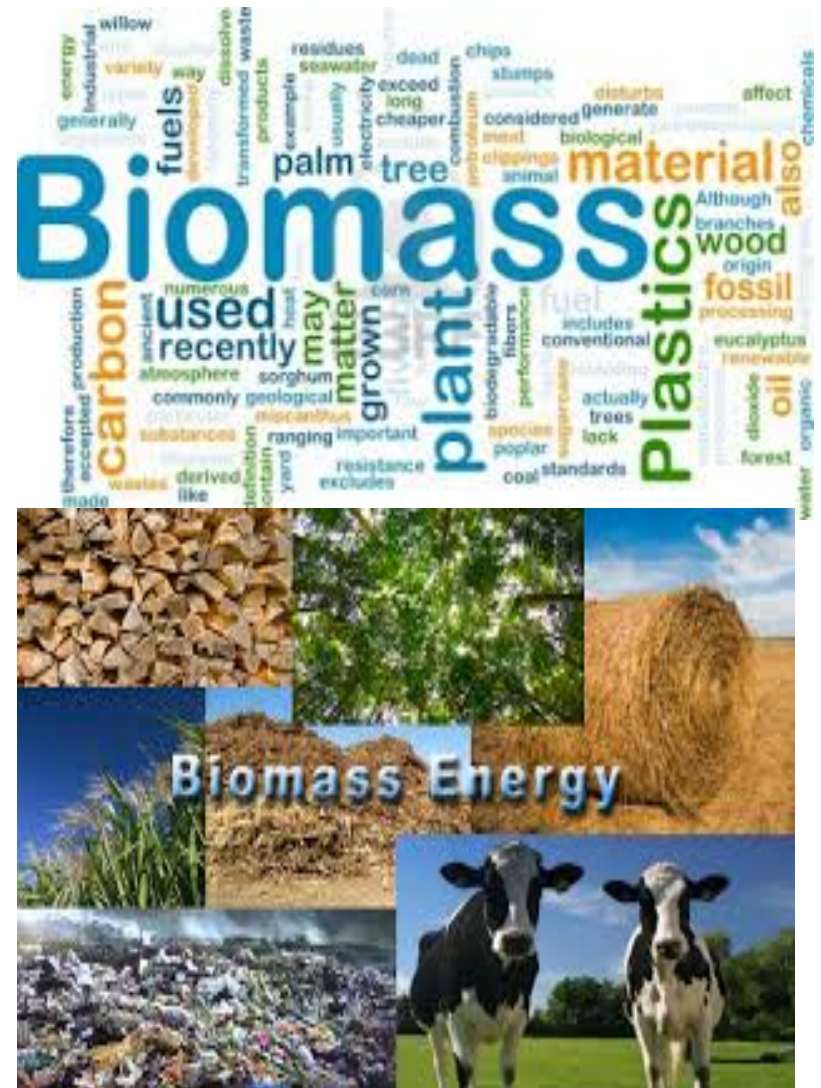
# Wave Power



- Wave power is the transport of energy by ocean surface waves,
- and the capture of that energy to do useful work –electricity generation, water desalination, or the pumping of water (into reservoirs).
- A machine able to exploit wave power is generally known as a wave energy converter (WEC).

# Biomass

- Combustion of wood to produce heat
- Use of energy crops for biofuels
- Converting waste from landfills into energy, collecting methane for biogas



# How Environmentally Sustainable is Renewable Energy??



- Renewable energy resources are being generated/ replaced at the same rate that they are being utilised naturally, hence they will last indefinitely.
- Renewable energy and energy efficiency are widely recognized as the most promising alternatives for reducing fossil energy consumption, mitigating climate change, and advancing the goal of energy sustainability.
- It propels a green economy revolution and captures interrelationship between the environment, the economy, and human wellbeing in the effort to meet the needs of the present without compromising the ability of future generations to meet their own needs.
- It reduces drastically the consumption of resources like coal, fossil fuel and others that has many harmful environmental effects: devastating lands ,causing air and water pollution that are toxic to human health and the environment.
- Use of Renewable energy sources enables people to cook without suffering from wood-smoke pollution. It also reduces CO<sub>2</sub> emissions by removing the need for highly polluting diesel generators.



# How does Renewable Energy translate to poverty reduction??

- Over 50% of Nigeria's 160 million people receive no electricity at all
- Direct cost is the negative impact on people's time — this can mean the time spent accessing alternatives, or the time lost because children cannot read in the evenings. The modern world is dependent on access to information, which in turn is only possible with a reliable and constant source of electric.
- Use of Renewable Energy alleviates poverty because it enhances the technological capacity of developing countries and therefore accelerates their economic development.
- Environmentally sound technology may also prevent people in developing countries from destroying the basis of their life-support through over-exploitation of natural resources.
- It allows for decentralisation and localisation of technology, has potential for a domestic industry and is labor-intensive rather than capital intensive.





**Bjorn Lomborg**

**“we should rather focus on getting more cheap energy to poor people, which is a proven way to reduce indoor air pollution, increase growth and alleviate poverty”**

- Reduce Malaria & Tuberculosis – Technology is simple, cheap avoids deaths and improves society productivity
- Remove fossil fuel subsidies in developing countries – Wasteful resources, strains on government budgets, reduce carbon emissions



- 40% of the production cost of manufacturers in Nigeria goes into the provision of electricity, compared to 5-10% in other similar economies.
- Most importantly, it would remove the greatest obstacle to doing business in Nigeria which is electricity enabling manufacturing and other industries to compete internationally.
- Governments should develop Legislative and Regulatory frameworks to drive renewable energy use.
- Renewable energy provides an enormous opportunity to drastically reduce GHG emissions, pursue economic growth and enhance energy security. Thereby advancing sustainable development.
- Develop a communication and awareness action plan to raise awareness on the benefits of using renewable energy & energy efficiency against other forms
- Therefore Governments have a duty to create the enabling environment through a government –private collaboration in developing infrastructures required to drive renewable energy.





THANK YOU

- OPEC Bulletin Commentary, Cleaner Oil For A Cleaner Future (2007)
- POVERTY ALLEVIATION AND ENVIRONMENTAL SUSTAINABILITY THROUGH IMPROVED REGIMES OF TECHNOLOGY TRANSFER by Klaus Bosselmann
- Environmental Justice Issues In Sustainable Development: Environmental Justice In The Renewable Energy Transition by Uma Outka
- INTERNATIONAL LAW AND RENEWABLE ENERGY:FACILITATING SUSTAINABLE ENERGY FOR ALL By STUART BRUCE
- Sustainability As A Means Of Improving Environmental Justice by John C. Dernbach
- United Nations 17 Sustainable Development Goals

