
TECHNICIAN TRAINING PROGRAMME



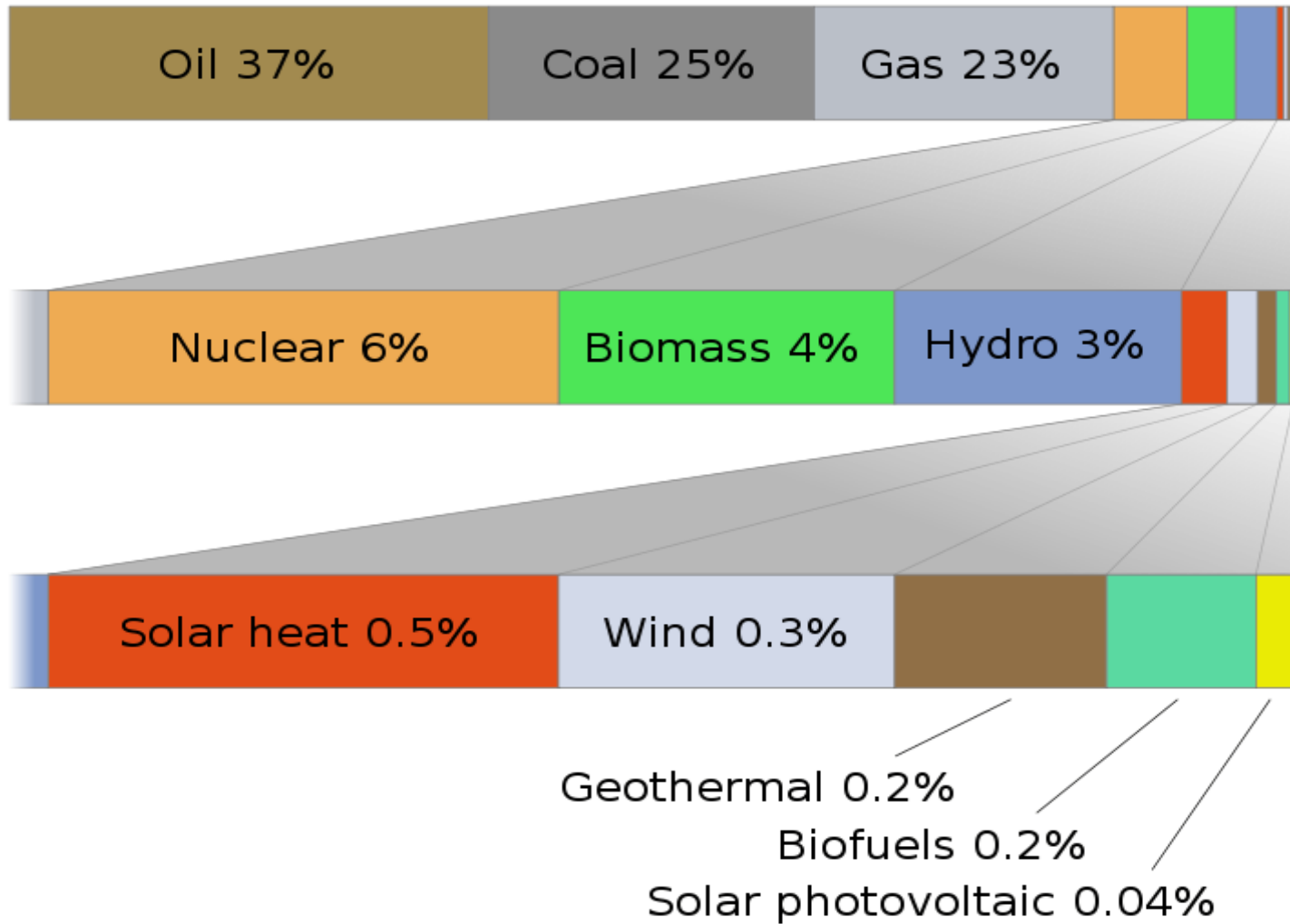
INTRODUCTION TO SOLAR ENERGY

ENERGY

THE BACK BONE BEHIND HUMAN ACTIVITIES



Where do we get the energy from



What is the origin of the energy sources

- Coal, oil and Gas –
Vegetation matter buried
under the earth (Fossil
fuels)
- Hydro – Running rivers

And they are all gifts from
the sun



SUN - SOME FACTS

Is a middle aged star

Is mid sized

4.5 bn yrs old

Converts 60core tons
of H_2 to He every Sec.

Loses 40 Lakhs tons of mass each second

Nuclear reaction will stop in about 500 crore yrs

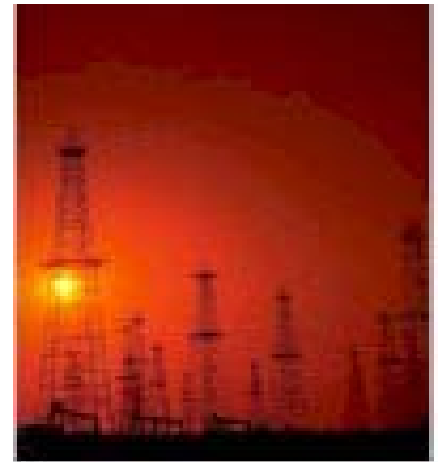


Will fossil fuels last for ever

Unfortunately not –

At 5% growth rate, our coal reserves can not last for >than 86 years

World oil production likely to reach a maximum by 2010-15 and would rapidly decline thereafter.



ARE THERE PROBLEMS

They Pollute the atmosphere releasing Carbon Monoxide, Sulphur and other toxic gases.

They cause global warming that can cause drought and floods and increase in sea levels.



WHAT ARE THE ALTERNATIVES

Fossil fuels give very high energy per unit weight.

They are easy to Transport and convenient to use

AND THEREFORE

There are no immediate substitute for fossil fuels

BUT

We have to find solutions soon



RENEWABLE ENERGIES ARE ALTERNATE ENERGY SOURCES



Solar



Wind



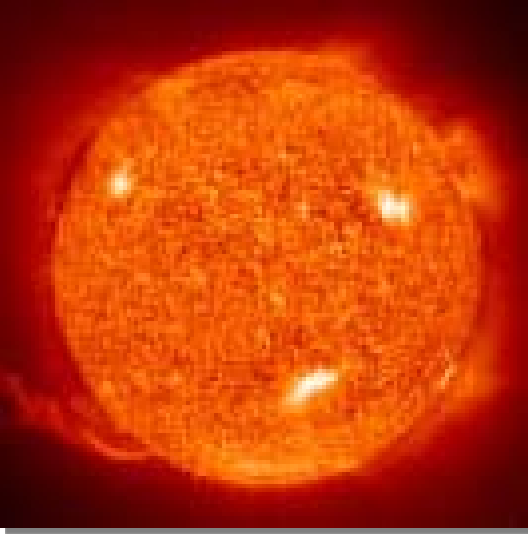
Wave



Biomass



Geothermal



Renewable Energy...

Definition: Energy from sources that are 'regenerative' and for all practical purposes cannot be depleted.

Examples: Sun, Wind, Hydro-electricity, Geothermal, Ocean currents, Biomass.



Power generated adds **ZERO**

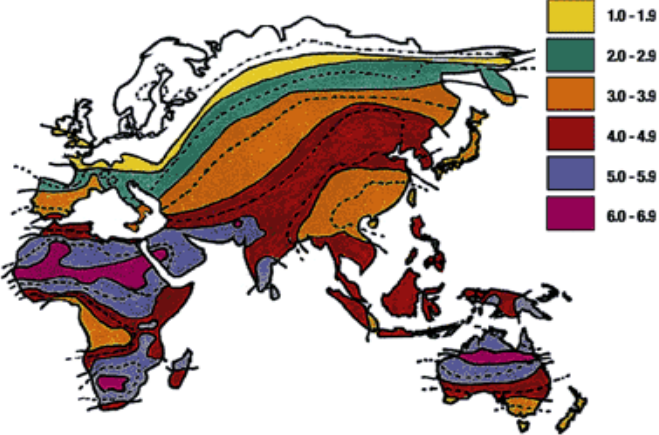
CARBON into the atmosphere thus you leave the Earth a better place...



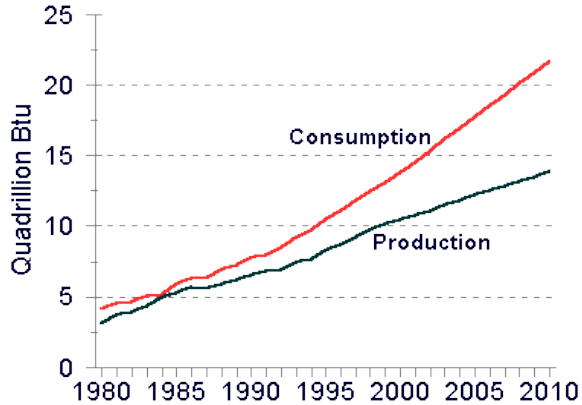
RENEWABLE ENERGY ADVANTAGES

- **No extraction process involved**
 - No transportation of fuel
 - De-centralized generation
 - Green energy – no pollution
 - Inexhaustible
 - Conserves precious natural resources
-

The Power of Sun ...



WORLD INSOLATION MAP
(winter peak sun hours in worst case month)



Source: U.S. Energy Information Administration

India's energy balance.



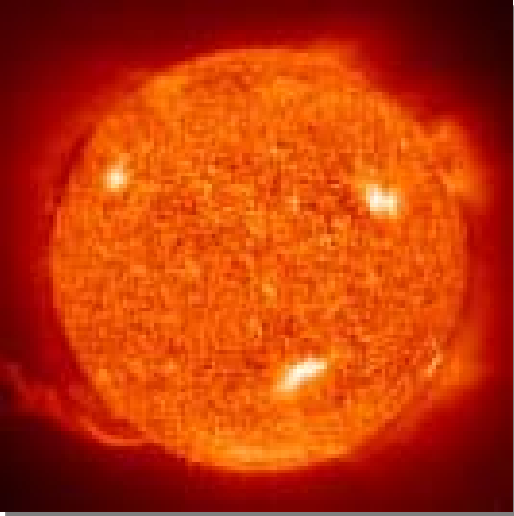
The Sun in Perspective:

- India's energy demand is expected to rise by 9% annually, one of the highest in world.
- At 4-7 kWh/m² solar insolation we receive an energy equivalent of 5000 trillion kWh/yr!
- Energy from wood, coal, oil, natural gas or petrol can be traced to the sun.
- Solar potential: 20MW/sqkm (current 0.8)

Energy of sun can be harnessed for:

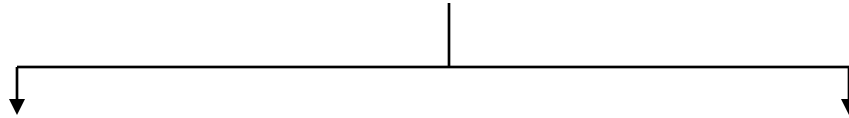
- *Electricity* (Photo-voltaic).
- *Heating* (Thermal).

*Source: //ireda.nic.in.



Classification ...

- Sun is a massive source of heat and light.
- India receives abundant solar radiation.
- Two distinct solar technologies:



Solar **Photo-Voltaic** (SPV)

SPV is the technology that converts light into electricity.

- Lighting systems.
- Water pumping.

• **Green Power !!!**

Solar **Thermal** Systems

- Solar Water Heaters.
- Solar Cookers.



Why Solar Energy ...

- Solar is clean & green energy, available in plentiful.
- Not dependent on local conditions like wind/water.
- Fossil fuel has its inherent problems like depletion, pollution, dependency on global oil prices, problems that are bound to increase in the coming future.
- Develop a responsible image for the owner.
- No recurring fuel cost, can be grid/battery connected.
- No moving parts therefore negligible maintenance.
- Avail 80 % tax depreciation for any solar product.
- RENEWABLES ARE THE FUTURE...