



# **SNS COLLEGE OF TECHNOLOGY**

(An Autonomous Institution)

COIMBATORE-35

**Accredited by NBA-AICTE and Accredited by NAAC – UGC with A+ Grade**

**Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai**

## **DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**



**COURSE NAME: 19EEO305 /Renewable Energy Generation Technology**

**IV YEAR / VII SEMESTER**

**UNIT 3- WIND ENERGY**

**Topic 1 – Power in wind**



# SUCCESSFUL STUDENT

Positive  
Attitude

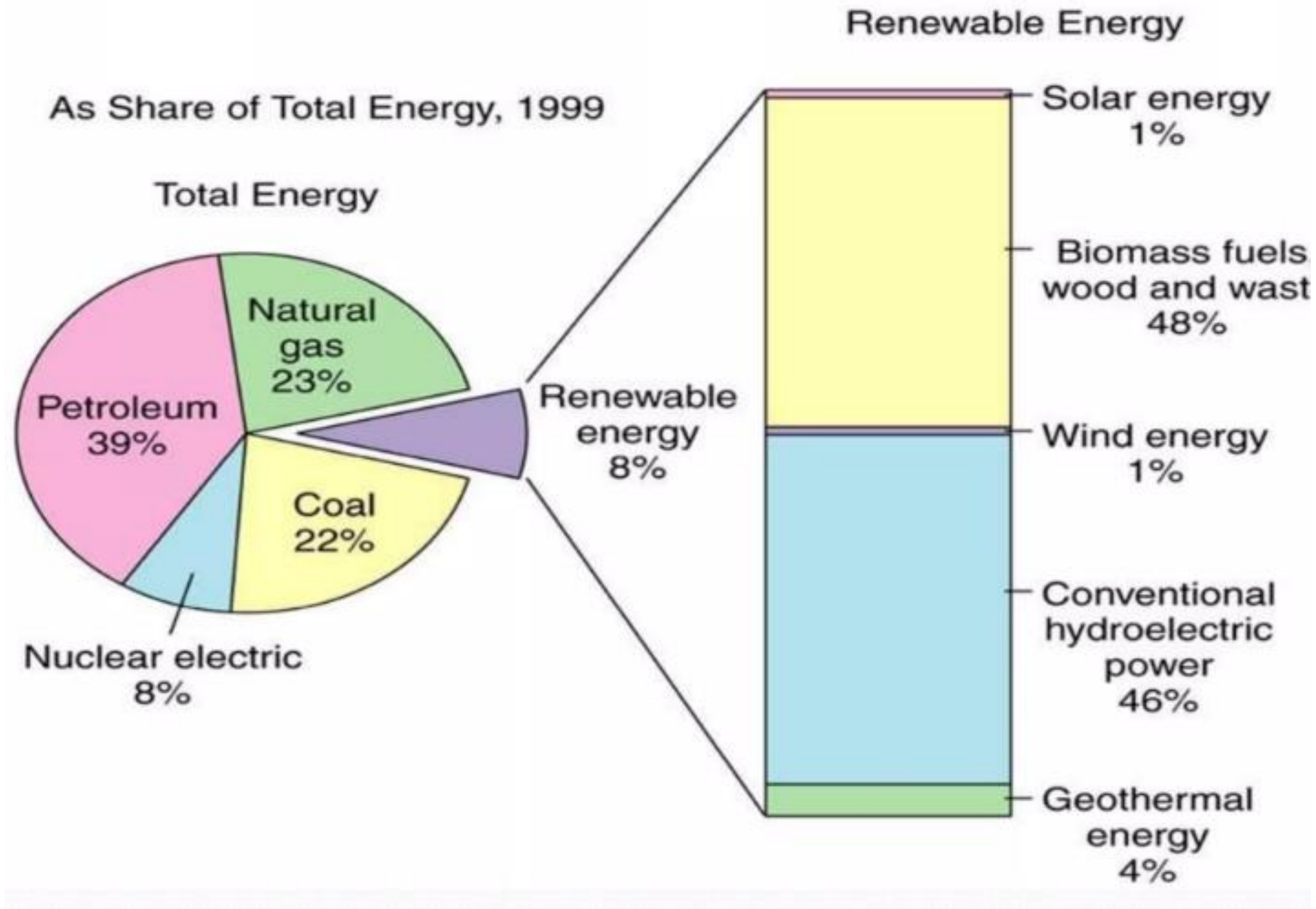
Professionally  
Groomed

Socially  
Interactive

Technically  
Skillful



- All renewable energy (except tidal and geothermal power), ultimately comes from the sun
- The earth receives  $1.74 \times 10^{17}$  watts of power (per hour) from the sun
- About one or 2 percent of this energy is converted to wind energy (which is about 50-100 times more than the energy converted to biomass by all plants on earth)





- A Windmill captures wind energy and then uses a generator to convert it to electrical energy.
- The design of a windmill is an integral part of how efficient it will be.
- When designing a windmill, one must decide on the size of the turbine, and the size of the generator.





- Most common design is the three-bladed turbine. The most important reason is the stability of the turbine. A rotor with an odd number of rotor blades (and at least three blades) can be considered to be similar to a disc when calculating the dynamic properties of the machine.
- A rotor with an even number of blades will give stability problems for a machine with a stiff structure





### **SMALL GENERATORS:**

- Require less force to turn than a larger ones, but give much lower power output.
  - Less efficient
- i.e..** If you fit a large wind turbine rotor with a small generator it will be producing electricity during many hours of the year, but it will capture only a small part of the energy content of the wind at high wind speeds.

### **LARGE GENERATORS:**

- Very efficient at high wind speeds, but unable to turn at low wind speeds.
- i.e..** If the generator has larger coils, and/or a stronger internal magnet, it will require more force (mechanical) to start in motion.



# ASSESSMENT



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# REFERENCE



## Reference Book:

1. S.P. Sukhatme, 'Solar Energy', Tata McGraw Hill Publishing Company Ltd., New Delhi, 1997. (UNIT II)
2. G.N. Tiwari, 'Solar Energy – Fundamentals Design, Modelling and applications', Narosa Publishing House, New Delhi, 2002. (UNIT II)
3. S.M. Muyeen," Wind Energy Conversion Systems: Technology and Trends", Springer 2012. [UNIT III]

## Text Book:

1. G.D. Rai, 'Non Conventional Energy Sources', Khanna Publishers, New Delhi, 2006. (UNIT I - V)
2. D.P.Kothari, K.C.Singal and Rakesh Ranjan,"Renewable energy sources and Emerging Technologies", PHI Pvt. Ltd., 2009. (UNIT I-V)



# THANK YOU!!

