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 – Components of Wind energy System

SUCCESSFUL STUDENT

Positive Attitude

Professionally Groomed

Socially Interactive

Technically Skillful

POWER IN WIND

- Three factors determine the output from a wind energy converter:
  1. Wind speed
  2. Cross section of wind swept by rotor
  3. The overall conversion efficiency of the rotor, transmission system and generator or pump

- No device – can extract all of the wind's energy
- Power in the wind can be computed by using the concept of kinetics.

WIND ENERGY CONVERSION

Middle age wind energy used as

- Mill grain, Lift water, Land drainage, Watering cattle

Main focus now used to generate electricity

- WECS, aero generators, wind turbine generators, wind turbines

Small producers back up can take the form of

- Battery storage
- Connection with local electricity distribution system
- A stand by generator

WIND ENERGY CONVERSION

Small producers

- Export power to grid
- Most produce direct current or AC

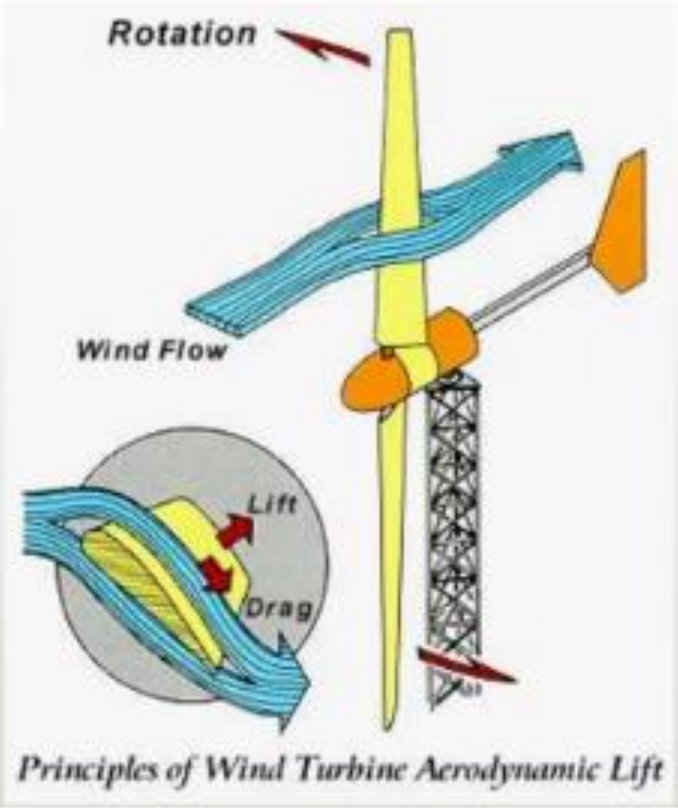
Large producers

- Most produce constant electric output
- They operate primary fuel savers
- Reducing utilities of total fuel burns

Choice of generators

- Depends on size of local distribution grid
- Generating capacity
- An induction generators generally used where there is a significant amount of other generating capacity
- Synchronous generator is more complex

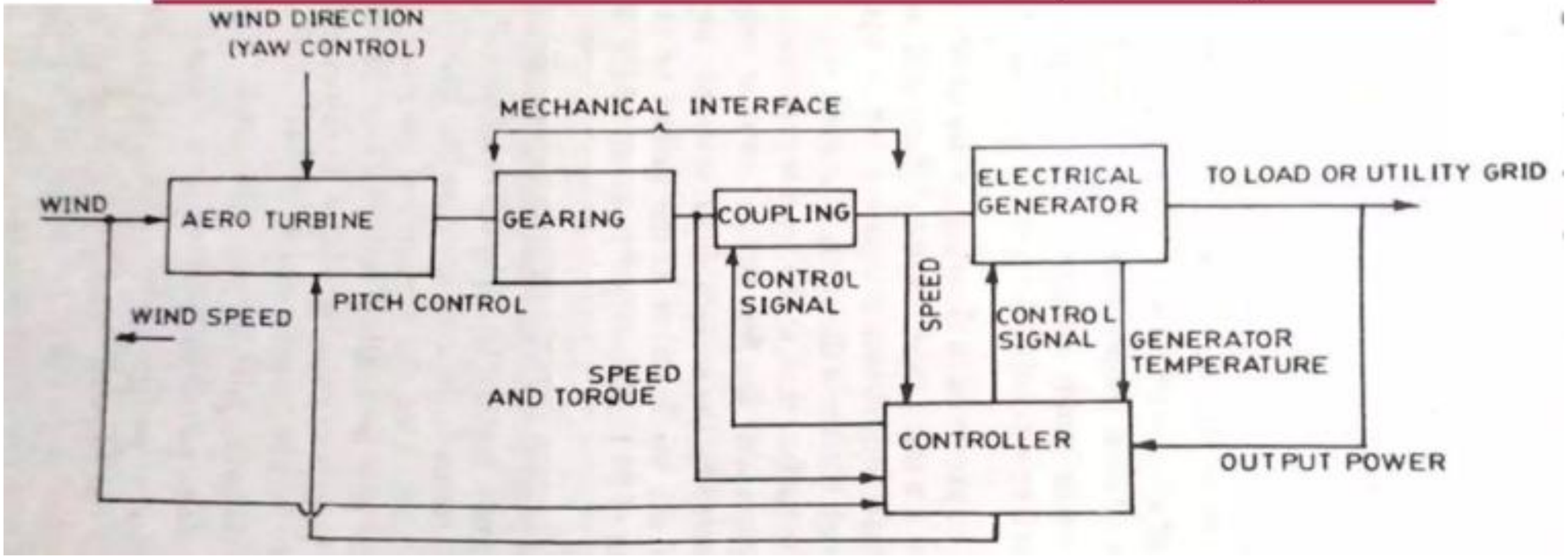
LIFT AND DRAG : THE BASIS FOR WIND ENERGY CONVERSION



Principles of Wind Turbine Aerodynamic Lift

- Two primary mechanisms for producing forces : lift and drag
- Lift - perpendicular to the air flow
- Drag – parallel to the flow
- Airfoil – pressure difference produces a force that begins to act on high P side and moves towards low P side of the lifting surface
- Stalling- lift decrease, drag increases

BASIC COMPONENTS OF WIND ENERGY CONVERSION SYSTEMS (WECS)



ASSESSMENT

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!!