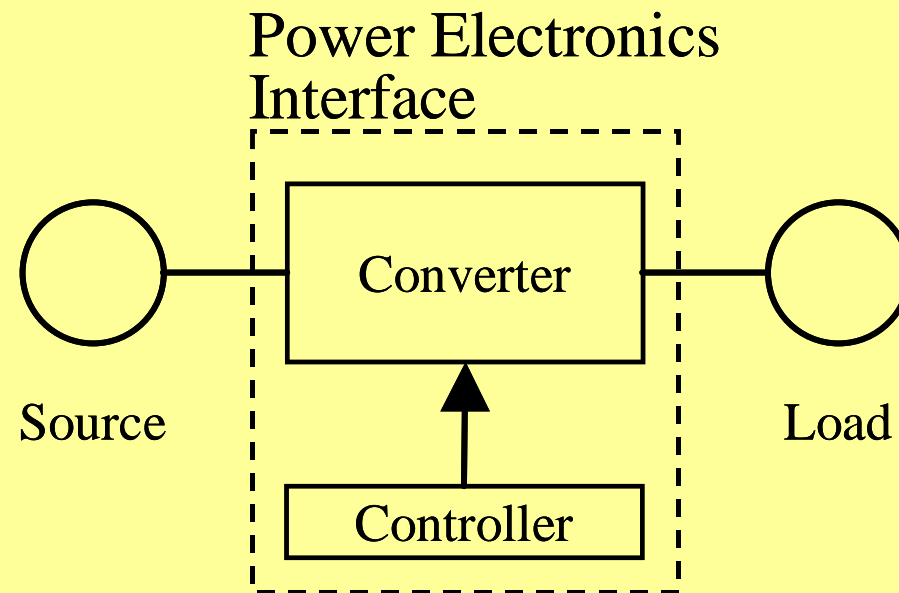


# Introduction to Power Electronics

- Role
- Applications
- Requirements

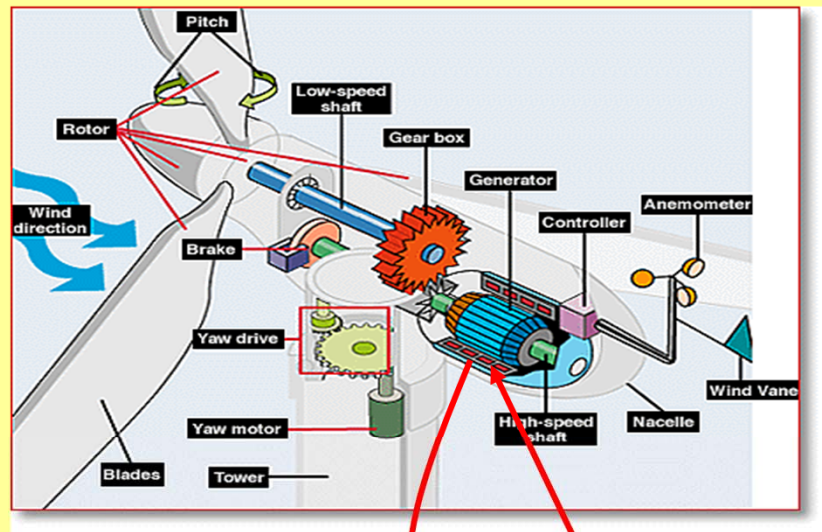
# Role



# Applications

- Renewables-based Electric Generation
- Electric/Hybrid Vehicles
- Improving Efficiency
- Information Technology
- Utility Applications

# Wind Turbines



**Heavy Cables**  
80-100 m

**Generator**

0 – 690V  
10 – 60 Hz

**Power Electronics  
Converter**

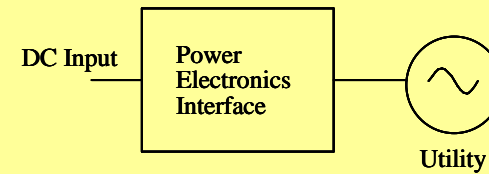
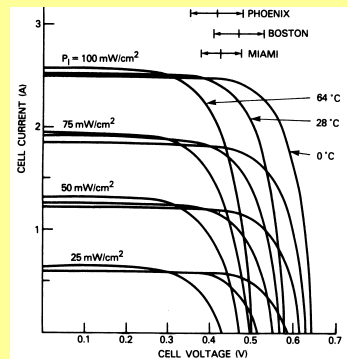
690V

**Transformer**

34.5kV

161kV

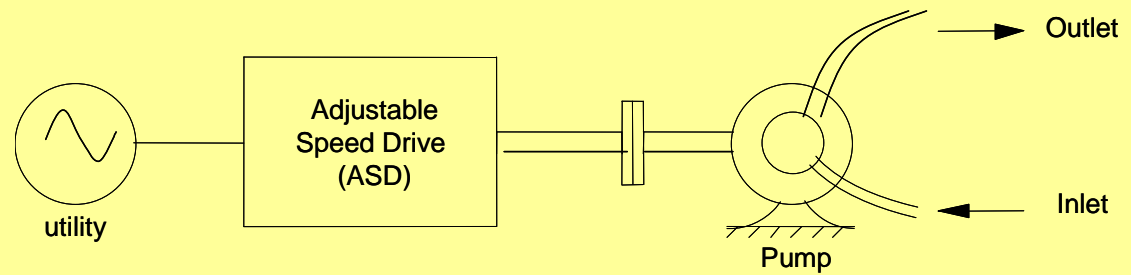
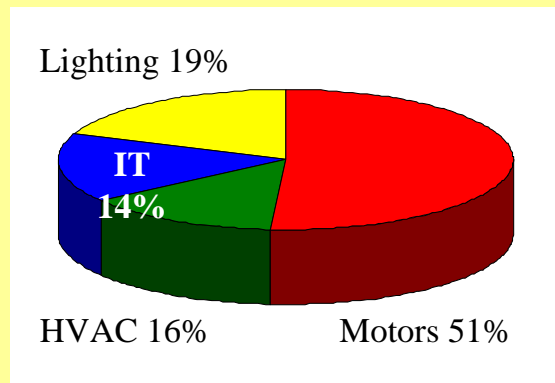
# Photovoltaic Systems



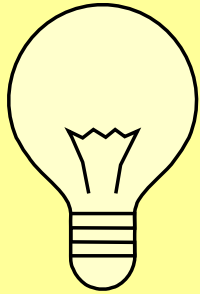
# Hybrid-Electric Vehicles



# Efficiency Improvement



# Lighting





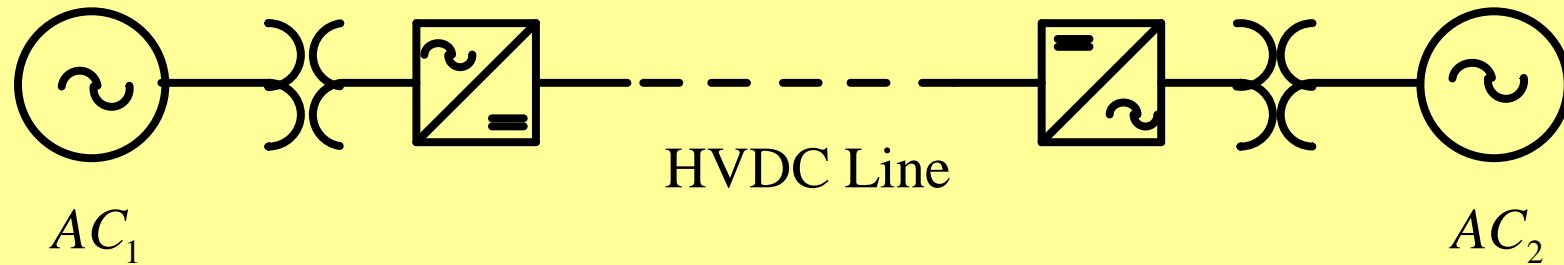
# Information Technology

- Computers
- TVs
- Phones

# Utility Applications

- Transmission and Distribution
  - HVDC Transmission Systems
  - FACTS (Flexible AC Transmission Systems)

# HVDC Transmission Systems



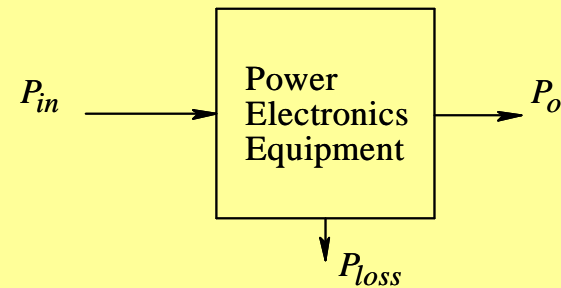
# FACTS

## (Flexible AC Transmission Systems)

- Control of Voltages
- Control over the Flow of Power
- Various Devices:
  - SVC, STATCOM, TCSC, UPFC

# Requirements

- High Energy Efficiency
- High Power Density
- Cost, Reliability, etc



# Summary

- Role
- Applications
- Requirements