



# **SNS COLLEGE OF ENGINEERING**

Kurumbapalayam (Po), Coimbatore – 641 107

**An Autonomous Institution**

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**

### **UNIT – V**

**Stability Studies and Reactive Power Compensation**

**Overview of Reactive Power Control**



# CONTENTS

- Introduction to power
- Type of power
- Analogy of power
- Need for reactive power compensation
- Compensation Techniques



# POWER

- Electrical power is the rate which electrical energy is transferred by an electrical circuit.
- Generally electrical energy is produced at 11kV with the help of synchronous generators.
- Then in step up level 132kV,220kV,440kV and 765kV transmitted to grid.

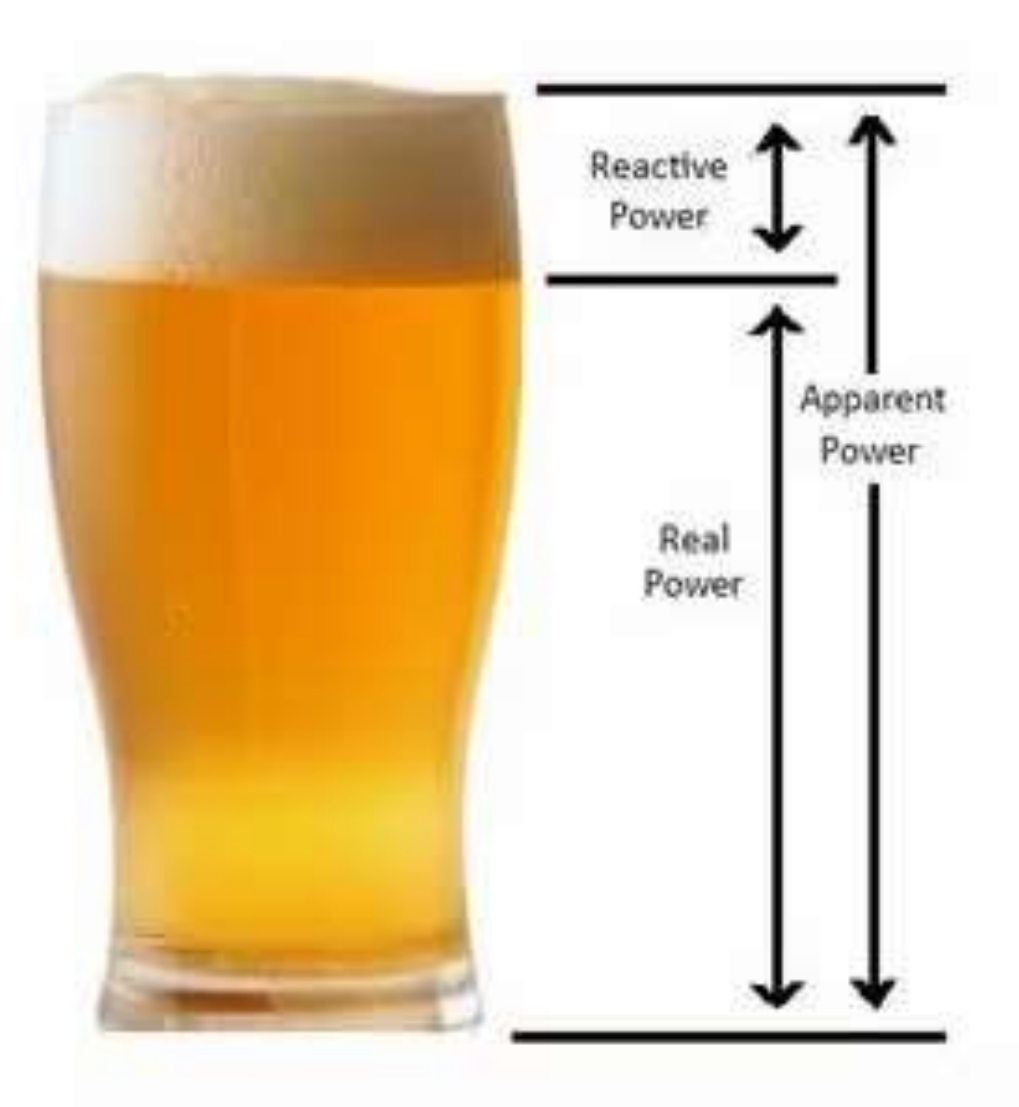


## Types of POWER

- **Active Power (kW)** is working power also called as Actual power or active power .It is the power which actually powers the equipment and performs useful work.
- **Reactive Power (kVAR)** is the power that magnetic equipment needs to produce magnetic flux.
- **Apparent Power (kVA)** is the vectorical summation of kVAR and kW .



# Types of POWER





## NEED FOR REACTIVE POWER COMPENSATION

- Improves system power factor
- Reduces network losses
- Reduces cost and generates higher revenue to customers.
- Increase system capacity and saves cost for new installations.
- Improves voltage regulation in the network
- Increases power availability



# REACTIVE POWER COMPENSATION

- Reactive power compensation is defined as the management of reactive power to improve the performance of AC Systems.
- There are two aspects:
  - Load compensation
  - Line compensation

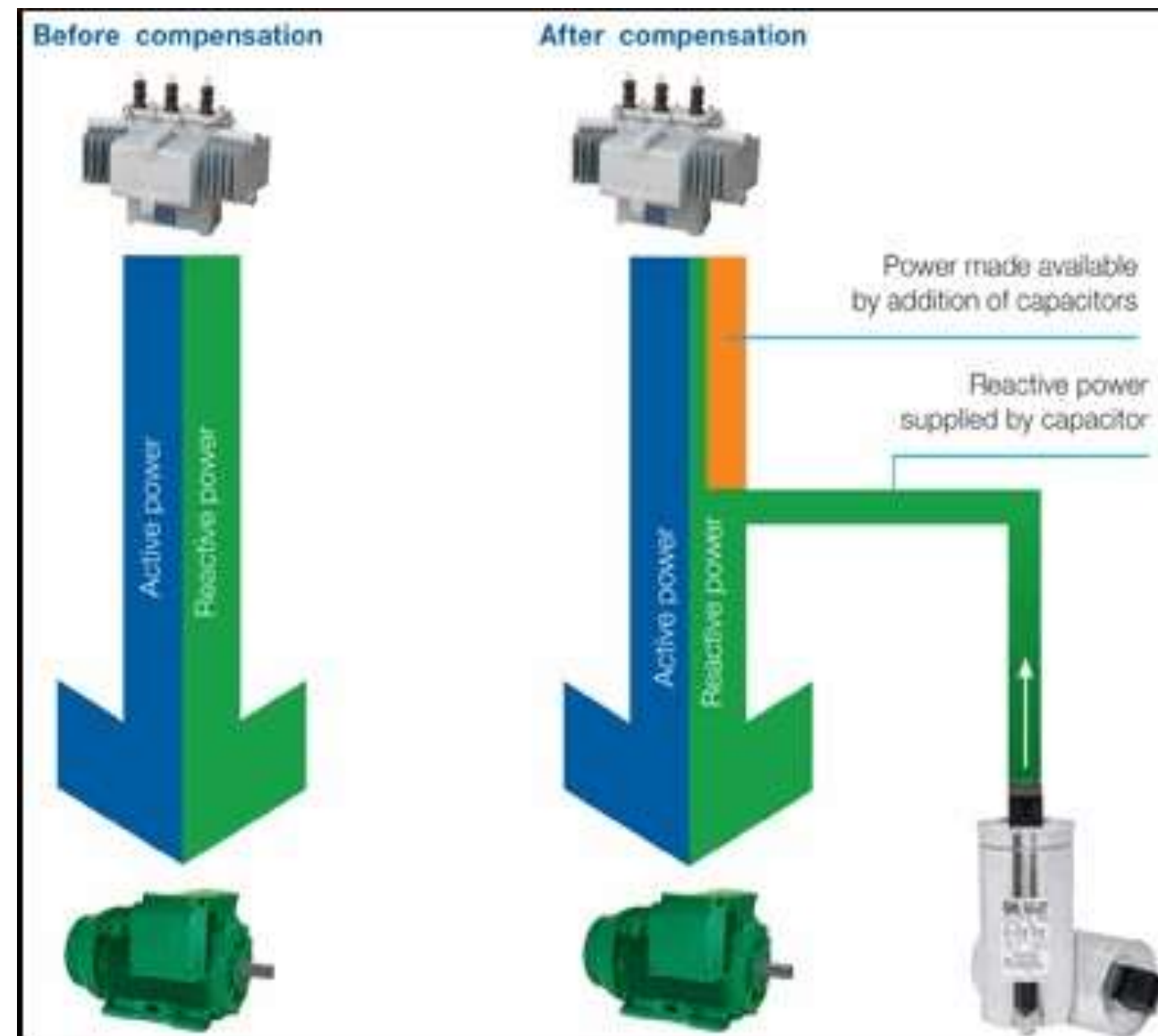


# REACTIVE POWER COMPENSATION

- Load Compensation : Objective is to increase the power factor of the system to balance real power drawn from the system
  - Compensate voltage regulation to eliminate current harmonics
- Line Compensation : Main purpose is to decrease the voltage fluctuation at a given terminal of transmission line.
  - Improves the stability of AC System by increasing the maximum active power that can be transmitted.



# REACTIVE POWER COMPENSATION





# ASSESSMENT

1. The instantaneous voltage wave in the long transmission line is a function of \_\_\_\_\_

- **time and distance**
- time
- distance
- time, distance and reactive inductance



## ASSESSMENT

2. At any point along the line, the instantaneous voltage is \_\_\_\_\_

- **sum of incident and reflected voltage**
- incident voltage
- sum of incident and refracted voltage
- twice the incident voltage

