



RSET
RAJAGIRI SCHOOL OF
ENGINEERING & TECHNOLOGY

EE403 Distributed Generation & Smart Grids



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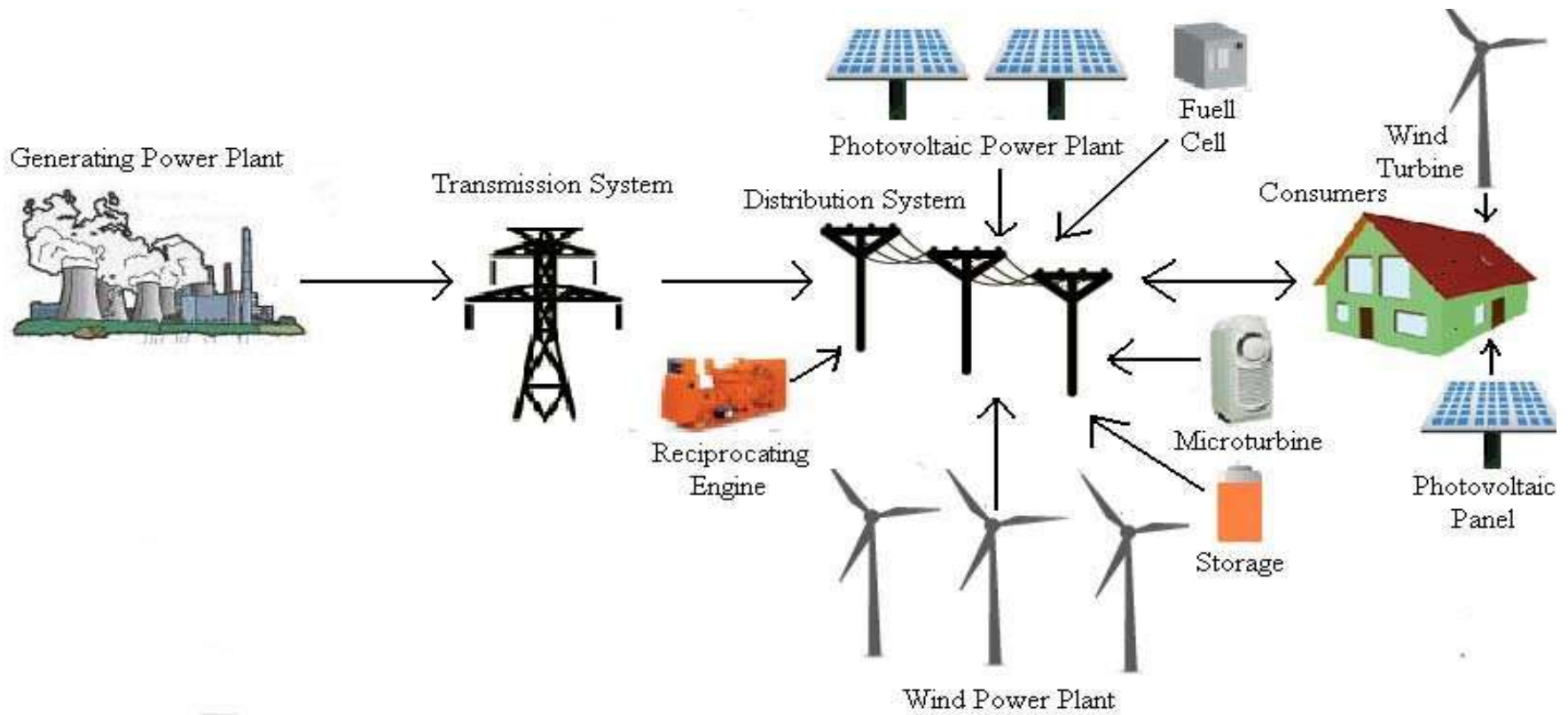
Module I

Distributed generation : Introduction - Integration of distributed generation to Grid – Concepts of Micro Grid - Typical Microgrid configurations - AC and DC micro grids - Interconnection of Microgrids - Technical and economical advantages of Microgrid - Challenges and disadvantages of Microgrid development

Smart Grid: Evolution of Electric Grid - Definitions and Need for Smart Grid, Opportunities, challenges and benefits of Smart Grids

Distributed Generation (DG)

- Small, modular, decentralized, grid connected or off-grid energy sources located at or near the place where energy is used
- Mostly renewable based sources



DG-Technologies

- **Micro-turbines**
- **Combustion Gas Turbines**
- **Fuel Cells**
- **Solar Energy Or Photo-Voltaics (PV)**
- **Wind Turbines**
- **Bio Energy and Fuels**
- **Combined heat and power system (CHP)**
- **Stirling Engines**
- **Marine and Hydro Power**
- **Geothermal**

Vision for future energy distribution



Integration of distributed generation to Grid

Technical, Economic and Environmental Benefits of DG Integration

- Less centralized and more consumer interactive
- Connection of widely distributed, renewable energy sources (RES) across the network
- Facilitate market interactions, providing customers access to products and services with choice, based on price and environmental concerns
- RES is an alternative to Fossil Fuels

Integration of distributed generation to Grid

- Distributed Energy Resources (DER) produce clean electrical energy
- Reduces thermal pollution by utilization of waste heat from industries by CHP plants
- Reduced Transmission and Distribution (T&D) losses as loads are near to generation units
- DERs can be connected to form a micro-grid, a separate autonomous unit, and can be connected to the grid too.
- Grid connected and stand-alone operation of DERs improve reliability and power quality
- DG system offers fuel diversity meeting power shortage

Integration of distributed generation to Grid

- Energy efficiency
- Optimizing electricity infrastructure replacement investment

Thank You



It's just the beginning