



RSET
RAJAGIRI SCHOOL OF
ENGINEERING & TECHNOLOGY

EE403 Distributed Generation & Smart Grids



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Module I

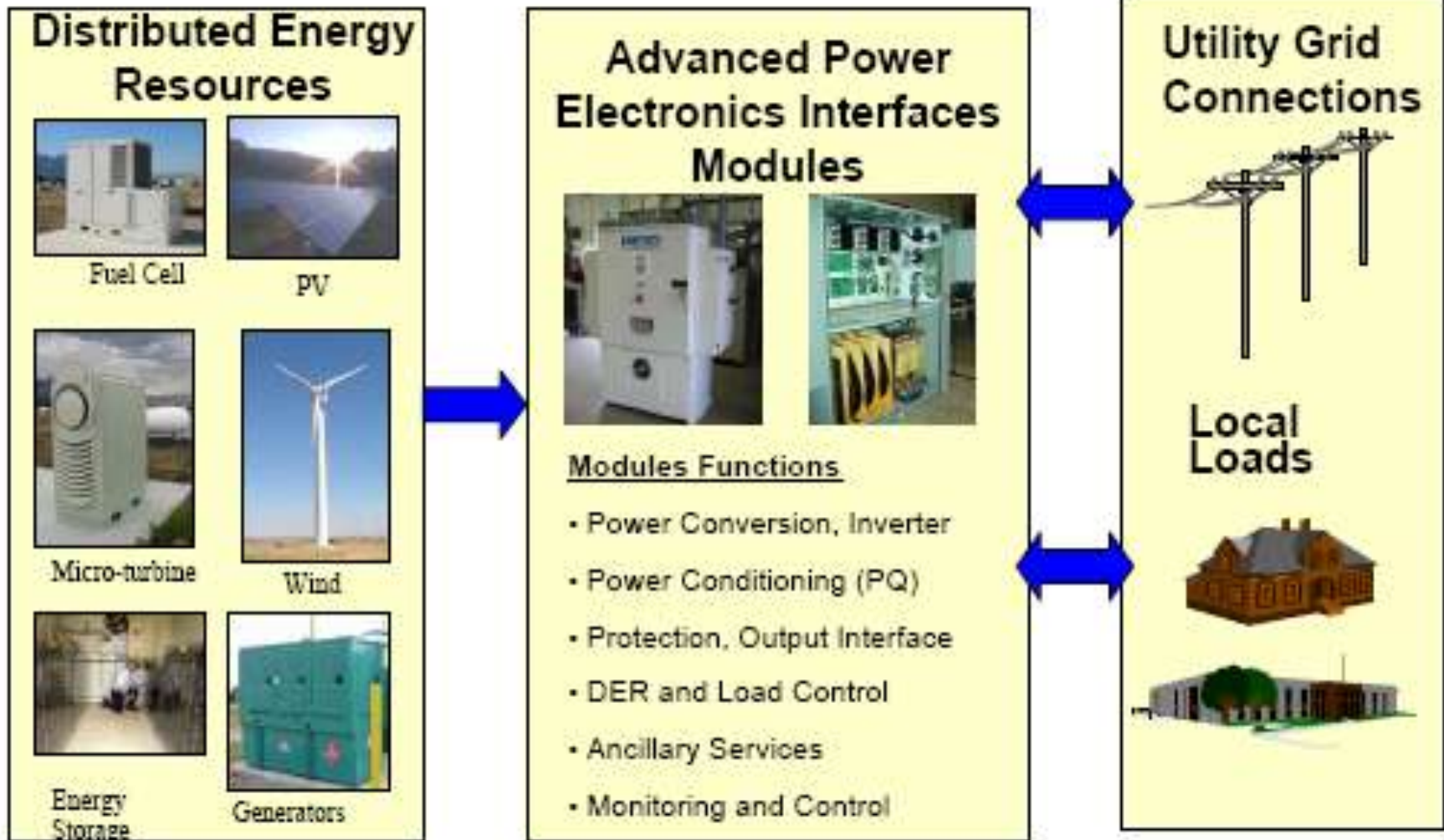
Distributed generation : Introduction - Integration of distributed generation to Grid – Concepts of Micro Grid
- Typical Microgrid configurations - AC and DC micro grids - Interconnection of Microgrids - Technical and economical advantages of Microgrid - Challenges and disadvantages of Microgrid development

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

Concepts of Micro Grid

- The Micro-grid can be assumed as a cluster of loads and micro sources operating as a single controllable system that provides power to its local area
- Normally operates connected to and synchronous with the traditional centralized grid, through a single point of common coupling (PCC) with the utility grid
- Distributed generators and loads in the neighborhood can form micro-grids which can work parallel to grid or operate in islanded mode providing UPS services
- A Complete Solution for rural electrification

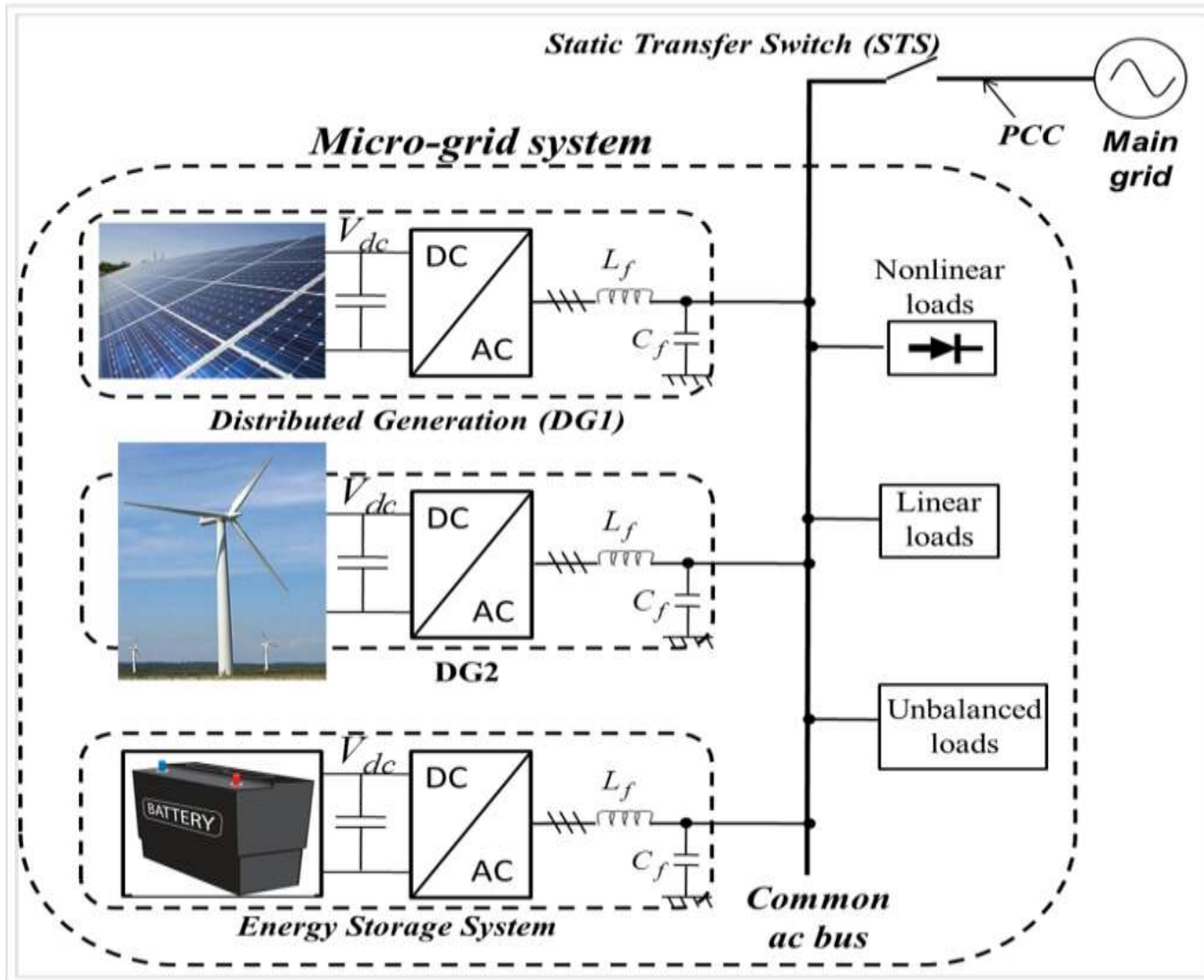
Conceptual Micro grid



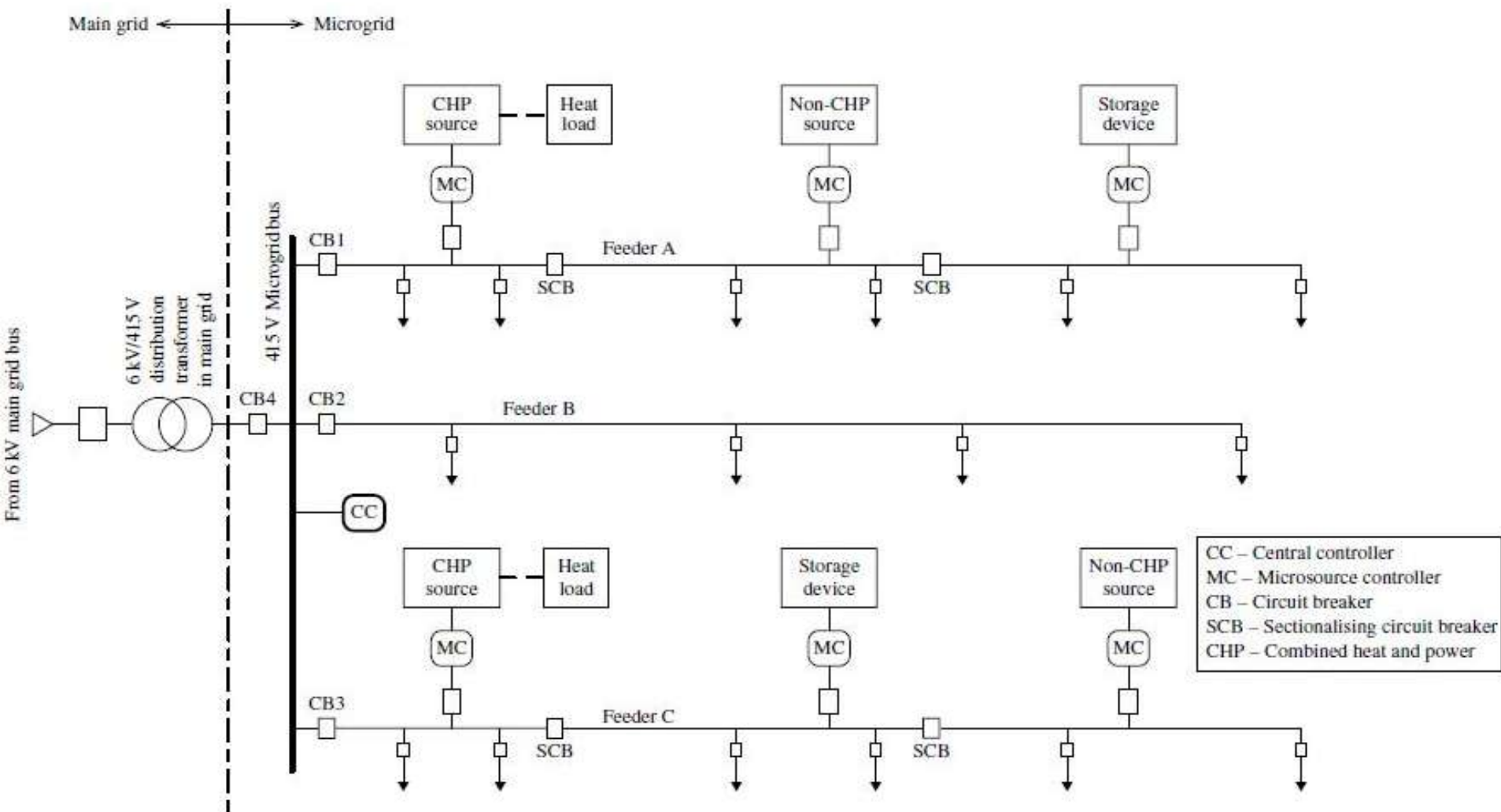
Why Microgrid?

- When it demands a reliable source of power for your critical infrastructure
- Resilience
- Green power with minimum intervention of fossil fuels
- Complements main grid – especially during peak demands
- **Enhances social well being**
 - **Rural electrification to areas where no electric grid or reliable power**
 - During disasters when critical facilities fail to operate

Microgrid Configuration



Micro Grid Configuration



Micro Grid Configuration

- Group of radial feeders
- Micro sources like CHP
- Point of Common Coupling (PCC)
- Power electronic-interface- e.g. rectifiers, Inverters.
- Storage
- Critical and non critical loads

Micro Grid Configuration

- Operation & Control of Microgrids is controlled and coordinated by Microsource Controllers (MCs) and Central Controller (CC)

(1) Microsource Controller (MC):

- **Control the voltage profile at load end** and power flow of the microsource independently.
- **Ensures each microsource supplies its share** in standalone mode.
- Participates in **Demand side management (DSM), load tracking management and economic generation scheduling** by controlling the storage devices.

Micro Grid Configuration

(2) Micro Grid Central controller (MGCC Or CC):

Overall Control, maintain power quality, Provides power dispatch and voltage set points for all MCs, Coordinate protection.

Energy Management Module (EMM) and Protection Coordination Module (PCM) are its functional modules.

Micro Grid Configuration

Functional modules of CC

Energy Management Module EMM:

Provides set points for frequency, voltage, active and reactive power output to each MC

Protection Coordination Module PCM:

Protection coordination to faults in grid, microgrid and Loss of Grid (LOG). Disconnects grid in case of LOG, Disconnects feeders to stabilize, Resynchronize Microgrid to utility grid

Thank You



It's just the beginning