



# S&C POWER ELECTRONICS PORFOLIO, ISSUES AND OPPORTUNITIES IN THE DISTRIBUTION SYSTEM

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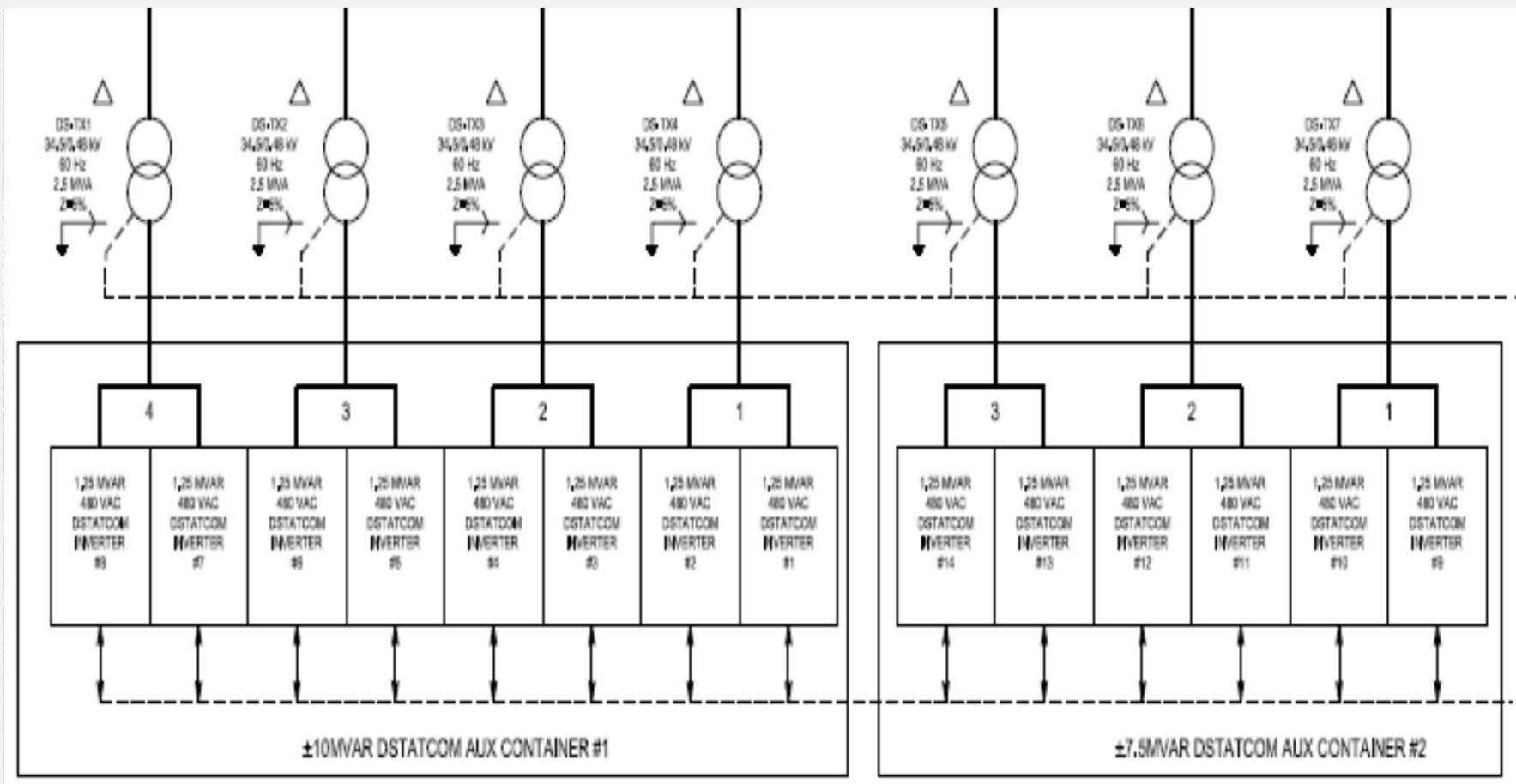
# DISTRIBUTION AUTOMATION DEVICES

- Reactive current control
  - **DSTATCOM** : in modules of **1.25MVar**
- Storage Management Technology
  - **SMS** (Storage Management System)
    - Utility/Substation: **1 MW** – 20 MW
    - Commercial/Industrial: **250 kW** – 500 kW
  - **CES** (Community Energy Storage)
    - Grid-edge: **25 kW** single-phase



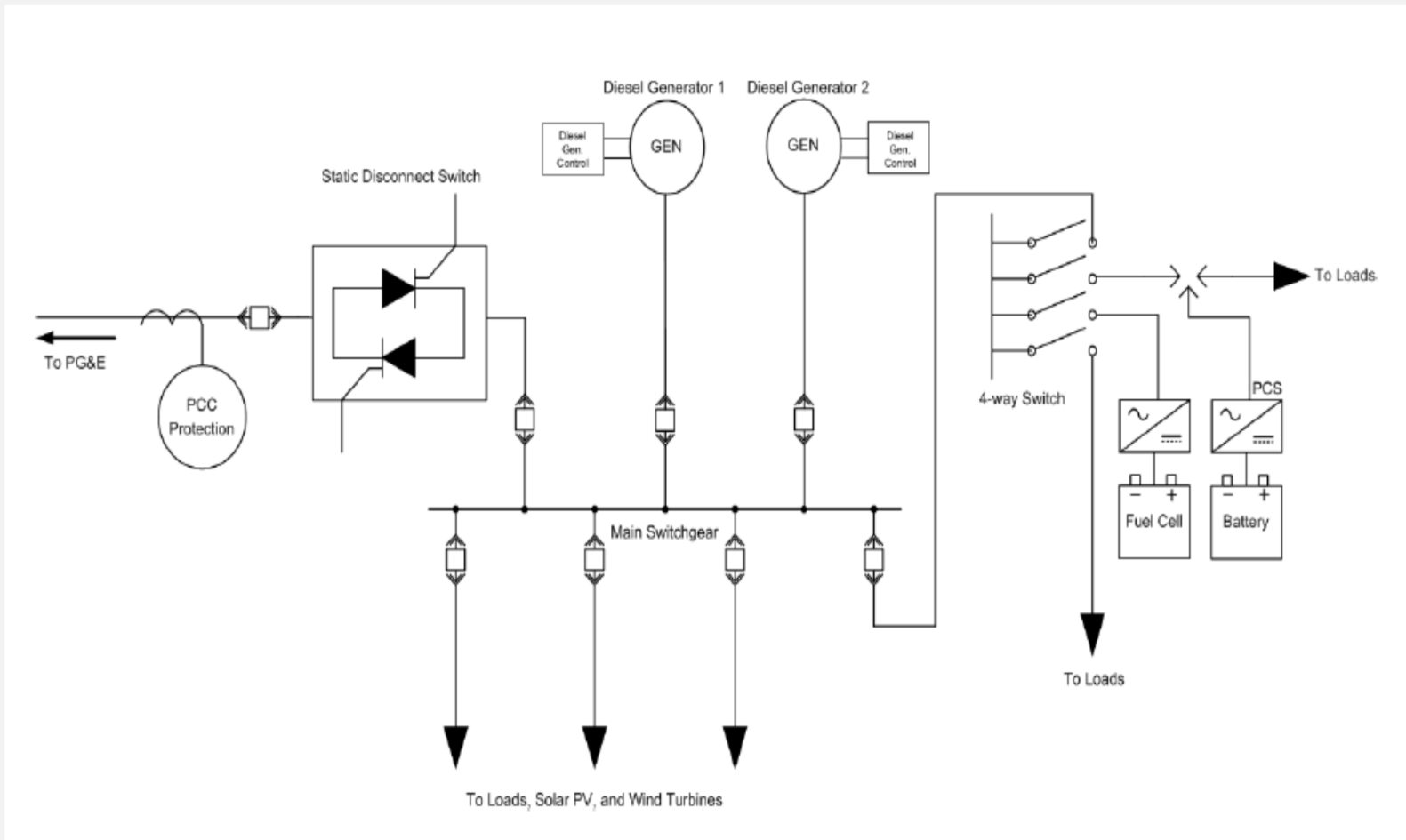
# DSTATCOM

## 100-MW ONTARIO SOLAR FARM





# SANTA RITA JAIL LAYOUT





# SANTA RITA JAIL – DUBLIN, CA – 2MW SMS IN 27FT CONTAINER

- Energy storage provides system backbone:
  - Remains in Voltage Source mode for instant islanding
  - Controls via patented frequency droop and voltage droop algorithm





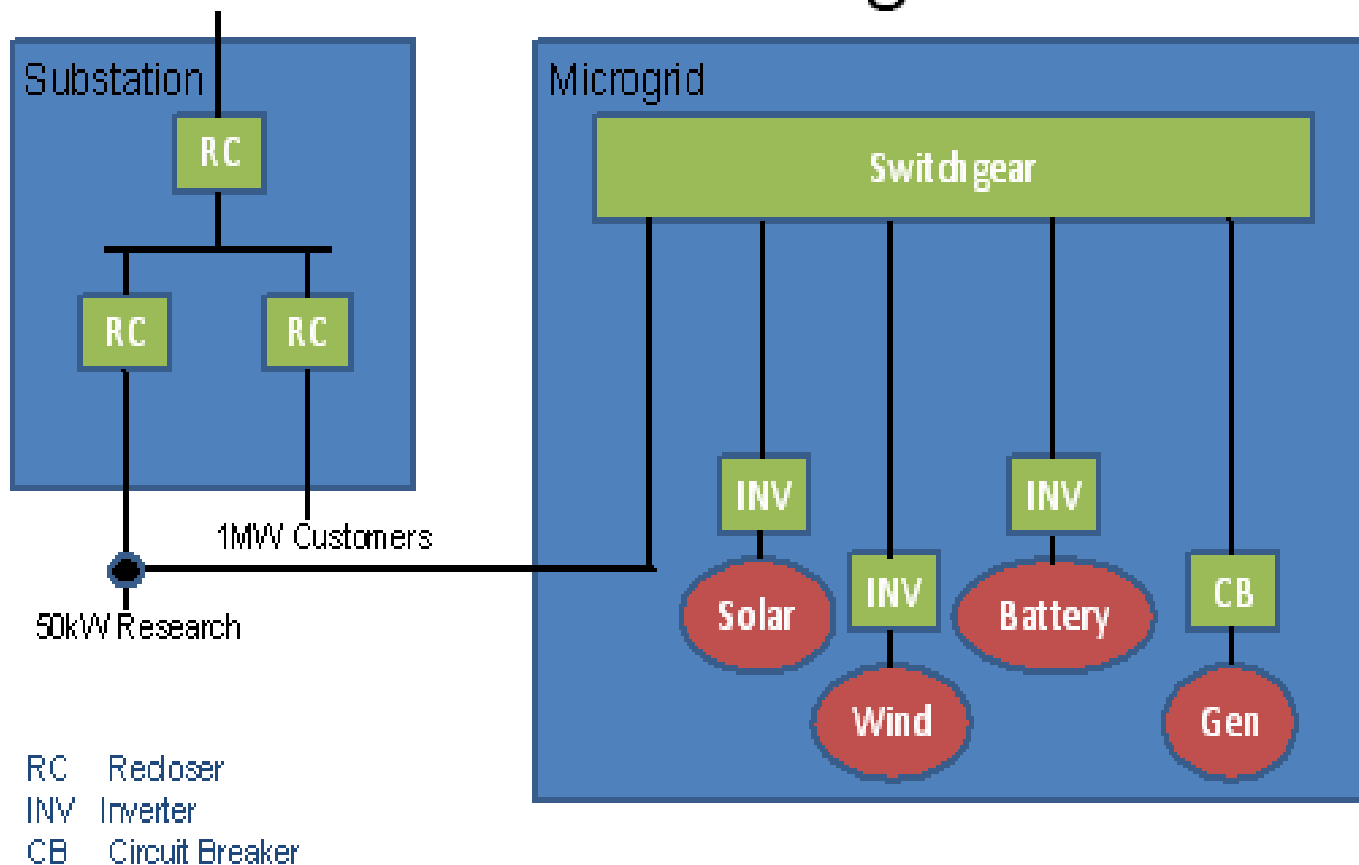
# SMS – AMEREN MICROGRID





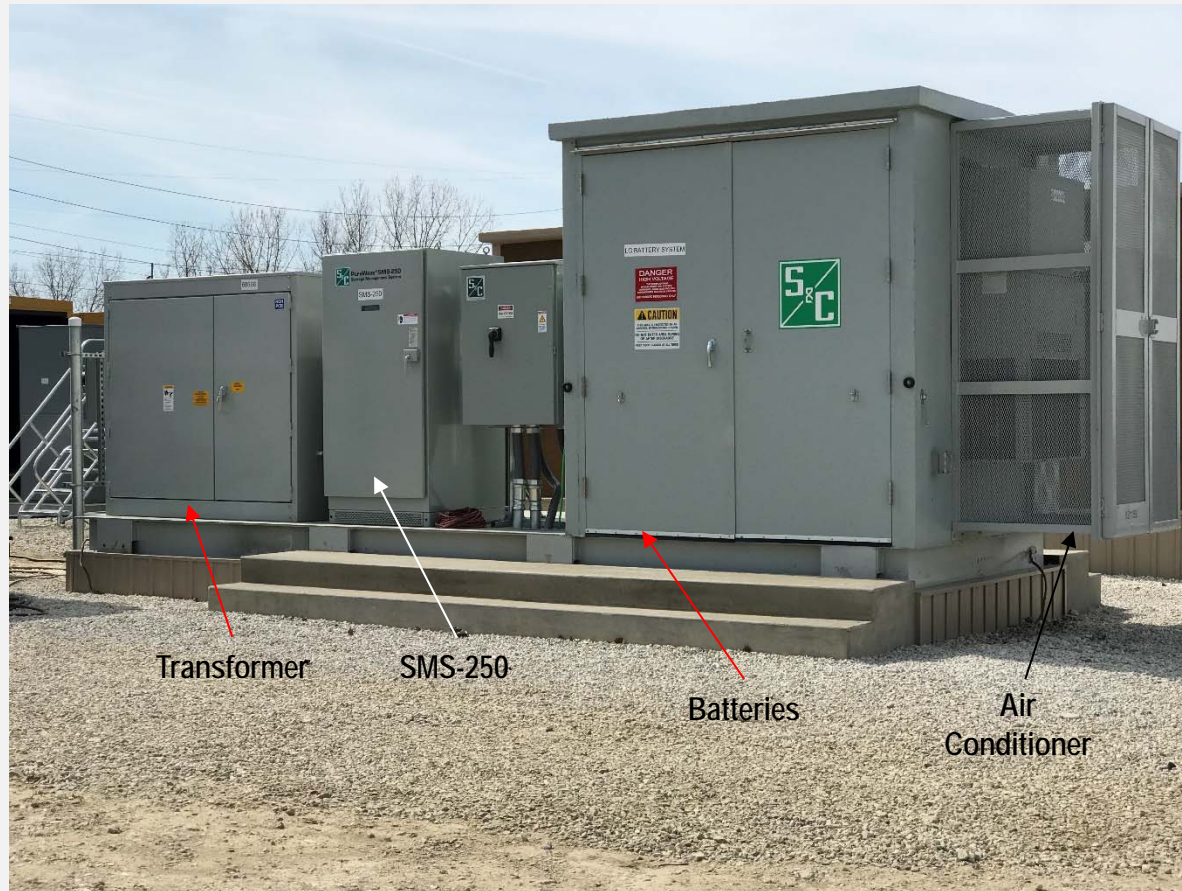
# SMS – AMEREN MICROGRID

## Ameren Microgrid





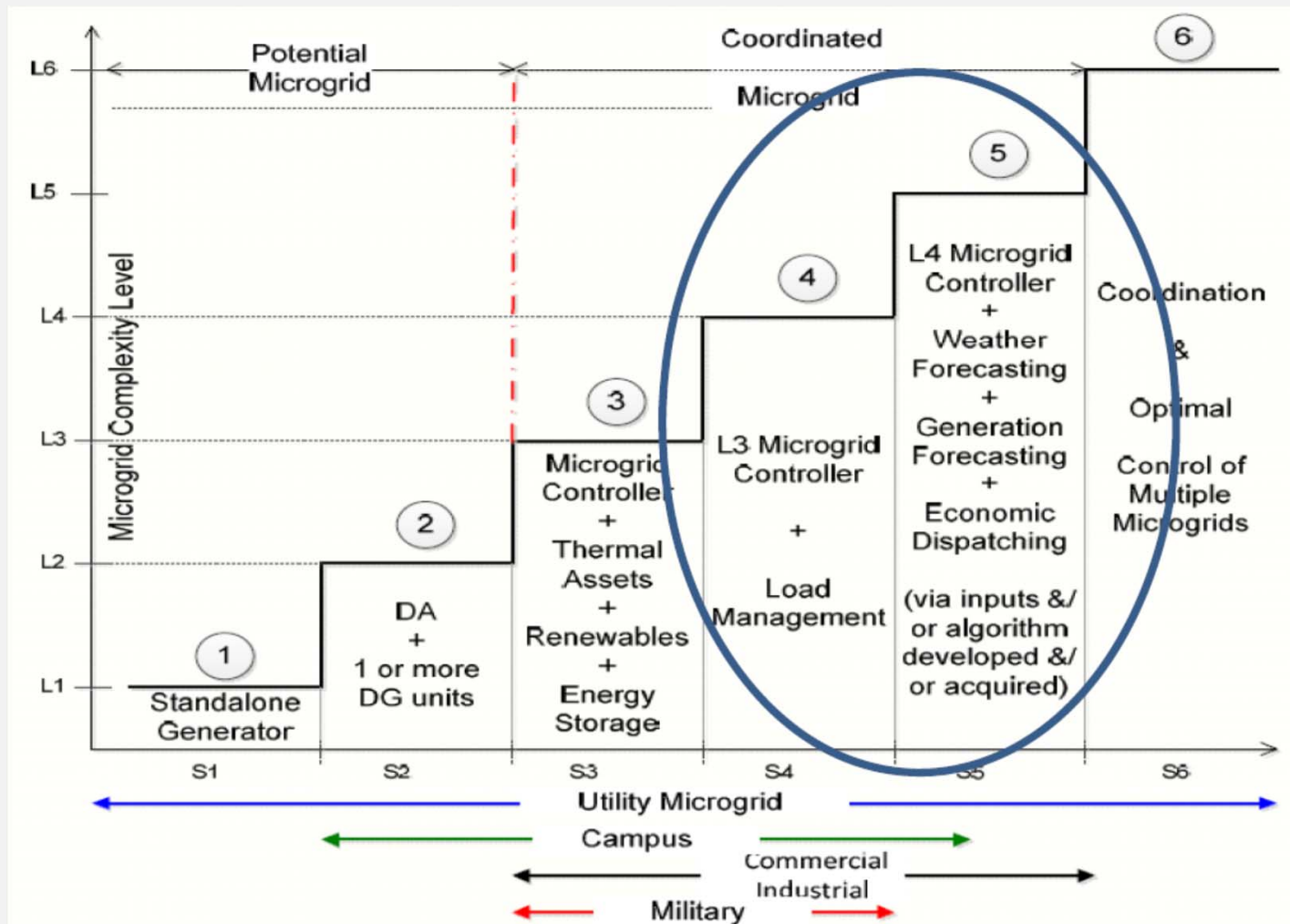
# SMS – AMEREN MICROGRID







# SMS – AMEREN MICROGRID





# AMEREN MICROGRID- ISSUES

- Protection/Coordination
- System Integration
- Logic
  - Transitions
  - Black start





# Si BASED POWER ELECTRONICS CHALLENGES

## 1. Heat

- Low Switching frequency  $\approx 3-5\text{kHz}$
- Efficiency ( $>90\%$ )

## 2. Size

- Filters
- Transformer (Vdc link  $\approx 800\text{ V}$ )

## 3. Speed (UPS applications)