Grid Level Power Electronics and Electrical Safety

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Power Electronics in the Bulk Power Systems

Source: Dr. Ram Adapa (The Role of Power Electronics in the Future Smart Electric Grid)
Potential Benefits of Power Electronics

- Improve efficiency
- Enhance the functionalities/flexibilities of the power systems
- Enable the integration of renewable resources
- Improve the safety of the power systems
Potential Benefits of Power Electronics

- Current Limiting
- Fault Isolation and Self Healing

Source: Dr. Ram Adapa (The Role of Power Electronics in the Future Smart Electric Grid)
Potential Issues of Power Electronics

• Failure Mode and Fail Safe of the Power Electronics Devices
  ▫ Creating Fault Tree and Analyzing Its Consequence
• Coordination with Traditional Protection Devices
  ▫ Short Circuit Current Contributions
  ▫ Impact of System Frequency on Fuse Operation
Other Safety Related Issues

- Fire

Source: UL
Other Safety Related Issues

- **AC** and **DC** Arcing Fault
Other Safety Related Issues

• AC and DC Arcing Fault

Source: utexas.edu/research/cem
Other Safety Related Issues

- AC and DC Arcing Fault (Simulation)
Thank You !!!