Grid Level Power Electronics and Electrical Safety

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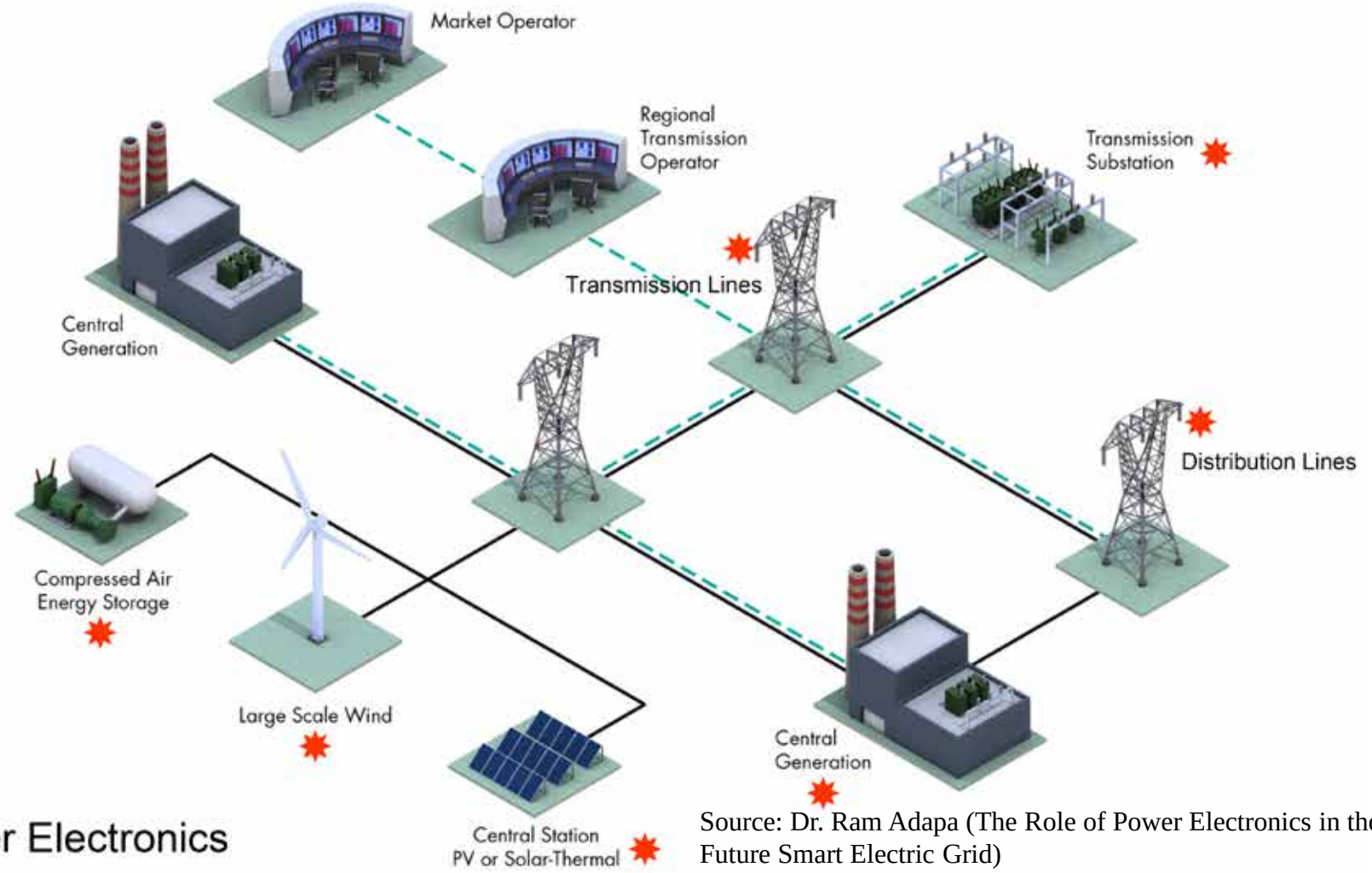
July 18, 2018

Power Electronics in the Bulk Power Systems



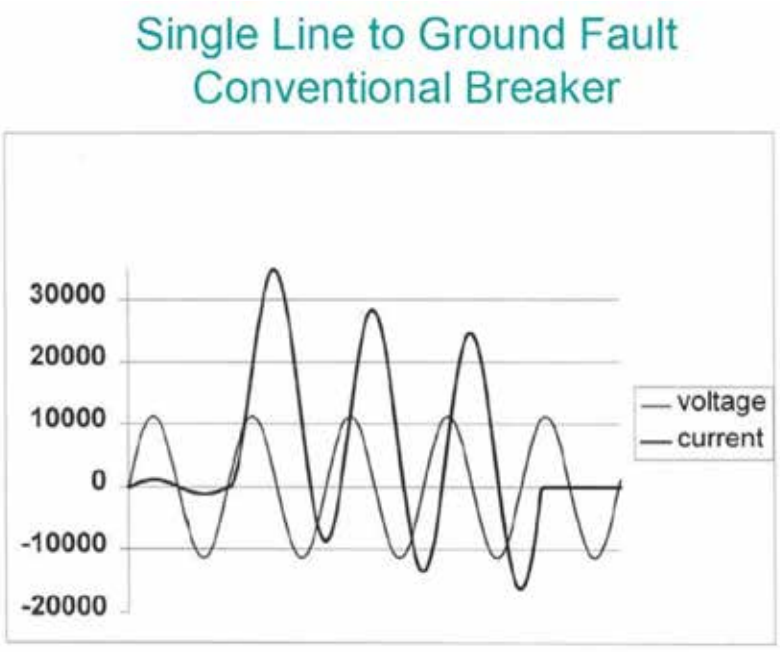
Source: Dr. Ram Adapa (The Role of Power Electronics in the Future Smart Electric Grid)

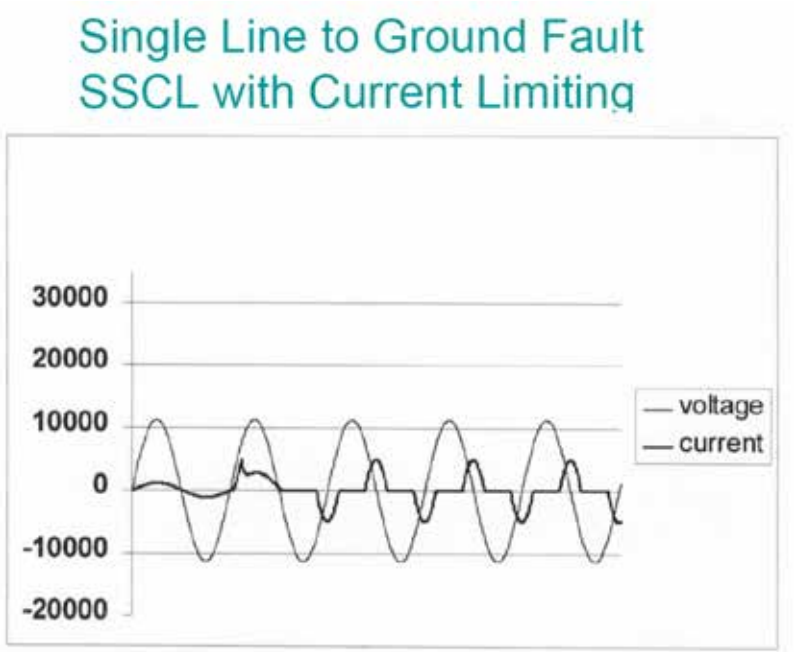
Potential Benefits of Power Electronics

- 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

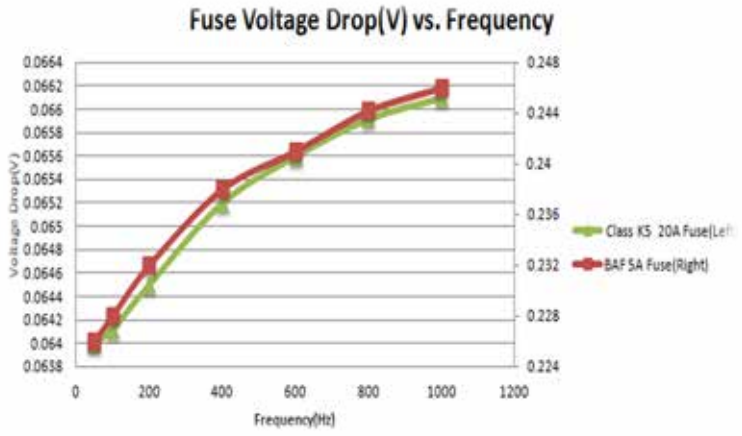




Source: Dr. Ram Adapa (The Role of Power Electronics in the Future Smart Electric Grid)

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 !!!