

Smart Grids

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Energy Distribution Theme

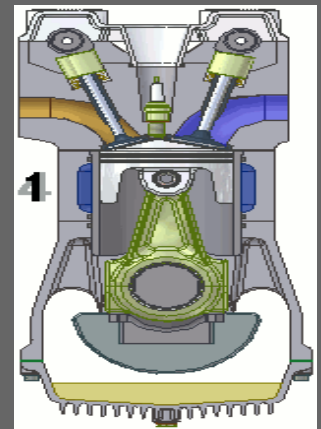
□ Smart Grids

- Technologies for Smart Grids
- Mobile Communication and Sensor Networks
- Intelligent Algorithms
- Cloud Computing
- Reconfigurable Computing
- Information Security (Cyber Physical Security)
- Human-Computer Interaction

□ Smart Utilities/Trenchless Technology (Professor Chris Rogers)

The Third Industrial Revolution

- The First Industrial Revolution
 - brought together print and literacy with *coal steam and rail*.
 - triggered by the invention of the steam engine in 1776 by James Watt
- The Second Industrial Revolution combined the telegraph and telephone with the internal combustion engine and oil



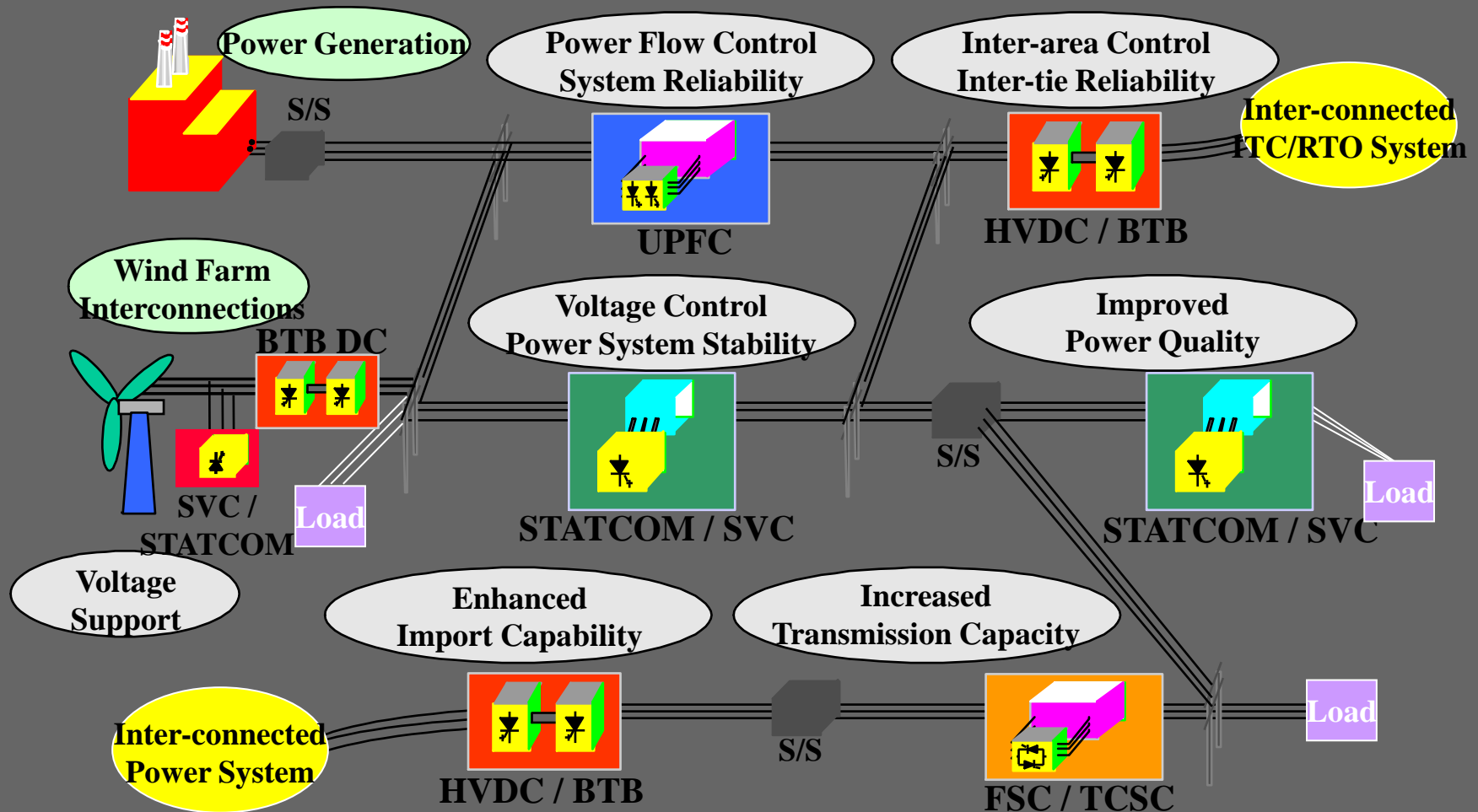
The Third Industrial Revolution

- The Four Pillars
 - Renewable Energy Generation
 - Buildings as Positive (Active) Power Plants
 - Hydrogen and Other Energy Storage Technologies
 - Smart Grids and Plug-in Vehicles
- The 3rd Industrial Revolution brings energy supply revolution!
- Smart Grid is the Key Pillar
 - fundamental infrastructure to enable or support other three pillars

Vision on Smart Grids

- Drivers: Energy Market, Security of Supply & Environment
- Smart Grids
 - Smart Grid is an electricity network that can intelligently integrate the actions of all users connected to it - generators, consumers and those that do both – in order to efficiently deliver sustainable, economic and secure electricity supplies
- Key Elements
 - Intelligent
 - Efficient
 - Sustainable
 - Economic
 - Secure

What a Smart Grid looks like?



What a Smart Grid looks like?



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Global Power Internet: Is This real?



Research Facilities on Smart Grids

□ Smart Grid Facilities

- A smart power grid and real-time simulator that provides the capability to realistically simulate smart power grids with the integration of distributed power generation including wind, wave and fuel cell generation systems.
- Monitoring and control capability as well as real-time information integration, monitoring, protection and closed-loop control functions.

Research Facilities on Smart Grids



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Discussions

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