



IDEA2017

Sustaining Our Success

Microgrid Workshop

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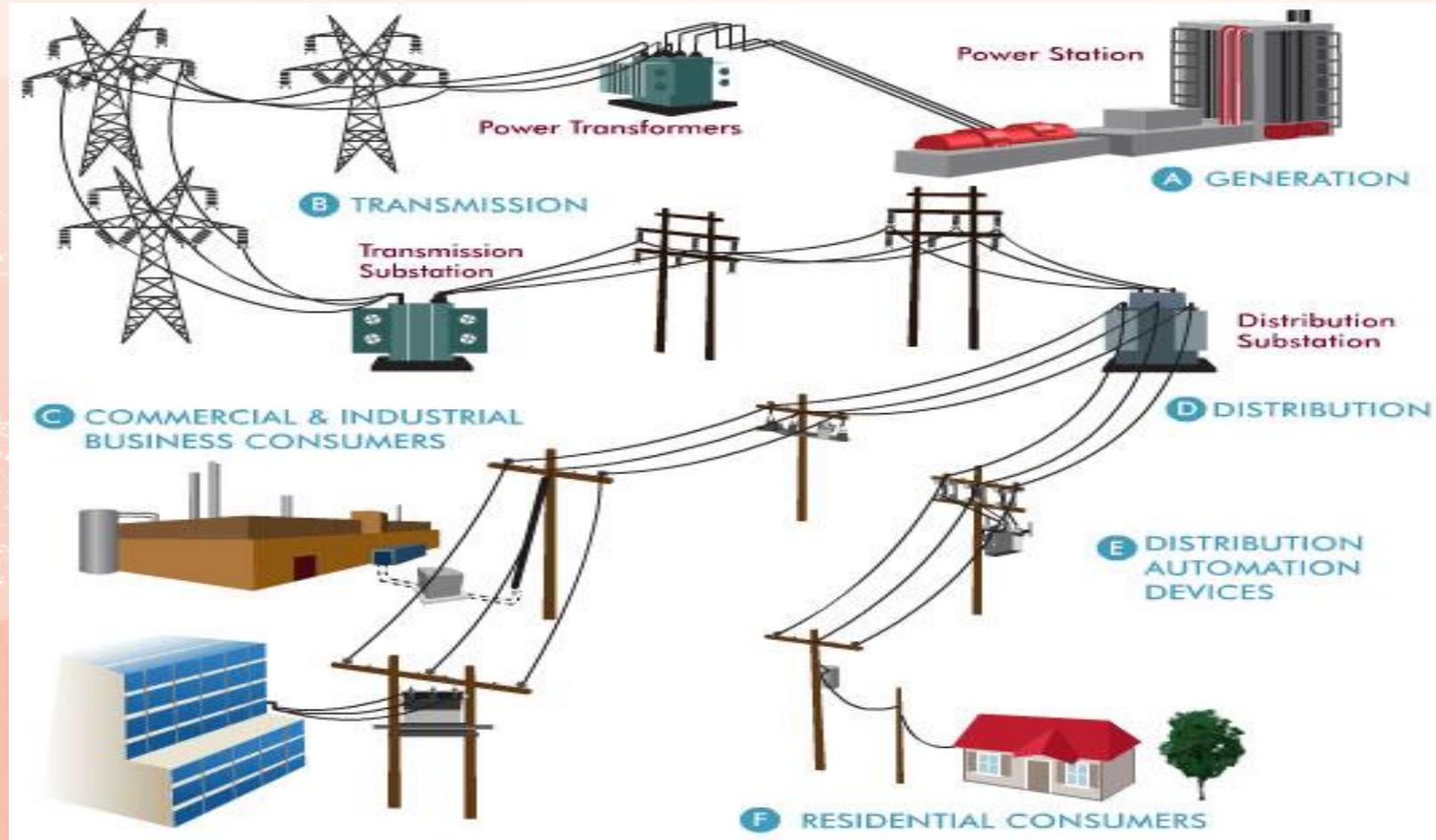
Some Key Definitions

- MICROGRID (DOE & EPRI)
 - A microgrid is a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid and that connects and disconnects from such grid to enable it to operate in both grid-connected or “island” mode
 - MRC adds that a microgrid also provides a significant amount of normal power on-site generation

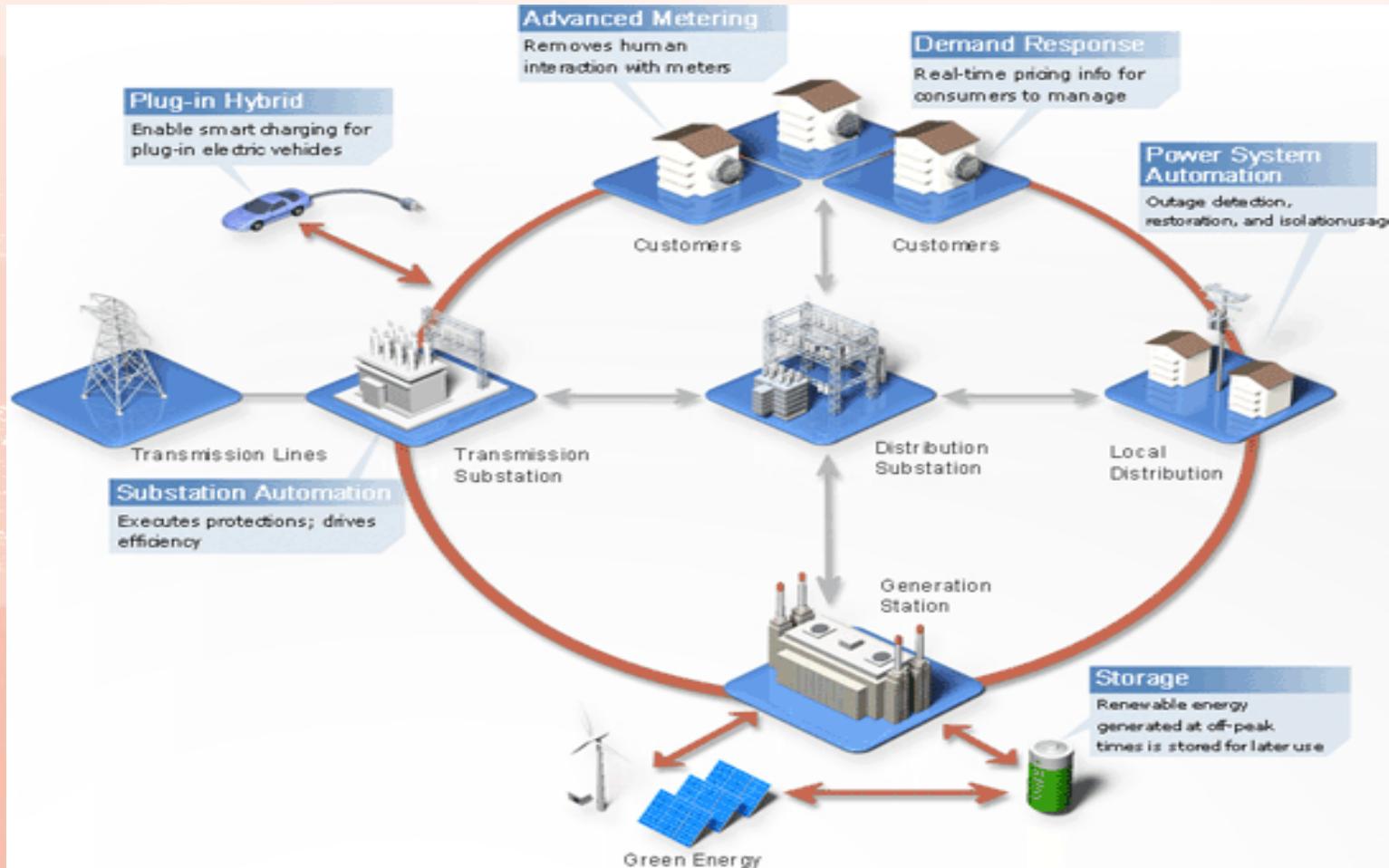
Some Key Definitions

- COMBINED HEAT AND POWER (CHP)
 - The production of electric power and thermal energy from one source of fuel
- DISTRIBUTED GENERATION
 - Generation on-site can be CHP, generators w/emissions control, emergency generators, solar PV, battery or Storage
- RESILIENCY
 - The ability of an onsite power system or microgrid to be able to operate for an extended time period (minimum 72 hours) disconnected from and independent of the electrical grid. Providing the host site with all critical power needed to sustain essential operations.

Current Electric Grid



Future Electric Grid



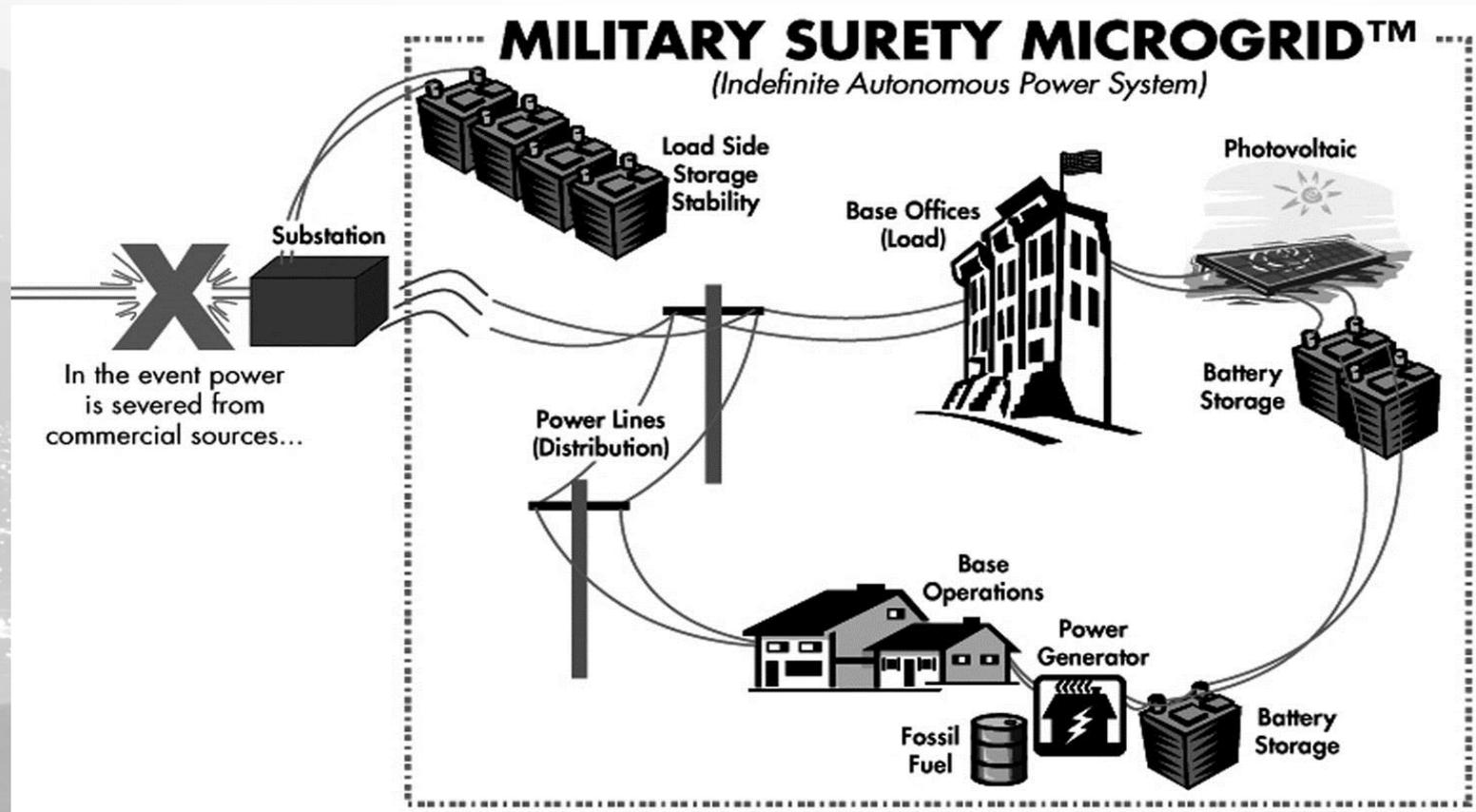
Ownership or Development options

1. PRIVATELY OWNED CAMPUS OR SINGLE USER MICROGRID
2. THIRD PARTY OWNED CAMPUS MICROGRID ON CONTIGUOUS PROPERTY
3. UTILITY OWNED MICROGRID ON CONTIGUOUS PROPERTY
4. UTILITY OWNED MICROGRID ON NON-CONTIGUOUS PROPERTY (URBAN)
5. HYBRID UTILITY AND PRIVATE OWNED MICROGRIDS

Traditional Private Wires

- SINGLE CONTIGUOUS PROPERTY
- ELECTRIC POWER INTEGRAL TO MICROGRID TYPICALLY CHP
- ELECTRICAL DISTRIBUTION BY OWNER
- CHILLED WATER DISTRIBUTED FROM CENTRAL PLANT
- HOT WATER/STEAM DISTRIBUTED FROM CENTRAL PLANT

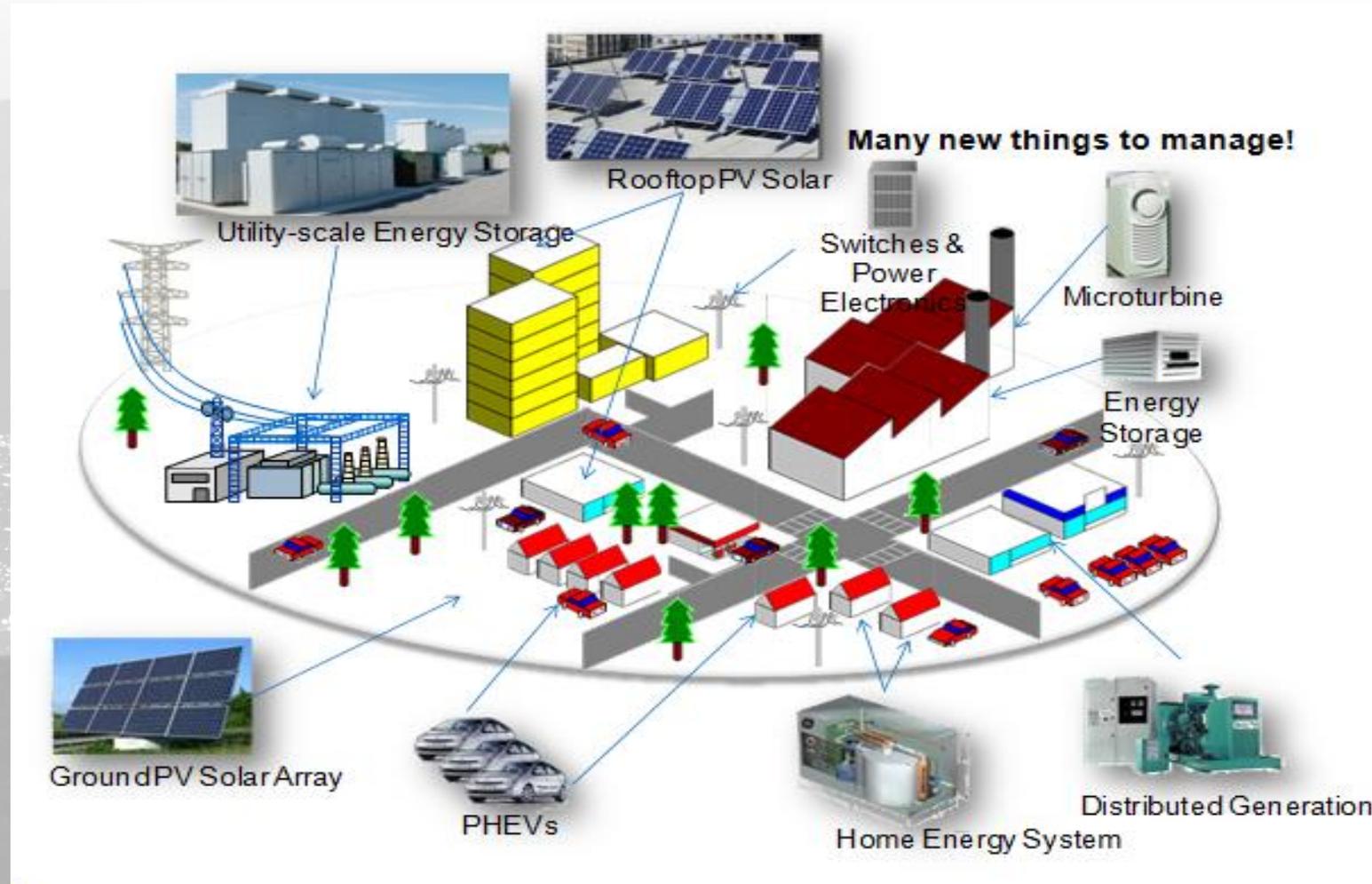
Single Owner Military Base / Campus



The Utility as Distribution Provider

- MULTIPLE PROPERTIES WITHIN DEFINED AREA
- ELECTRIC POWER SOLD/DELIVERED TO DISTRICT ENERGY PARTICIPANTS THROUGH REGULATED UTILITY
- CHILLED WATER MAY BE DISTRIBUTED FROM CENTRAL PLANT
- HOT WATER/STEAM MAY BE DISTRIBUTED FROM CENTRAL PLANT

Community (Urban) Microgrid



Some Advantages of Utility Distribution



Some Advantages of Private Wires



Questions?

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