



Modeling & Simulation Needs for The Power System of Tomorrow

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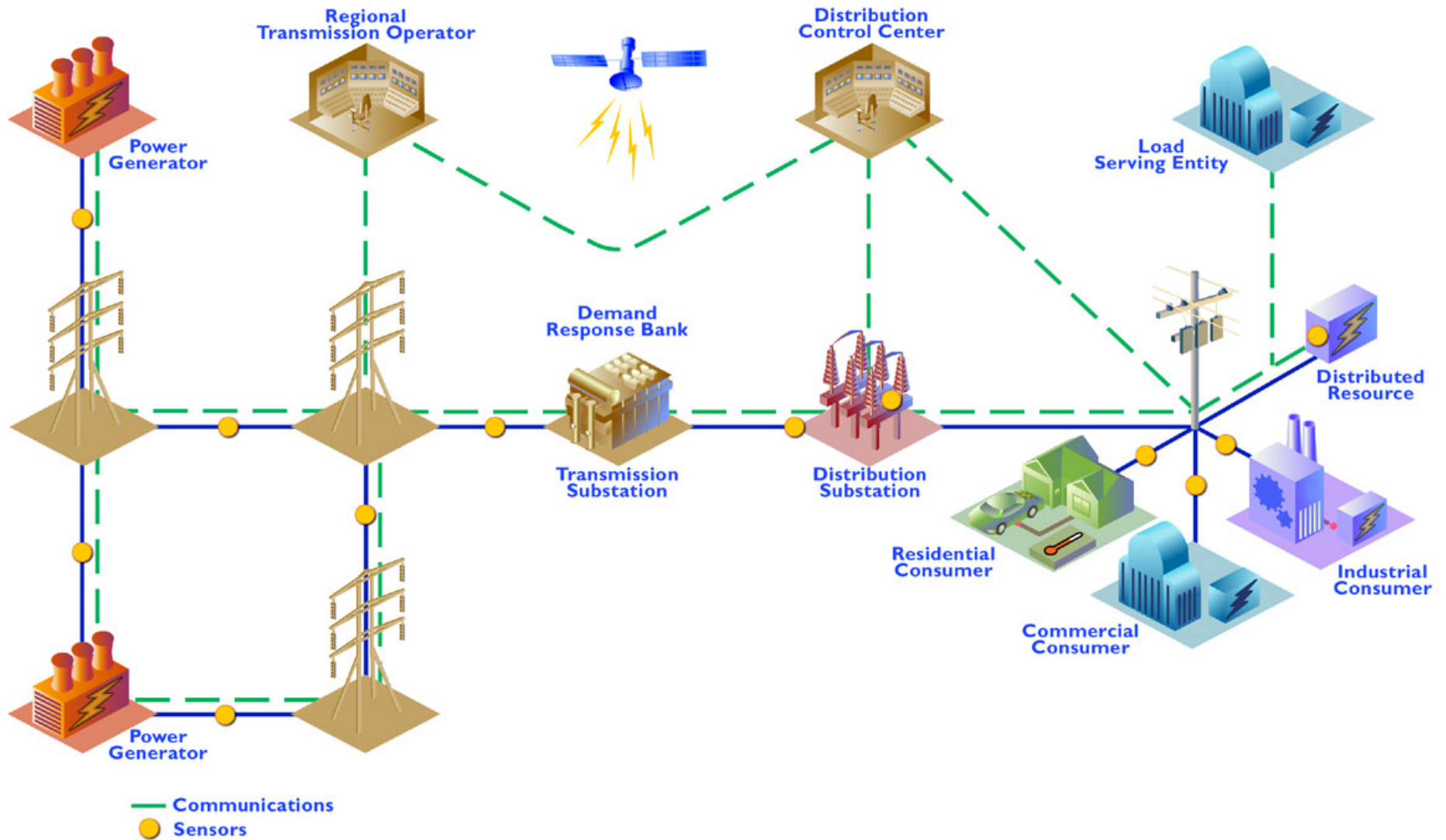
System Monitoring & Control



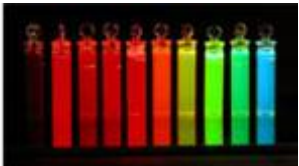
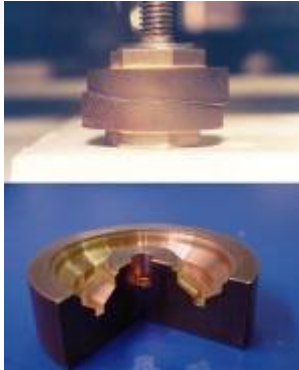
- Increased Use of Sensors
- Fast Simulation and Modeling
- Visualization
- Self Healing



Integrated Electric & Communications Systems



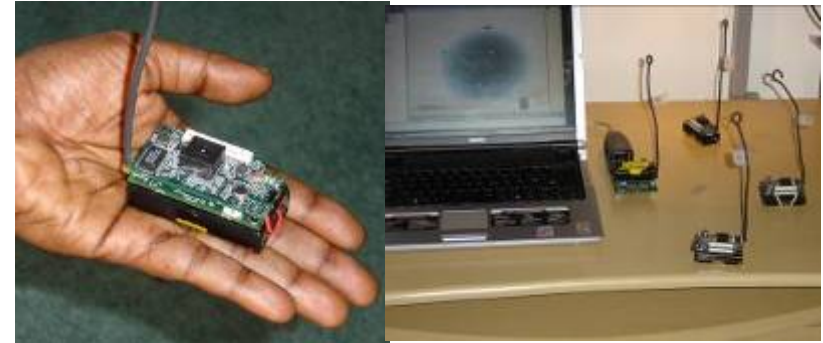
Widespread Use of Sensors



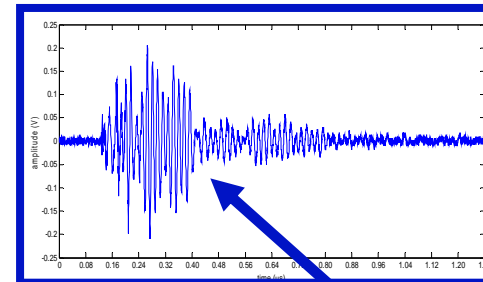
Fluorescent Nano-particle for Detecting LTC/OCB Contact Wear



3-D Acoustic for locating source of Partial Discharge



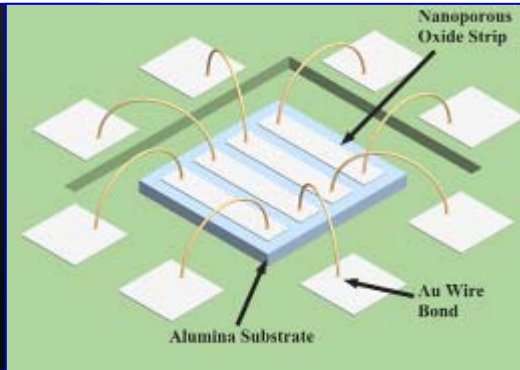
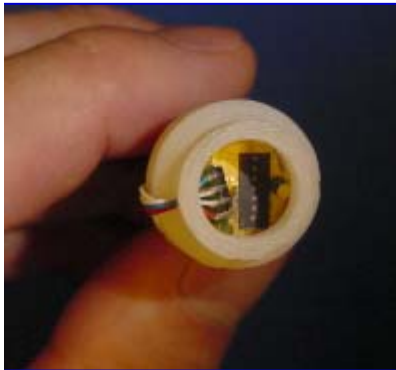
Wireless Meshed Sensor Network



Substation Antenna Array for Partial Discharge Detection



Metal Oxide Semiconductor Sensor for H₂ Gas Detection

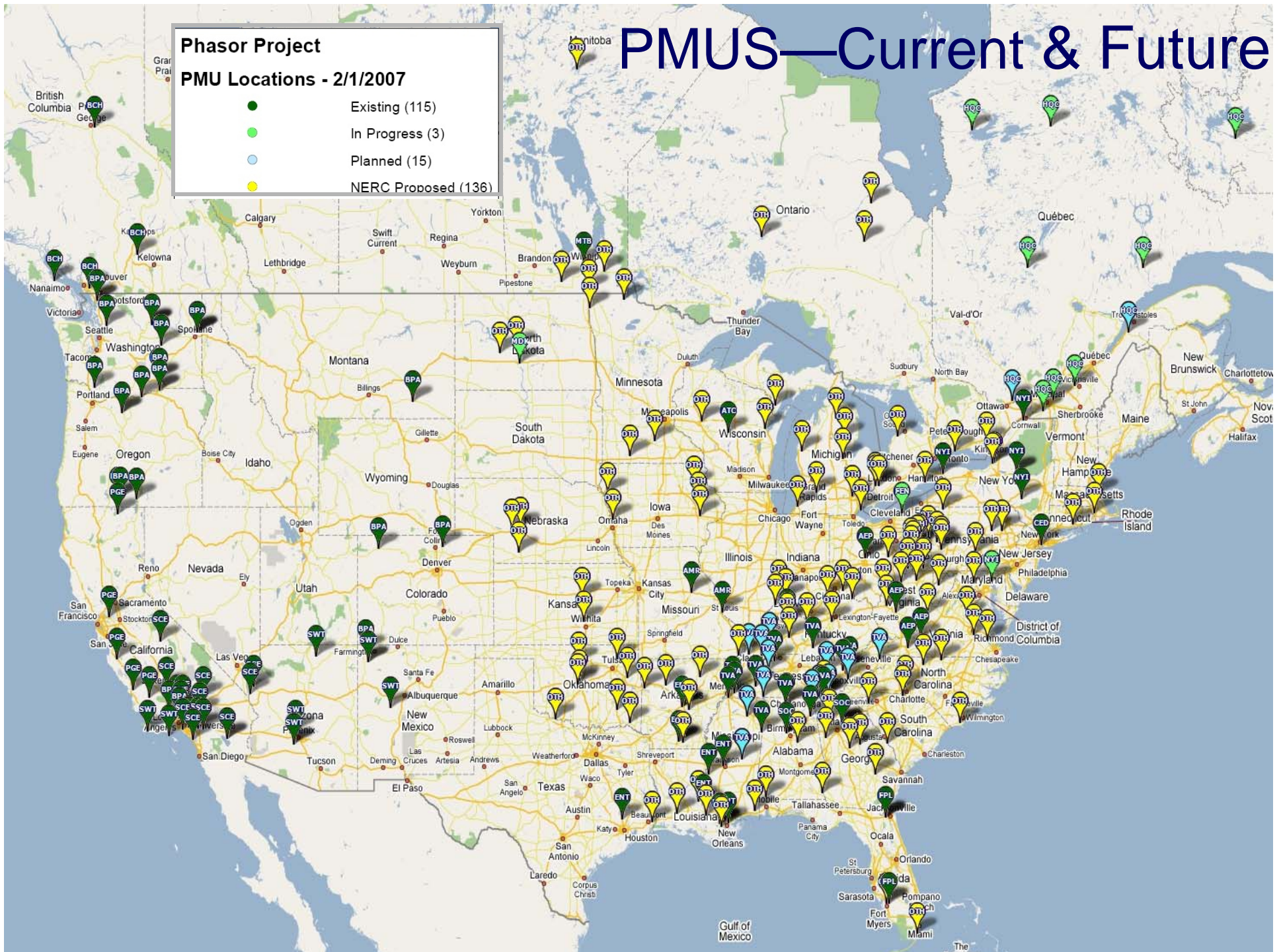


PMUS—Current & Future

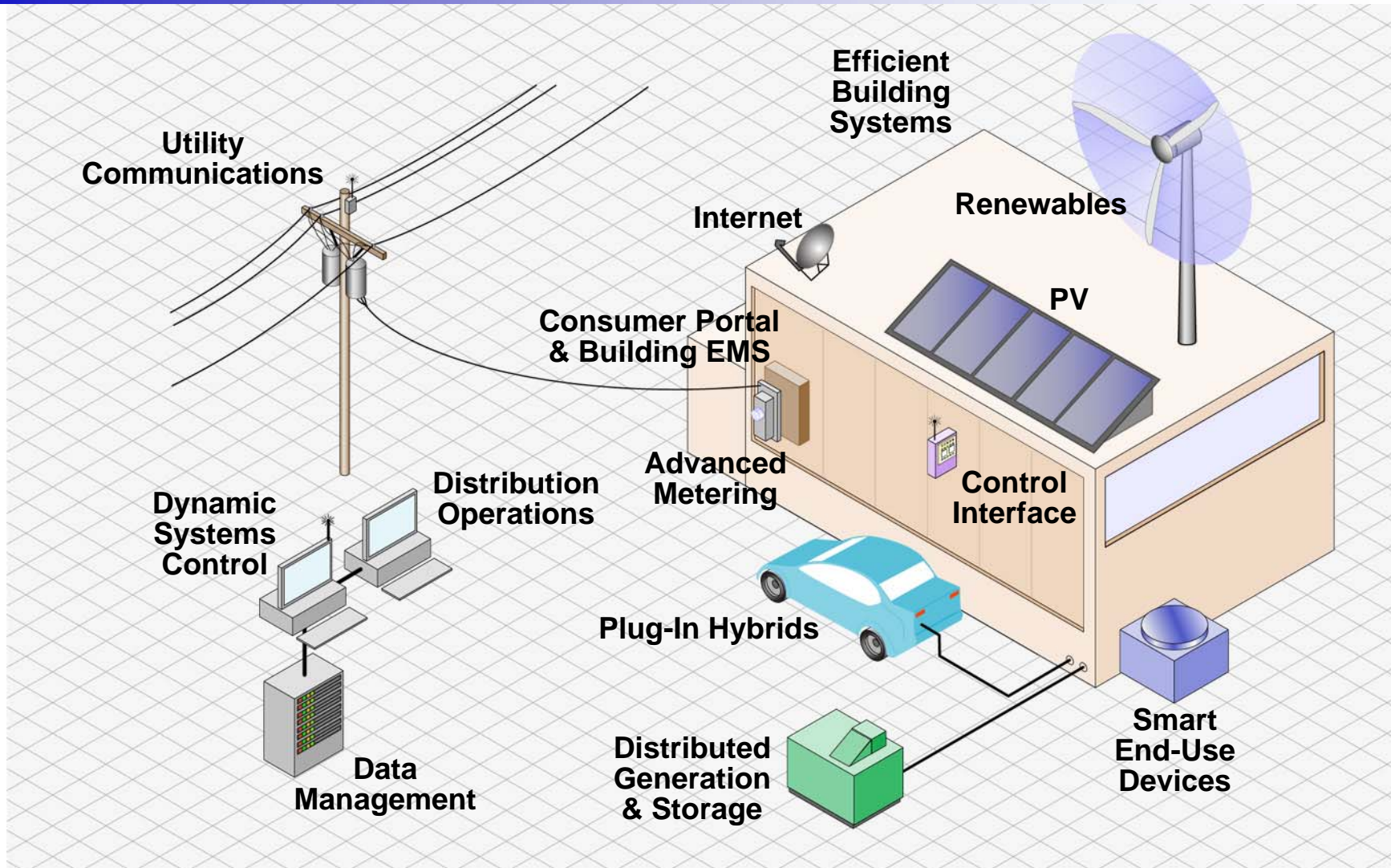
Phasor Project

PMU Locations - 2/1/2007

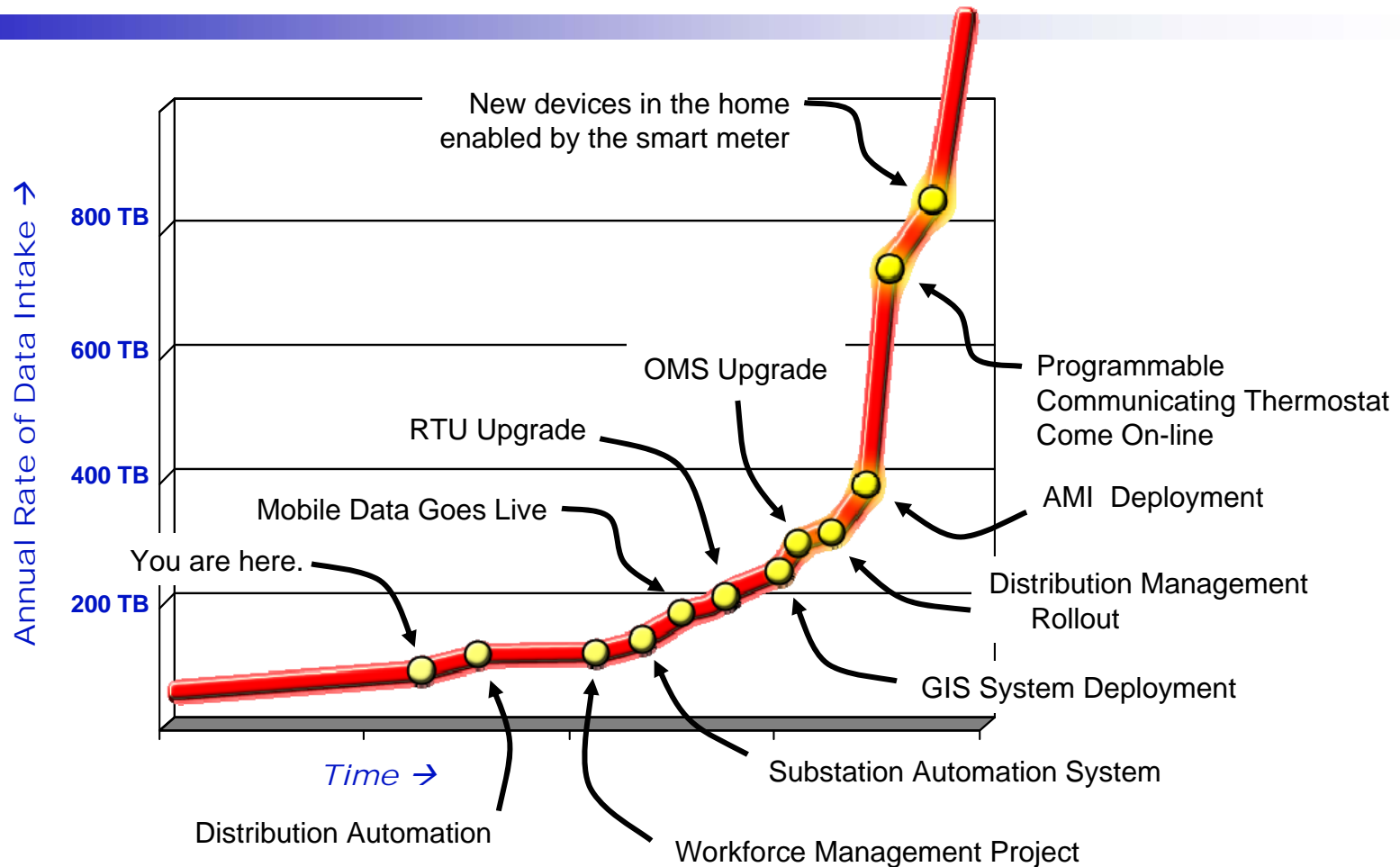
- Existing (115)
- In Progress (3)
- Planned (15)
- NERC Proposed (136)



Dynamic Systems Infrastructure: Consumer Opportunities



Smart Grid Field Data



Tremendous amount of data coming from the field in the near future - paradigm shift for how utilities operate and maintain the grid

BPA Workforce



- 2,944 employees
- Median age is 50
- 21% eligible to retire by 12/07
- 42% eligible to retire by 12/11

