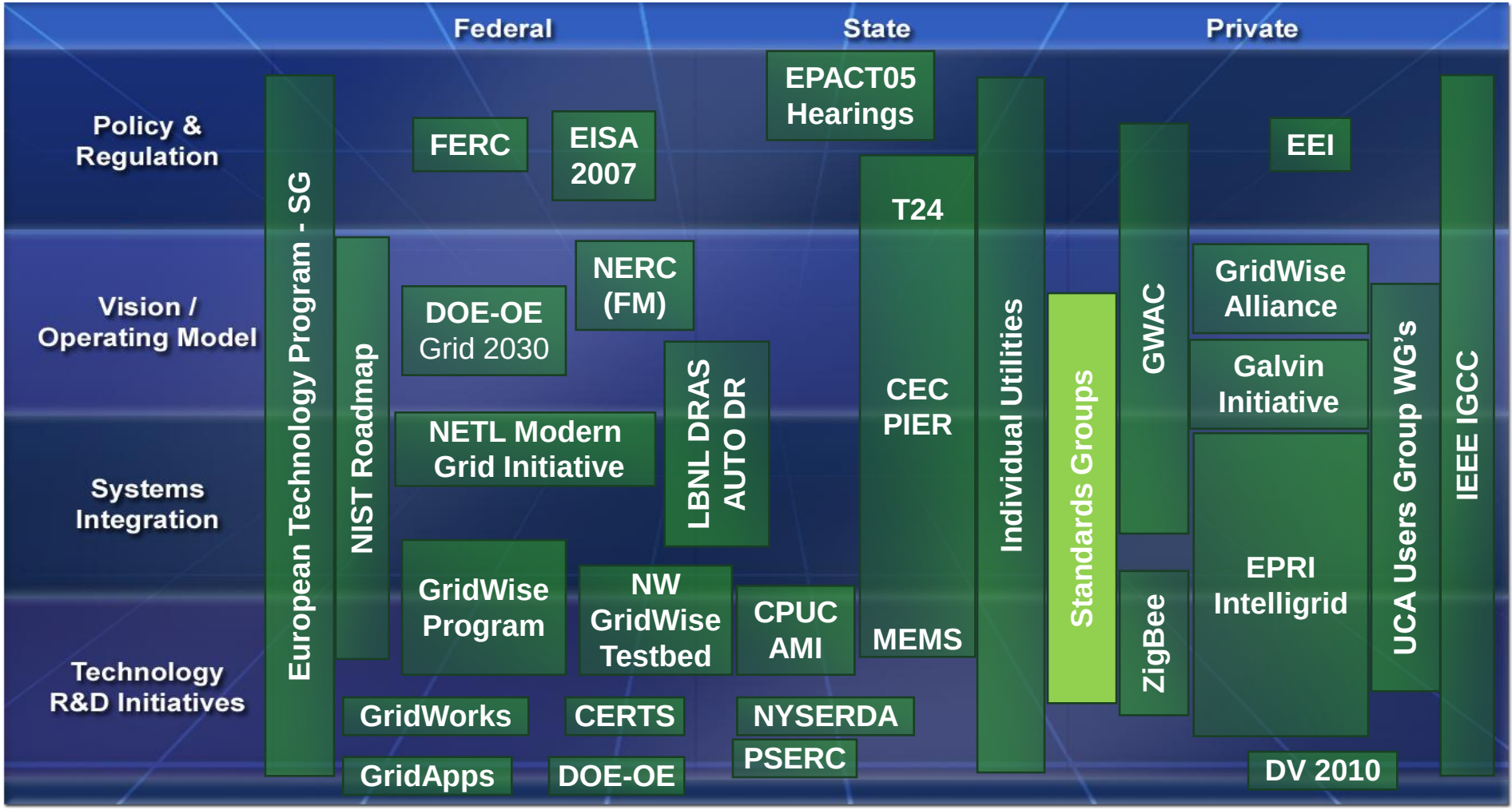
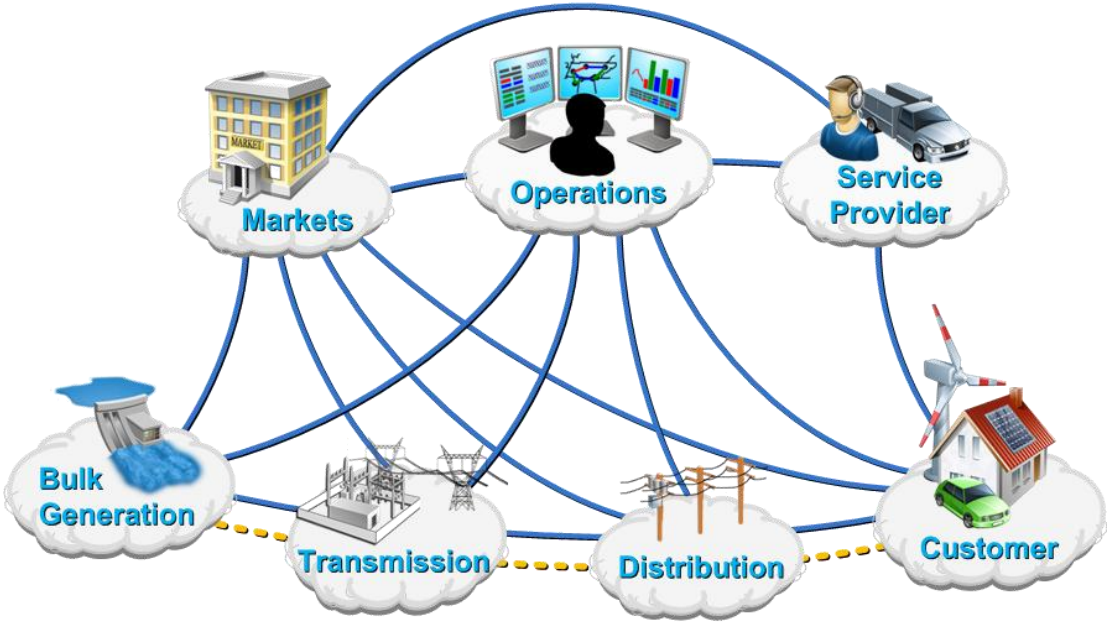
# Smart Grid Activities



# IEEE PES Smart Grid Activities

- PES is involved in all aspects of the “smart grid” through our various committees
- At least one committee of PES addresses each domain of the NIST conceptual model
- Not all are engaged in the Smart Grid overtly (yet), but all are aware and looking forward



# Smart Grid Activities - Generation

- PE/ED&PG  1595 Standard for Quantifying Greenhouse Gas Emission Credits from Small Hydro and Wind Power Projects and for Grid Baseline Conditions
- PE/ED&PG  1797 Guide for Design and Application of Solar Technology in Commercial Power Generating Stations
- Many of the generation standards are focused on the nuts and bolts of the equipment, but the equipment is changing.
- These standards projects address new concerns and new technologies that will certainly play a part in the Smart Grid

# Smart Grid Activities - Transmission

- PE/PSACE  859 IEEE Standard Terms for Reporting and Analyzing Outage Occurrences and Outage States of Electrical Transmission Facilities
- PE/PSC  1138 Standard for Testing and Performance for Optical Ground Wire (OPGW) for use on Electric Utility Power Lines
- PE/PSR  C37.236 Guide for Power System Protective Relay Applications over Digital Communication Channels
- PE/1686 – Standard for Substation Intelligent Electronic Devices Cybersecurity Capabilities
- We found much more than a slide-full of standards from the Committees related to transmission.
- Standards for capacitors, short circuit limiters, and harmonic filters are all players in the Smart Grid game

# Smart Grid Activities - Distribution

- PE/SUB  1613 IEEE Standard Environmental and Testing Requirements for Communications Networking Devices in Substations
- PE/SUB  1402 IEEE Guide for Electric Power Substation Physical and Electronic Security
- PE/T&D  1366 IEEE Guide for Electric Power Distribution Reliability Indices
- The Substations Committee is active in standards related to the Smart Grid
- These are examples, the list is longer

# Smart Grid Activities – T&D

- PE/SWG  C37.10 IEEE Guide for Diagnostics and Failure Investigation of Power Circuit Breakers
- PE/SWG  C37.10.1 IEEE Guide for the Selection of Monitoring for Circuit Breakers
- PE/SB 1679 Recommended Practice for the Characterization and Evaluation of Emerging Energy Storage Technologies in Stationary Applications
- Switchgear,  Transformers, even Stationary Batteries are now participants in the Smart Grid

# Smart Grid Activities - Consumer

- IEEE 1547 – Standard for Interconnecting Distributed Resources with Electric Power Systems
- PE/T&D 1250 Guide for Identifying and Improving Voltage Quality in Power Systems
- IEEE 1159 – Recommended Practice for Monitoring Power Quality
- PE/PQ IEEE 1159.3 – Recommended Practice for Transfer of Power Quality Data
- PE/PSR  C37.95 Guide for Protective Relaying of Utility-Consumer Interconnections

# Smart Grid Activities - Operations

- PE/SUB  C37.1 IEEE Standard for SCADA and Automation Systems
- PE/PSR  C37.118 Standard for Synchrophasors for Power Systems
- P1601 Standard for Optical AC Current and Voltage Sensing Systems
- The Analysis and Power System Communications committees are active in Smart Grid work
- Communicating data and interpreting the information provided is basic to the Smart Grid

# Smart Grid Activities - Conclusion

- PES committees have been involved in creating standards for the Smart Grid since well before the “Smart Grid” term was established
- We have a great foundation for the Smart Grid, built upon the expertise of the leaders in their fields.
- One of the upcoming challenges is to break the expertise out of the silos and create the “system of systems” that will make the Smart Grid work.
- We have all been challenged to make it happen faster
- As we saw earlier, we have to work across the boundaries to make the systems work

# Conclusion

- PES has many existing standards and authorized projects relevant to applications that qualify as Smart Grid
- A database that captures all of this information, scopes, technical attributes, NIST domains and other relationships is required
- Individual committees, subcommittees, and their working groups generally work independently of each other – there is an opportunity for cross committee collaboration
- PES will be an active participant in the NIST roadmap process to improve existing standards and develop new ones