

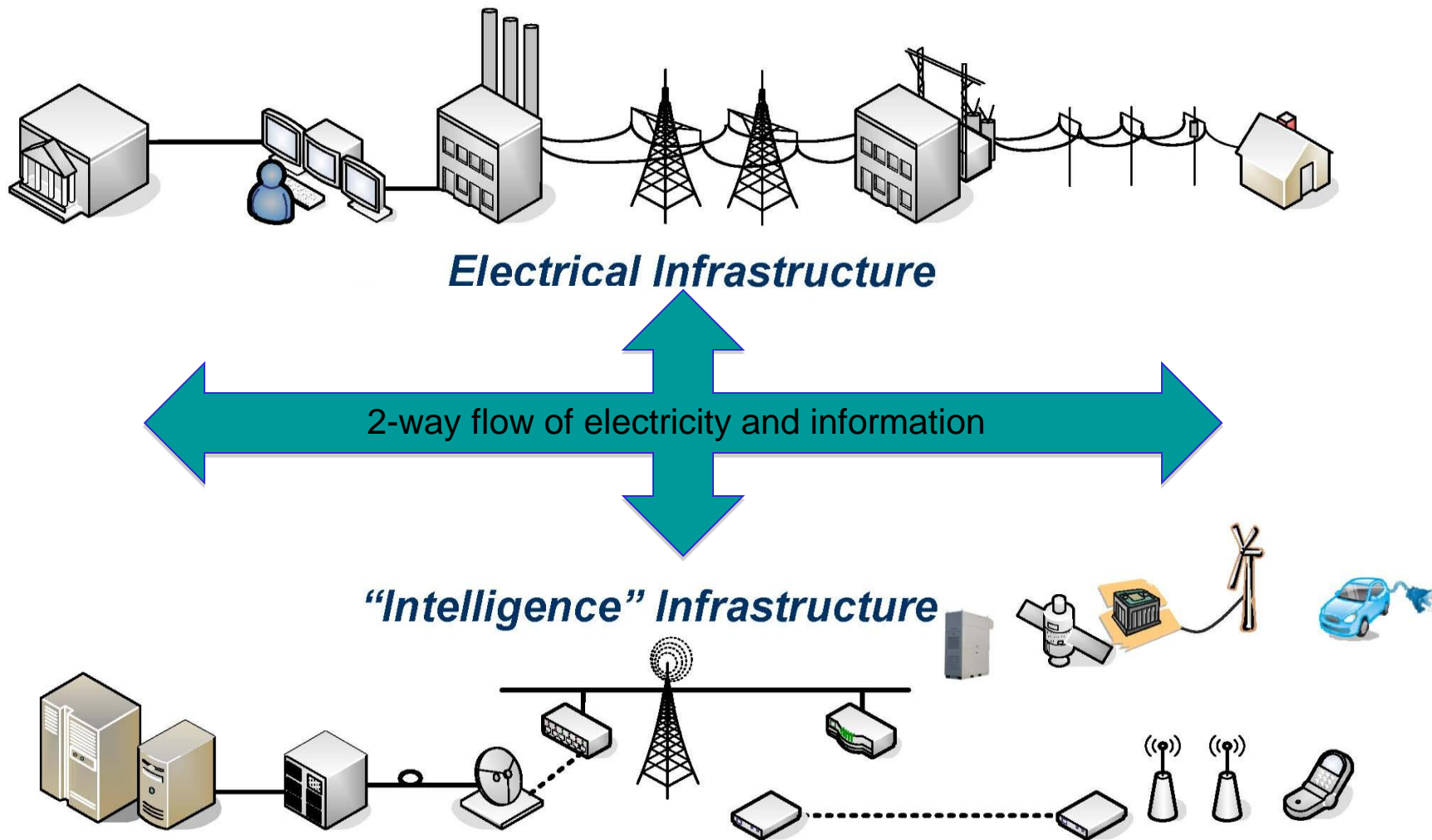
Communication Networks for Smart Grid:

Or Making “the Grid” Smart

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<http://www.nist.gov/itl/antd/emntg/smartgrid.cfm>

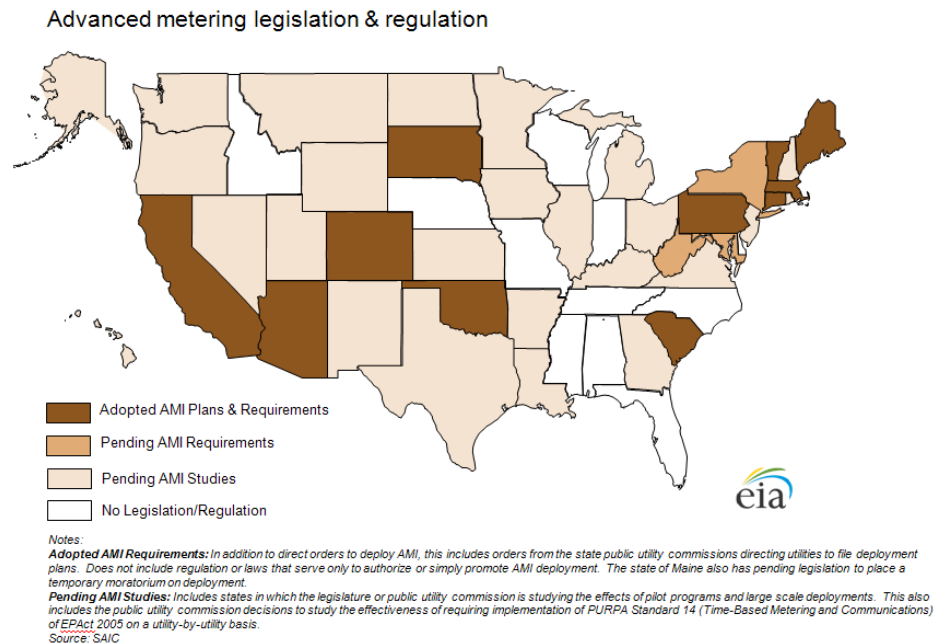
Smart Grid: The "Energy Internet"



What is the problem?

- Many communications and networking standards, not developed specifically for smart grid applications
- Multiple wireless technologies in close proximity can produce severe mutual interference
- System vendors' offerings dictate utilities' technology decisions, not vice versa
- Business decisions driven by regulatory commissions and organizations (e.g., FERC, PUC, and NERC)

⇒ *Utilities need guidance on how to select standards and design Smart Grid communication networks*



Source: US Energy Information Administration (EIA),
<http://www.eia.gov/analysis/studies/electricity/>

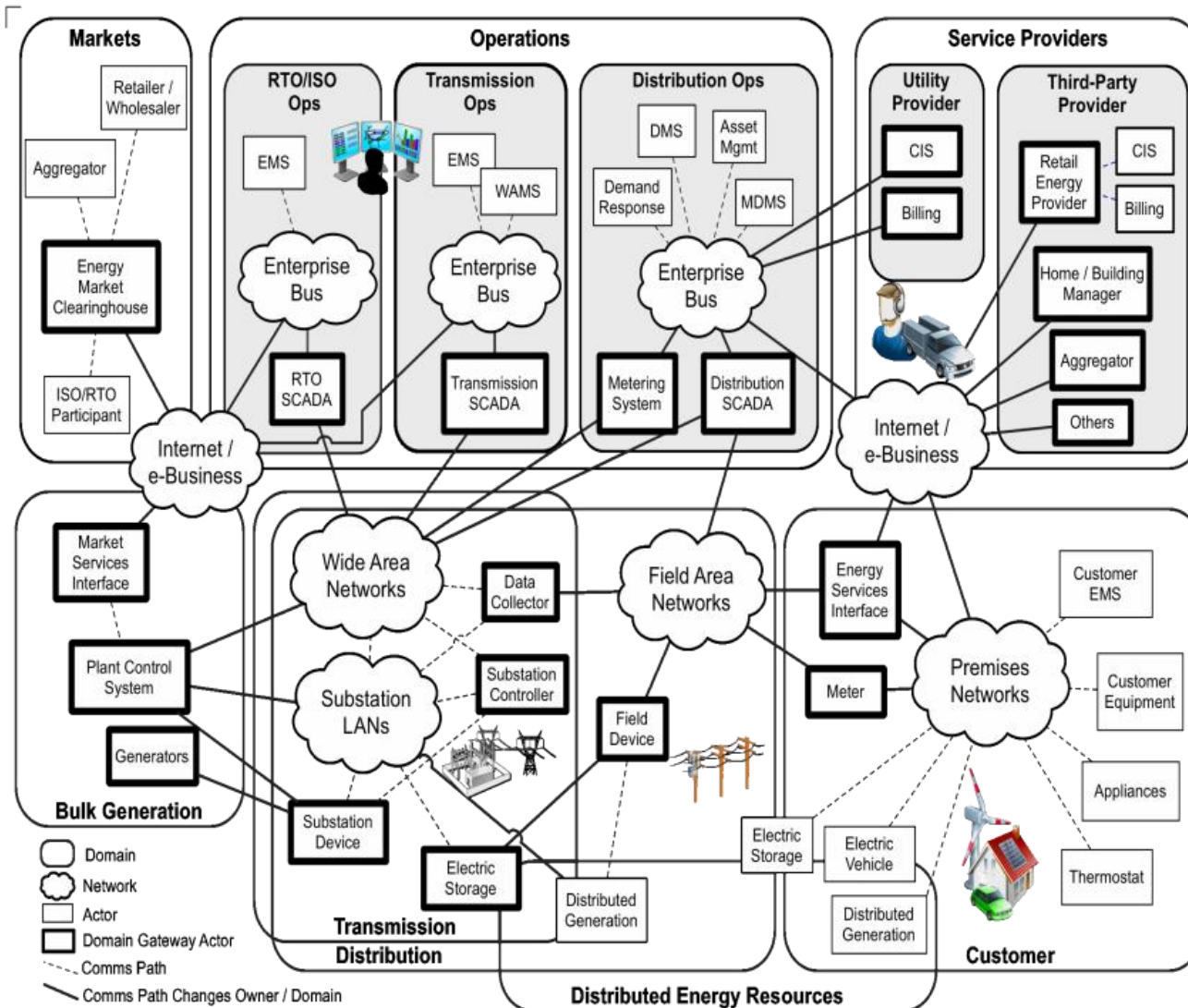
Standard Setting Organizations

- SGIP 2.0 since 2013
Over 180 member organizations
- SGIP1.0: 2009-2012
Over 500 organizations and thousands of members
- UCA International Users Group - Open SG:
150+ member companies including utilities, vendors, service providers
- Telecommunication Standard Setting Organizations (SSOs)
IEEE, 3GPP, 3GPP2, ISA, TIA, ATIS, IETF, ITU-T

Requirements

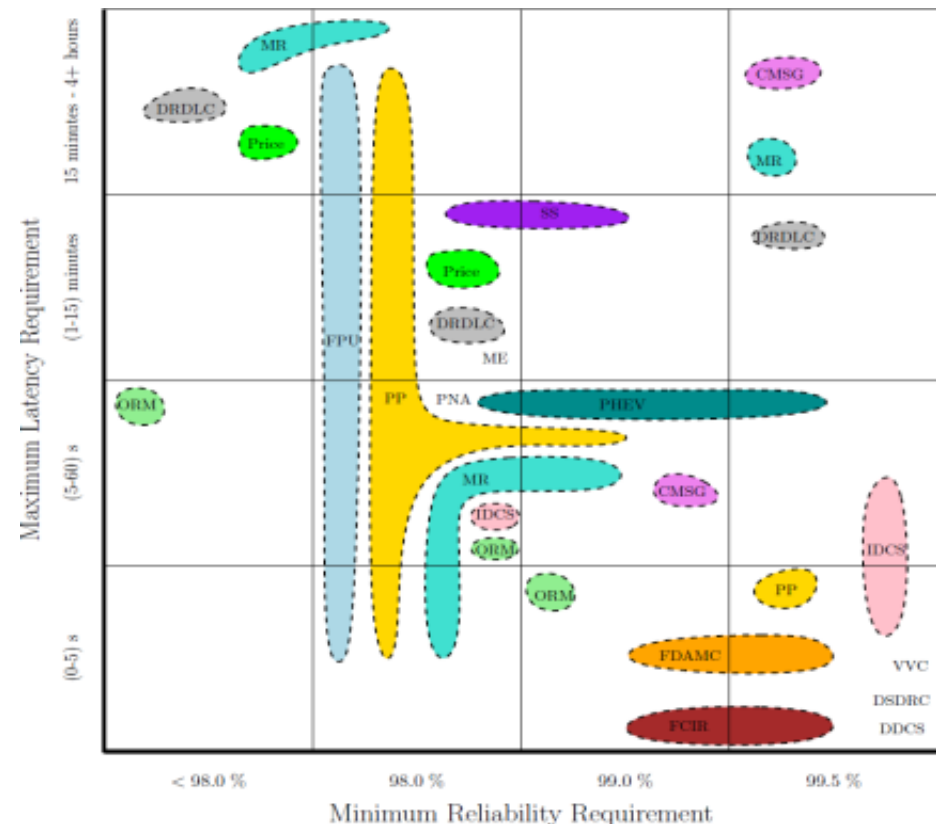
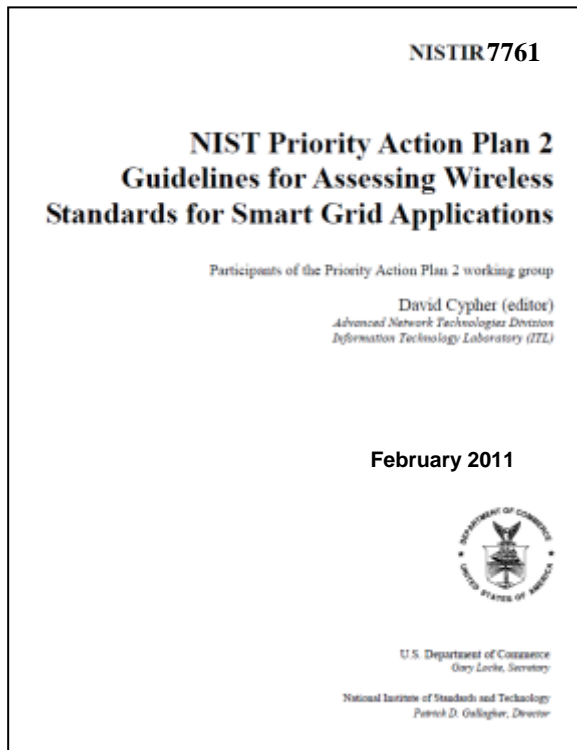
Standards

Smart Grid Information Networks



"NIST Framework and Roadmap for Smart Grid Interoperability Standards," NIST Special Publication 1108R2, February 2012

Smart Grid Application Communication Requirements



- SGIP Priority Action Plan 2, “Guidelines for Assessing Wireless Standards for Smart Grid Applications,” NISTIR 7761v1, February 2011, http://collaborate.nist.gov/twiki-sggrid/pub/SmartGrid/PAP02Objective3/NIST_PAP2_Guidelines_for_Assessing_Wireless_Standards_for_Smart_Grid_Applications_1.0.pdf
- UCA Open SG/SG-NET System Requirements: http://osgug.ucaiug.org/UtiliComm/Shared%20Documents/Latest_Release_Deliverables/SG%20Network%20SRS%20Version%20V5%20Final.pdf.

Areas of Investigation

- 1) Apply known network and communication theory techniques to solving energy problems.
- 2) Develop system level models capturing the interactions between the electric and communication plane
- 3) Develop resilient, reliable, and secure communication protocols to support smart grid applications
- 4) Expedite the development and deployment of interoperable communication standards for Smart Grid

