

Industrial to Grid What Is It?

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Forces At Work

- Carbon emissions
- Need for increased generation to meet demand
- Need for energy independence
- Increase in energy costs
 - Energy and power are first-class feedstocks for industrial plants

Energy Independence and Security Act of 2007 (HR-6)

- An Act to move the United States toward greater energy independence and security, to increase the production of clean renewable fuels, to protect consumers, to increase the efficiency of products, buildings, and vehicles, to promote research on and deploy greenhouse gas capture and storage options, and to improve the energy performance of the Federal Government, and for other purposes.

Title XIII – Smart Grid

Title XIII Sections and Topics

- 1301 – Statement of policy on modernization of the electric grid
- 1302 – Smart grid system report
- 1303 – Smart grid Advisory Committee and Task Force
- 1304 – Smart grid technology RD&D
- 1305 – Smart grid interoperability framework
- 1306 – Federal matching fund for smart grid investment costs
- 1307 – State consideration of smart grid
- 1308 – Study of the effect of private wire laws on CHP
- 1309 – DOE study of security attributes of smart grid systems

Section 1301 – Statement of Policy

Establish a National policy to support the modernization of the nation's electricity T&D system ... that can ... achieve each of the following, which together characterize a smart grid:

1. Digital information and controls
2. Dynamic optimization with cyber-security
3. Deployment and integration of distributed resources and generation, including renewables
4. Use of demand response, demand-side resources and energy efficiency
5. Smart technologies for metering, grid communications and distribution automation
6. Integration of smart appliances and consumer devices
7. Advanced storage and peak-shaving technologies, including PHEVs and thermal-storage A/C
8. Give consumers timely information and control options
9. Develop standards for communication and interoperability of appliances and equipment connected to the grid, including grid infrastructure
10. Identify and lower barriers to adoption of smart grid technologies, practices and services

Sec 1305 – Interoperability Framework

Primary responsibility given to National Institute of Standards and Technology (NIST) to develop a framework that includes protocols and model standards for info management that achieves interoperability of SG devices and systems.

The standards should align policy, business and technology to enable all electric resources, including demand-side, in an efficient, reliable network.

Seek input from:

- FERC and relevant federal and state agencies
- DOE's Smart Grid Task Force and Advisory Committee
- Stakeholders such as GWAC, IEEE and NERC

- Authorization of \$5mil/year from 2008 to 2012

Sec 1305 (Cont.) – Interoperability Framework

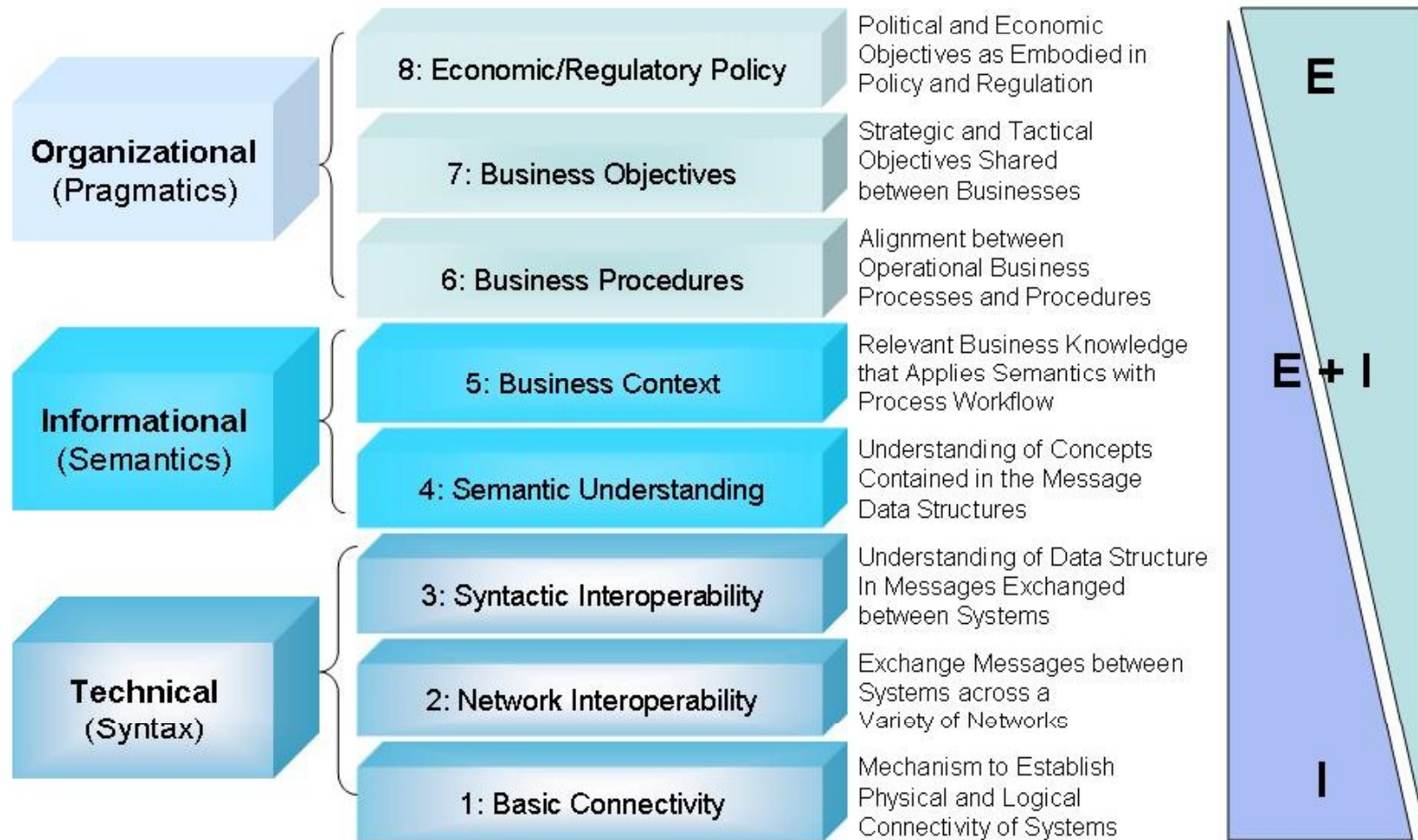
The interoperability framework shall be flexible, uniform and technology-neutral, including but not limited to information management techs, designed to:

1. Incorporate all resources, both generation and demand response and energy efficiency
2. Accommodate regional differences and technology innovations
3. Consider using voluntary uniform standards that accommodate mass-produced appliances and equipment that are manufactured to respond to grid emergencies and price signals to curtail or shed full or partial load or provide ancillary services
4. Framework shall accommodate appropriate manufacturer lead times

Timing -- NIST to start in 60 days, report after one year, interim reports as justified, and final report when work completed or federal role no longer necessary.

FERC to adopt standards and protocols as necessary to insure SG functionality and interoperability in interstate transmission and regional, wholesale electric markets

Smart Grid Interop Categories



Smart Grid

- More than just Transmission and Distribution
- Also includes new and smarter producers and consumers
- Big 3
 - Residential – Consumers
 - Demand response and advanced metering
 - Commercial – Consumers
 - Demand response, energy management and building controls
 - Industrial – Producers and Consumers
 - Smart Grid initiatives!?!? Why not?

Industrial Plants

- Have captive on-site generation including backup generation
- Are large consumers of power
- Are highly integrated and automated
- Have on-site technical and supports staffs
- Are often located far from population centers
- Own significant real-estate
- Can benefit greatly from improved market perception

Industrial Initiatives

- Increase on-site generation for base load and peak-shaving
 - CHP generation
 - Distributed renewable generation
 - Solar, Wind, Hydro, Fuel Cell, ...
- Improved on-site power management and demand response
 - Active power management
 - Load shedding in response to grid events

A View from the Grid

- Grid operations requires that industrial producers and consumers interface to the grid and to grid systems in a consistent and uniform manner.
- That the interface is supported by the industry through commercial products over a long life-cycle and
- That T&D, industrial, commercial and residential systems can be integrated into the utility infrastructure with least effort and cost.

Summary

- Industrial plants should be viewed as integral extensions of the Smart Grid
- They will play a variety of roles depending on size, industry and location.
- They all need to be provided the tools and technology to integrate consistently, cost-effectively and seamlessly with Smart Grid operations

Call To Action

- Organize a formal team to define the industrial to grid connectivity use-cases and requirements
- Define the industrial to grid interface and interoperability architecture
- Work with organizations to formalize and sustain I2G standards
- Promote the development of commercial off-the-shelf products that meet the standards