



Achieving the Smart Grid Vision

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Vision—Collaborative Energy

- Providers and consumers of energy
- ...Cooperating and working together
- ...With control mediated by markets
- ...And leveraging existing work

Don't reinvent.

Build on the present.

Consider the past.



What are the Stories?

- Compelling narratives
- Drive Requirements
- BUT...how do you accommodate
 - The businesses and models we don't know about yet
 - Architecture variations and evolution
- Who knew about eCommerce and the Web?
- Who planned for the explosive growth?
- Who knew what we'd take for granted today?



Collaborative Energy Interfaces

- Candidates for standards
- Interfaces between actors and roles
- Depend on the architecture and its evolution
 - What are the chunks? How do they interact?
 - At what level of detail and of abstraction?
 - What fits a niche?
- How to interoperate without knowing too much?
- Does what we're doing
 - Enable markets?
 - Motivate and include the customer?
 - Optimize assets and operate efficiently?
 - Modern Grid Strategy, DOE NETL

The Smart Grid Some Interfaces

- What you *pay* and what you *buy*
 - Cuts across areas and domains and geographic areas
 - NIST twiki Pricing Requirements
 - Markets for distributed control
 - Energy Market Information Exchange
 - DR/curtailment and wholesale price information

Price 1.0 is a number. Price 2.0 shows market context, units...
- When should something happen?
 - Discussions on smartgrid-interest list
 - Many different views, different domains, different needs
 - From appointments to time for price changes to phase

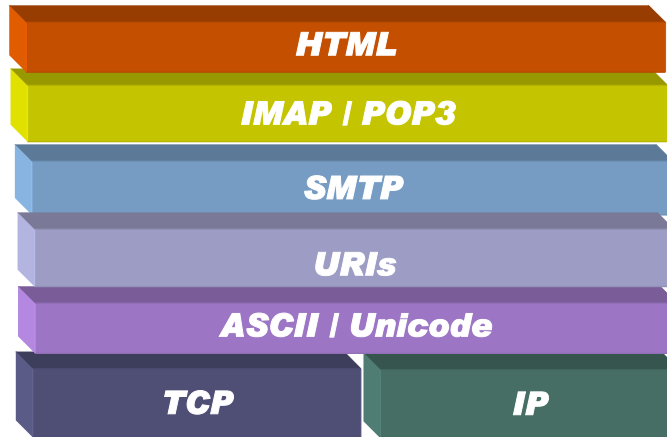
Easier integration with calendars, buildings, energy futures

The Smart Grid Guiding Principles

- Symmetry
 - Net Zero Energy by definition provider and consumer
- Transparency
 - What's happening? What happened?
- Composition
 - Simpler interfaces put together in useful ways
- Loosely coupled
 - Messages, not tied to details of other end
- Shallow integration
 - Less brittle, easier to implement



Composed Standards More Widely Adopted



Summary

- Collaborative energy is the goal
- Cooperation to improve efficiency
- Stories and scenarios
- Guiding Principles
 - Symmetry
 - Transparency
 - Composition
 - Loosely coupled
 - Shallow integration

To make it last