



Broadband and IT: *Enabling the Smart Energy Ecosystem*

Larry Plumb
Executive Director – Issues & Technology Policy
Verizon
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Topics

- **Smart Energy Ecosystem: *Modularity***
 - Grid, Buildings, Vehicles, etc.
- **Smart Grid: *Need for Advanced Communications***
 - “Smarts” in Smart Grid = Communications and Control Network
 - Utilities Telecom Council study confirms service providers have role
- **Smart Homes: *More Opportunities for Communications***
 - 50 million Home Area Networks already in place
 - Smart Homes . . . An idea that’s coming of age
- **Need for Inter-Utility Communications: *Yet More Opportunities***
 - Consider the impact of electric vehicles
 - Bringing renewable sources on line
- **Three Marketing and Policy Challenges for the Smart Grid**
 - Lack of effective demand?
 - “Forced” innovation?
 - Smart-Grid Islands?



Smart Energy Ecosystem

Interoperable yet Discrete Modules*

- Electric Grid (*which has its own modular distinctions between generation, transmission, distribution and meters*).
- Homes
- Apartments
- Buildings
- Transportation
- Etc.

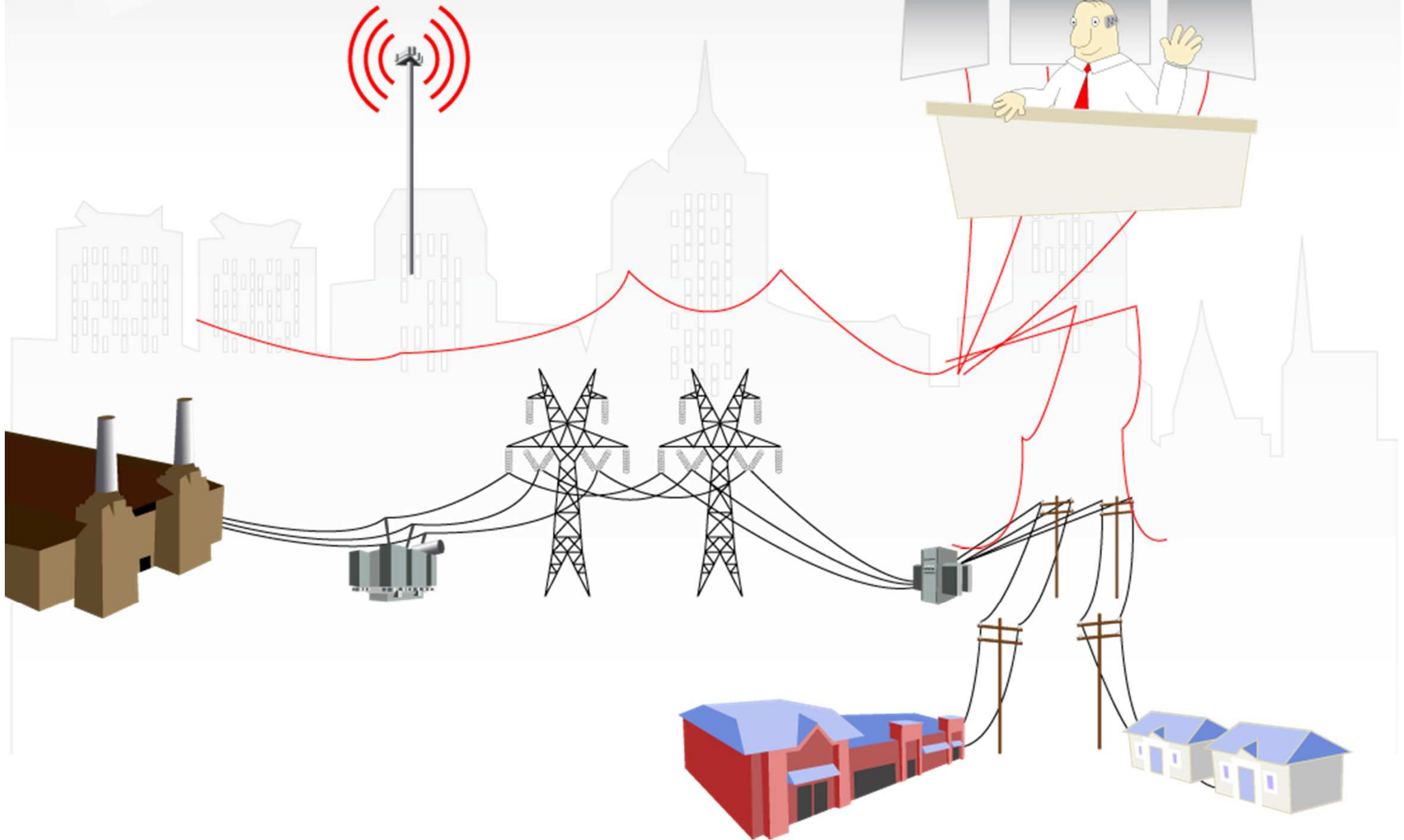
Homes, Buildings and Grids are Discrete Markets from each Other, presenting:

- Different opportunities for investment
- Different opportunities for innovation
- Different challenges

* *Analogous to the Internet Ecosystem*



Smart Grid = Electricity Grid *plus* Communications & Control Overlay Network





UTC Study Confirms Service Providers have Role in the Smart Grid

- Landmark study by the Utilities Telecom Council articulates requirements that utilities and communications service providers must meet in building the Smart Grid:*
 - Capacity
 - Latencies
 - Coverage
 - Reliability
 - Security
 - Back-up Power
- Findings:

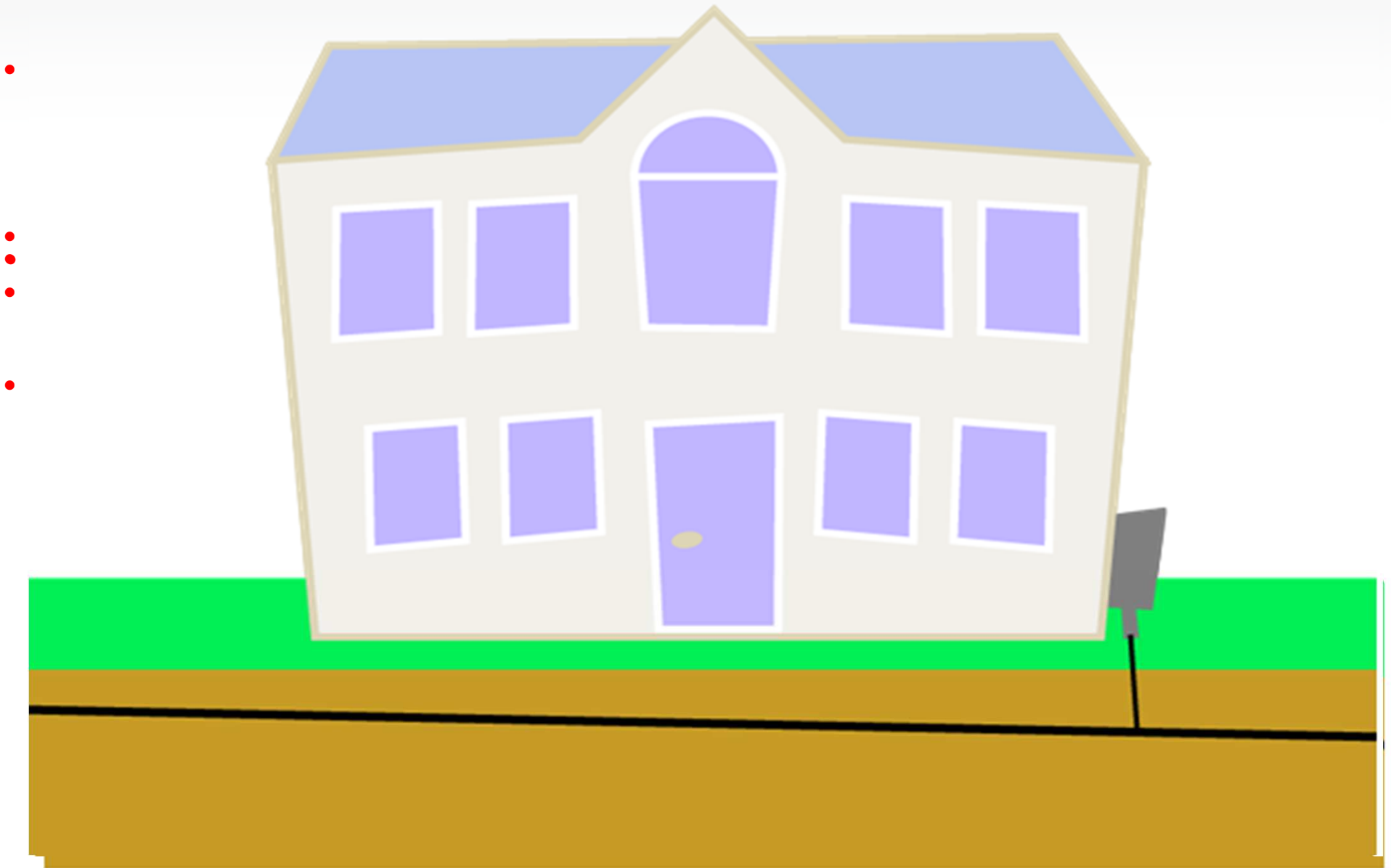
“... Bottom line? Utilities cannot build all the communications networks they need, and best of breed communications service providers will be essential to their success. . .” *William R. Moroney, UTC President and Chief Executive Officer* **

*A Study of Utility Communications Needs, by the Utilities Telecom Council, Sept 2010 – Sponsored by Verizon

**Quoted in UTC/VZ News Release: “Utilities Need Improved Networks to Improve Energy Independence and Sustainability,” 9/30/10



Smart Homes – Market Adjacent to the Smart Grid





Smart Homes Pre-Date Smart Grid

540-324-7315 | VOL 118 | 2009

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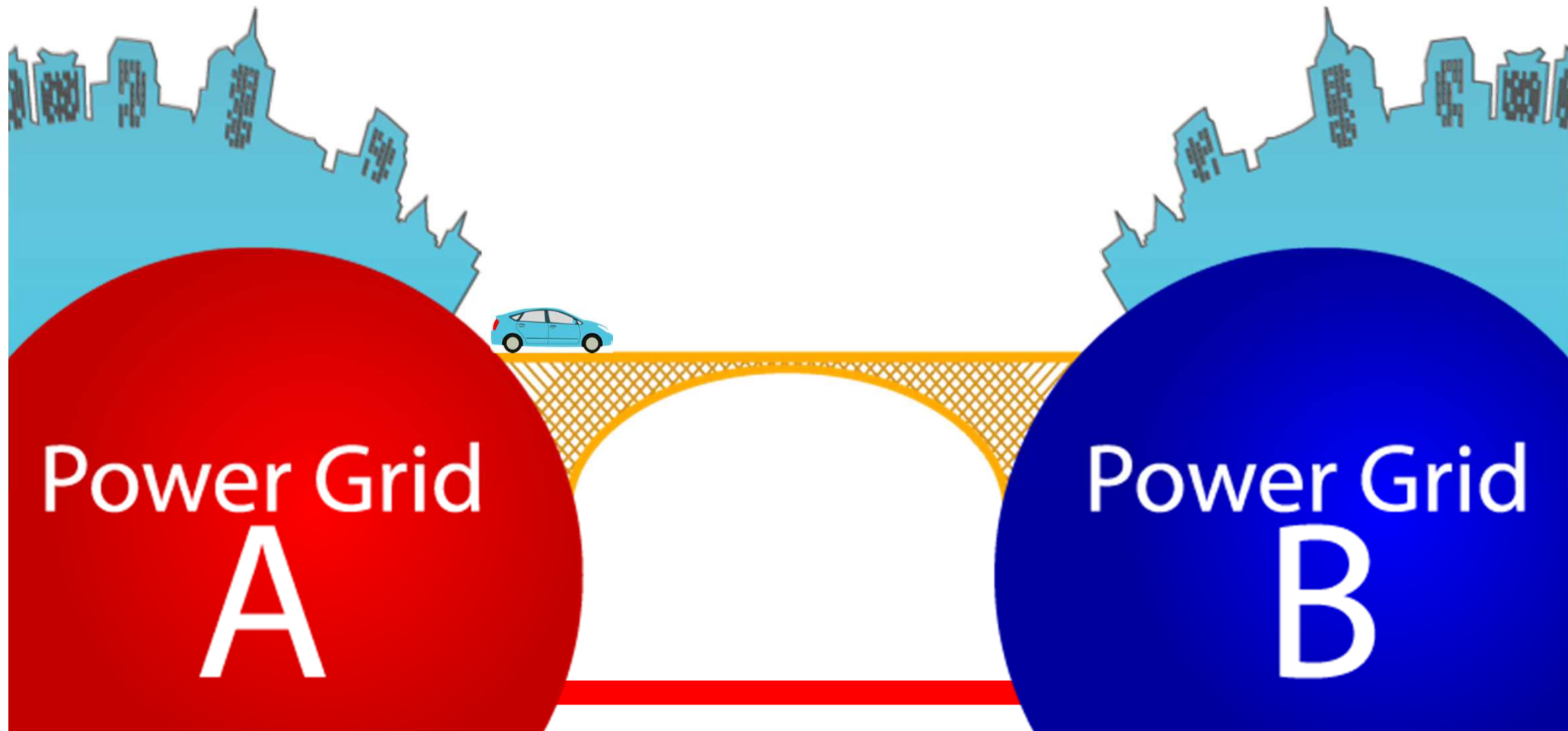
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Smart Grid Will Need New Inter-Utility Communications: Consider Electric Vehicles



Power Grid
A

Power Grid
B

New Need for Inter-Utility Communications ... Adding Renewable Sources

Solar in the Southwest
High Voltage Transmission

Wind in North Dakota

Ability to Choose Power Source





Smart Energy Ecosystem Challenges

The Challenge is not with Technology; the Technology exists Today

- **The far tougher problems rest with:**
 - Customer Behavior and Market Demand
 - Utility Business Models
 - Legal and Regulatory Questions



Policy Challenge I.

Needed: Fundamental Change in the Paradigm of How Electricity is Consumed

- Energy consumption traditionally is a passive purchase:
 - Electricity flows unseen to take care of our needs
- Consumers see only a monthly bill; no idea of the price of energy in real time, how much is used, or even the acceptable social norm for energy consumption.
- Most people in the U.S. are counted among the “energy blind.”

Response?

- Accelerate development of the Smart Home and Smart Building markets, which are adjacent to but different from Smart Grid
 - Pull energy use information from meters or in-home sensors
 - Care for privacy & security concerns that come with the generation of granular energy use data.
- Advertising and viral marketing are powerful forms of education



Policy Challenge II.

Utility business models and cost-plus, regulated pricing

- Utility sector is hampered by the lack of an “ecosystem of innovation”
- Rate-Base/Rate-of-Return regulation does not reward risk.

Response?

- Leverage the vibrant innovation in communications sector.
- Mine the communications sector for policy lessons that might be applied to electric utilities. Recognize that price and revenue caps change utility incentives.
 - How to spur investment in smart grid without mandated rate increases
 - Innovation should drive efficiency, differentiated services and consumer choices
 - Prices for innovation should be market-based



Policy Challenge III.

Fragmented nature of energy regulation

- Provision of electricity is local in many respects, and highly regulated.
- The shift toward “Smart Grid,” which could become a national interoperable network, will entail an enhanced level of state and federal cooperation and oversight of an array of issues.

Response?

- Federal ability to act as convener, to identify and harmonize best practices for states.
- Convene stakeholders, including Federal Energy Regulatory Commission (FERC), U.S. Department of Energy (DOE) and state regulators so that state rules enable and encourage national markets, interoperability and standards development.
- Look to existing institutions like Regional Transmission Organizations (RTOs) and perhaps yet-to-be created institutions to help create national markets and standards for the Smart Grid

