



## Collaboration, Collaborative Energy, and Smart Grids

Planning for Innovation,  
Virtuous Markets,  
& Unknown Opportunities



Changing demands require close coordination  
in an increasingly volatile grid





Perfecting the methods in use today is a barrier to the innovation we need



Models proven to support diversity and innovation—for collaboration rather than control—offer an answer



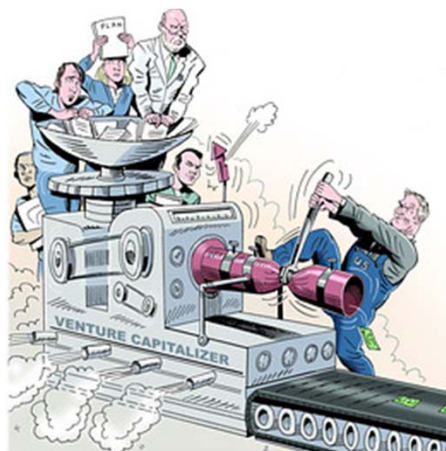


Complexity  
Scale  
Span of Control

**The grid is the largest engineering project of the 20<sup>th</sup> century**

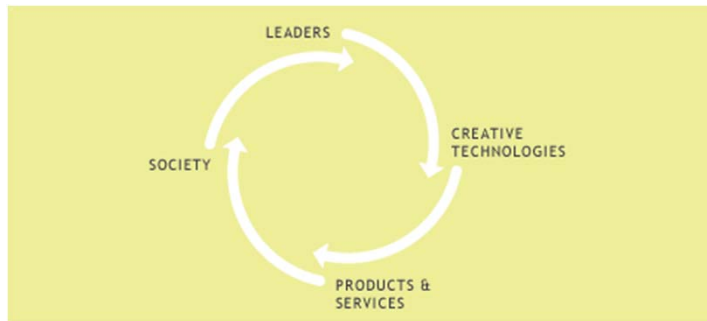


**Efforts to control complexity are today a barrier to growth and innovation**





## We don't know what future technologies will arise



## Continual changes to the grid make old models untenable

- Reduced Operating Margins
- Intermittent Power Sources
- Inadequate T&D for Distributed Energy



Loose Coupling  
Shallow Integration  
Composition

## The need to support rapid change dictates the means



## Allow rapid introduction of new technologies

- Tolerate diversity of technology
- Adapt to technologies we do not know today
- Wrap the installed base in the approaches of the future
- Light, Loose, Shallow integrations
- Consistent and cross-cutting models for information exchange



## Enable easy entrance of new business models and players

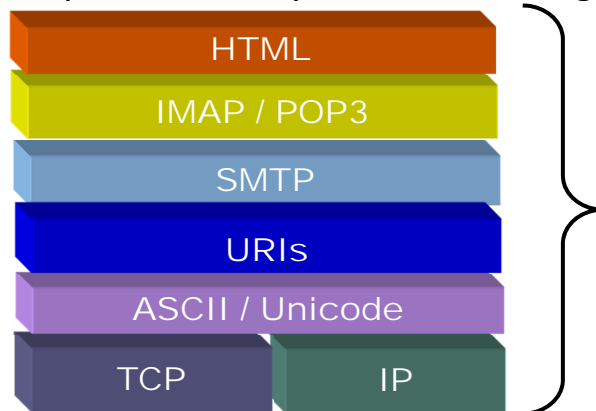
- Unbundle Power, Price Arbitrage, Availability Arbitrage, Energy Services
- Federate services so easy to reassign
- Recursively re-define the market place— similar interactions with different players and business models
- Avoid lock-in with open standards

***Fail Fast, Fail Cheap, and Move On***



## Use the approaches of eCommerce and the Internet

- Composition is key to enable change





E-Commerce  
Telecommunications  
XML Vocabularies  
Web Services  
Federated Security  
Open to use, Open to repurpose, Open to evolve

## The Open Standards Approach (SGIP)



## Light, Loose, Shallow Integrations

- Apply eCommerce & Internet lessons
- Collaboration *versus* fine-grained control
- Performance on a contract *versus* detailed control (knowledge problem)
- Composable
- Recursive—and designed for broad use to/from/in microgrids and grids



## Consistent and Connected

- Energy markets require schedules
- Interoperation and DR requires schedules
- Schedule communication requires balance of simplicity and flexibility



## OASIS Energy

- [OASIS WS-Calendar 1.0](#)
- [OASIS Energy Market Information Exchange 1.0](#)
- [OASIS Energy Interoperation 1.0](#)
- All in Public Review now or by early December 2010
- Details in Q&A





## Collaborators in OASIS Energy

- Facility vendors
- R&D Labs
- Control vendors and standards groups
  - LonMark, BACnet, oBIX, SEP participants
- ISOs and other market implementers
- Utilities
- Enterprise architects



Arms Length Collaboration.  
Clean Innovation.  
Broad Applicability.  
Encourage Market Solutions.



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## Questions