



### Utility Experience Developing a Smart Grid Roadmap

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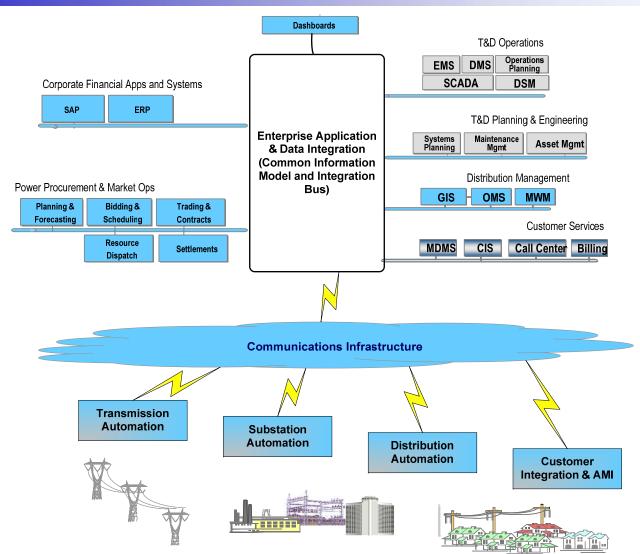
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## The Smart Grid is about the Infrastructure (Communications and Information)



## The benefits of the smart grid derive from the applications

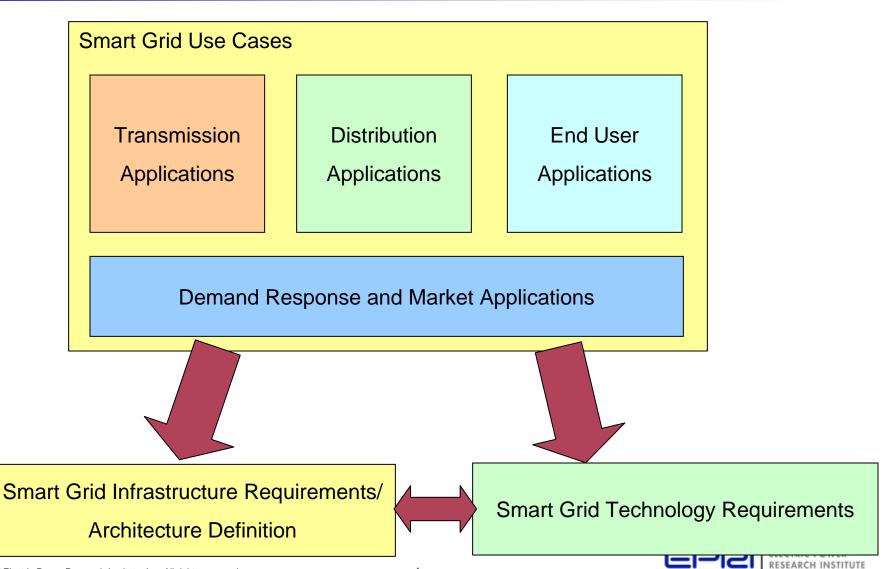
- Reliability
- Efficiency
- Demand Management
- Managing the utility infrastructure investment
- New Energy Services

#### **Key new drivers:**

- Integration of renewables (intermittent resources)
- Distributed resources, microgrids
- Facilitating customer participation in markets
- New technologies (PHEV, storage, smart loads)



# **Developing Use Cases and Deriving Requirements**

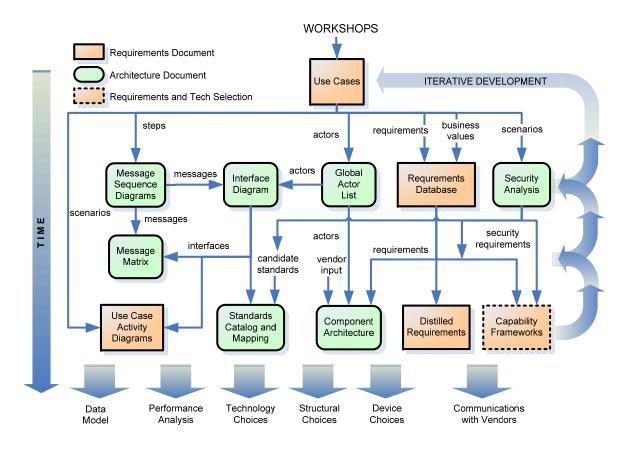


# **Examples of Use Cases for Deriving Requirements**

Transmission	1.Transmission Fault Location
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	2.PMU Data Collection and Management
	3.System-Wide PQ Monitoring, Integration with Asset Management
	4.Asset Condition Monitoring (Advanced Sensors)
	5.Real Time State Estimation
Distribution	6.Distribution Fault Location
	7.Distribution System Management with automated reconfiguration
	8.Distribution State Estimation (performance optimization)
Customer Integration	9.Web-Based Energy Use Information for Customers
	10.Real Time Pricing Information for Customers
	11.Monitoring and Management of Distributed Resources

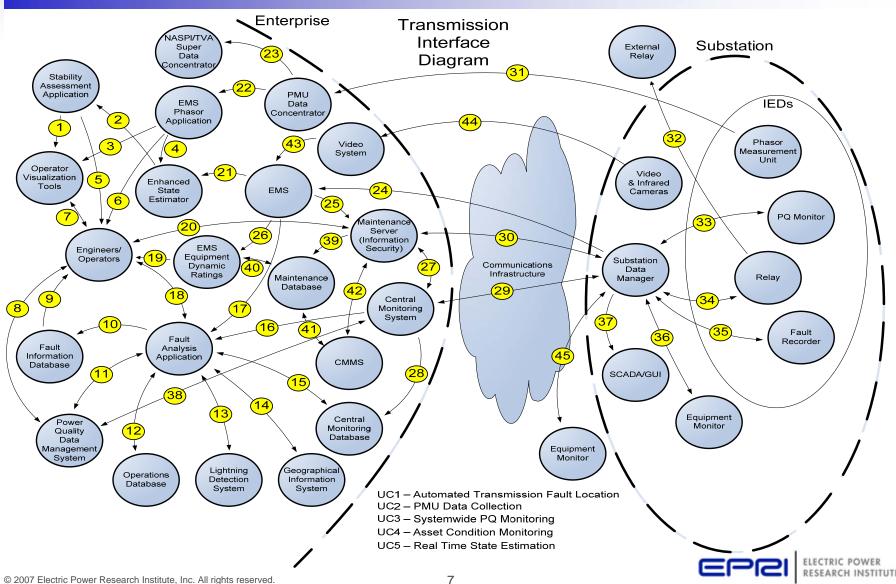
#### Use a consistent methodology



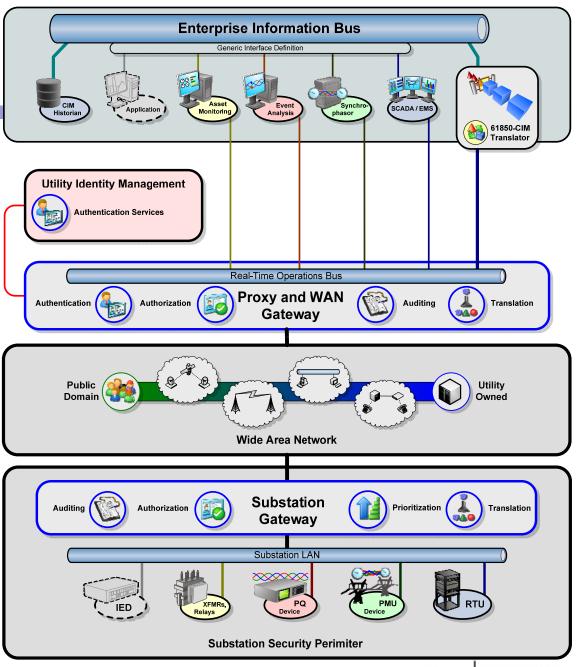




### **Documenting interfaces**

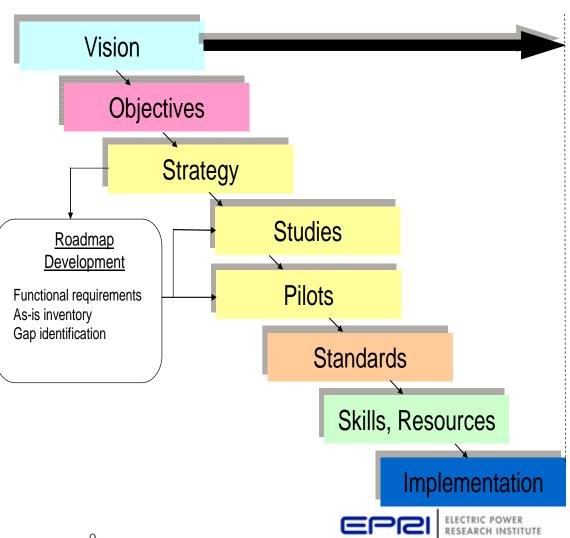


Develop the architecture specifications based on the requirements (including security)



#### **Utility Specific Smart Grid Roadmaps**

- Every utility will take a unique path in creating their smart grid
- Recommends technology investments to be made over time
- Projects underway with:
  - FirstEnergy
  - Salt River Project
  - Duke
  - Southern Company
  - TVA/TVPPA



# Organization for Smart Grid Roadmap Development

#### **Executive Sponsors**

### Steering Committee Directors and Managers that cut across company

- 1. Set vision and strategy
- 2. Champion studies, pilots and projects
- 3. Approve studies, pilots and projects
- 4. Maintain consistent methodology
- Identify and address gaps

Coordination / Technical Support Team
Team of individuals from different departments that are
given the time to contribute at a higher level

- 1. Evaluate studies, pilots and projects
- 2. Develop and implement analysis tools
- Monitor and report status
- 4. Prepare periodic updates to upper management
- 5. Communicate strategy and study, pilot and project status to interested utility departments
- 6. Support ongoing development and revision of roadmap in coordination with internal and external resources

Technical Liaisons
Planning & Protection
Substation Design
Substation Maintenance
Distribution Dispatching
Distribution Operations
Transmission Operations
Regional Engr/ Ops
Technologies
Real Time Systems
IT Security
Corporate Security







### Host of First Smart Grid Roadmap Workshop

Roadmap Development Process

June 5, 2008

### **Smart Grid Roadmap Workshop Participants**

- FirstEnergy
- Duke Energy
- Con Edison
- Orange & Rockland
- Southern Company (Alabama Power and Georgia Power
- AEP
- Southern Company
- Exelon (PECO)

- Kansas City Power & Light
- Detroit Edison
- BPA
- Entergy
- Long Island Power Authority
- We Energies
- Consumers Energy



#### **Workshop Results**

- Attendees shared information about
  - Smart Grid Organization
  - Smart Grid Roadmaps
  - Smart Grid Technologies, Demonstrations, etc.
- Sharepoint site created for initial information sharing
  - http://sharepoint.smartgridroadmap.com/
  - Username: smartgriduser
  - Password: sgrm101



#### Different groups developing Use Cases

- EPRI Intelligrid and Smart Grid Demonstrations
- Other parts of EPRI (e.g. EPRI Transportation for PHEV)
- DOE
- Gridwise Alliance and Gridwise Architecture Council
- IEC TC 57 (CIM and 61850)
- UCA Users Group
  - Utility AMI
  - CIM
  - IEC 61850
- Individual utilities and vendors as part of smart grid roadmaps and other activities



### **IEEE Intelligent Grid Coordinating Committee**

- Smart Grid Information Resource Center
  - Background references and links
  - Business cases
  - Use cases
  - Projects
- http://listserv.enernex.com/cgi/wa.exe?SUBED1=IEEE-PES-IGCC