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Utility Experience Developing a Smart Grid Roadmap

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IEEE PES

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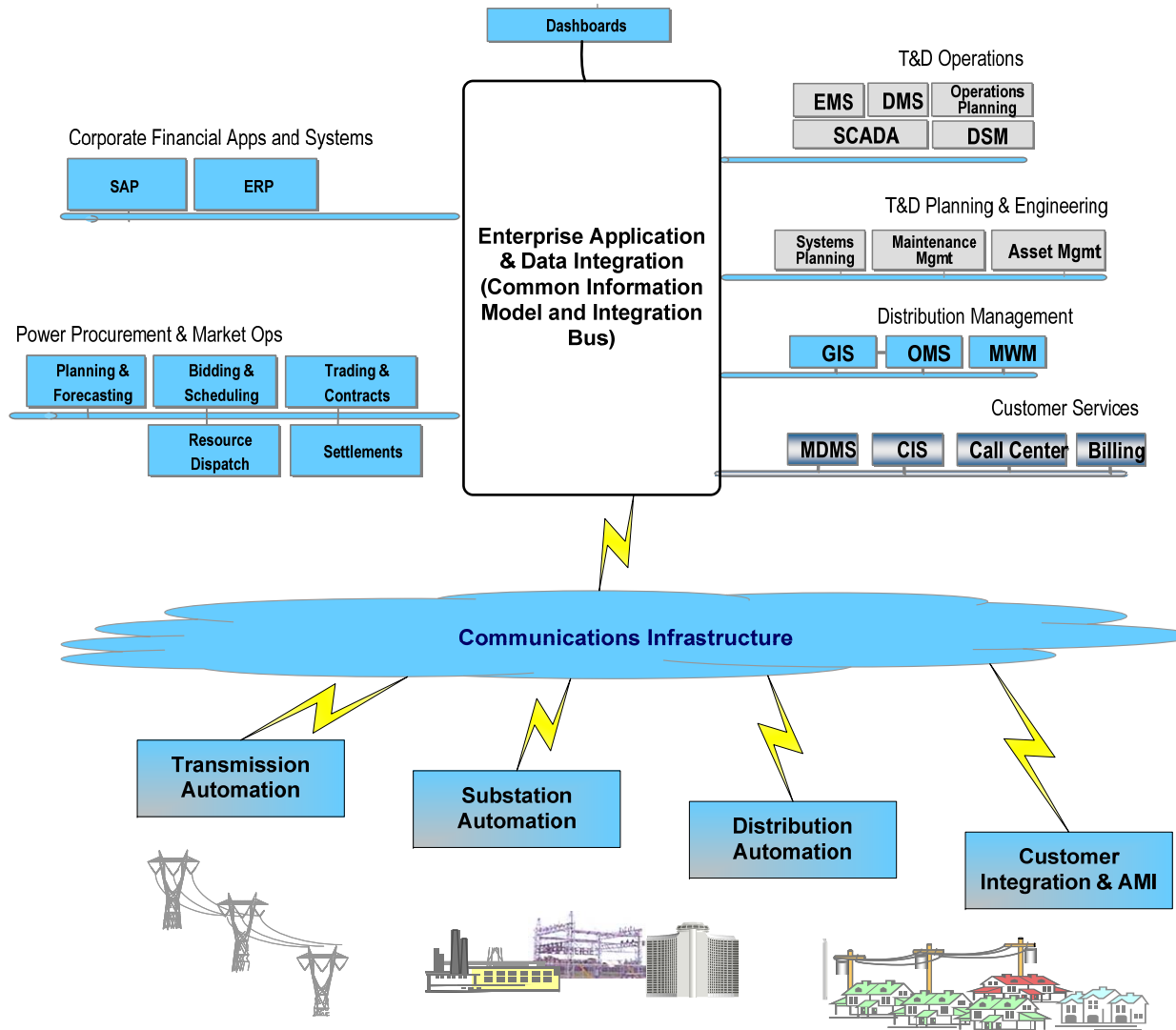
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The Smart Grid is about the Infrastructure (Communications and Information)



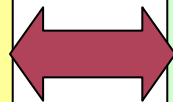
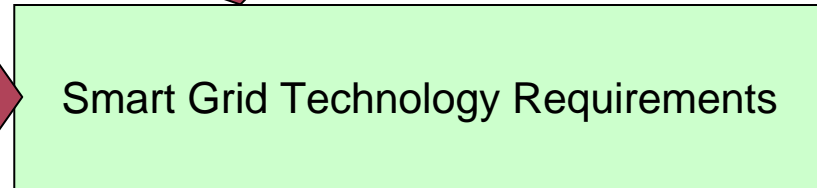
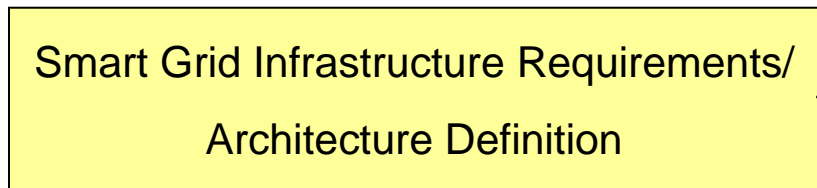
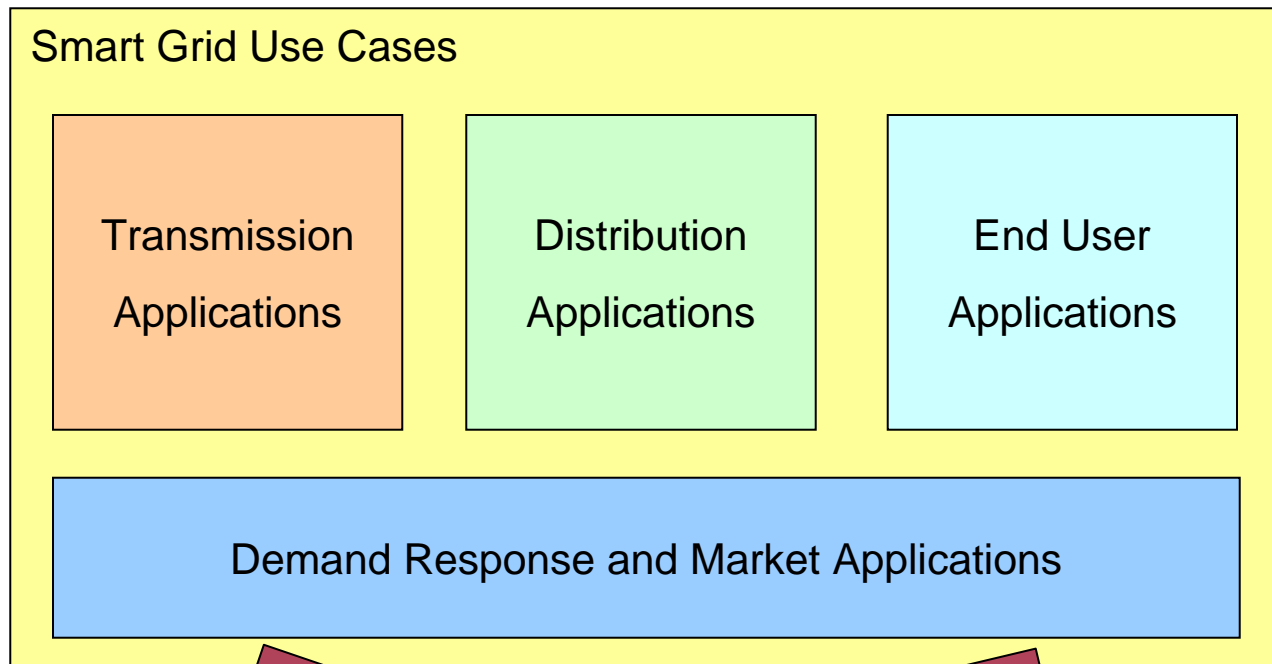
The benefits of the smart grid derive from the applications

- 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)**

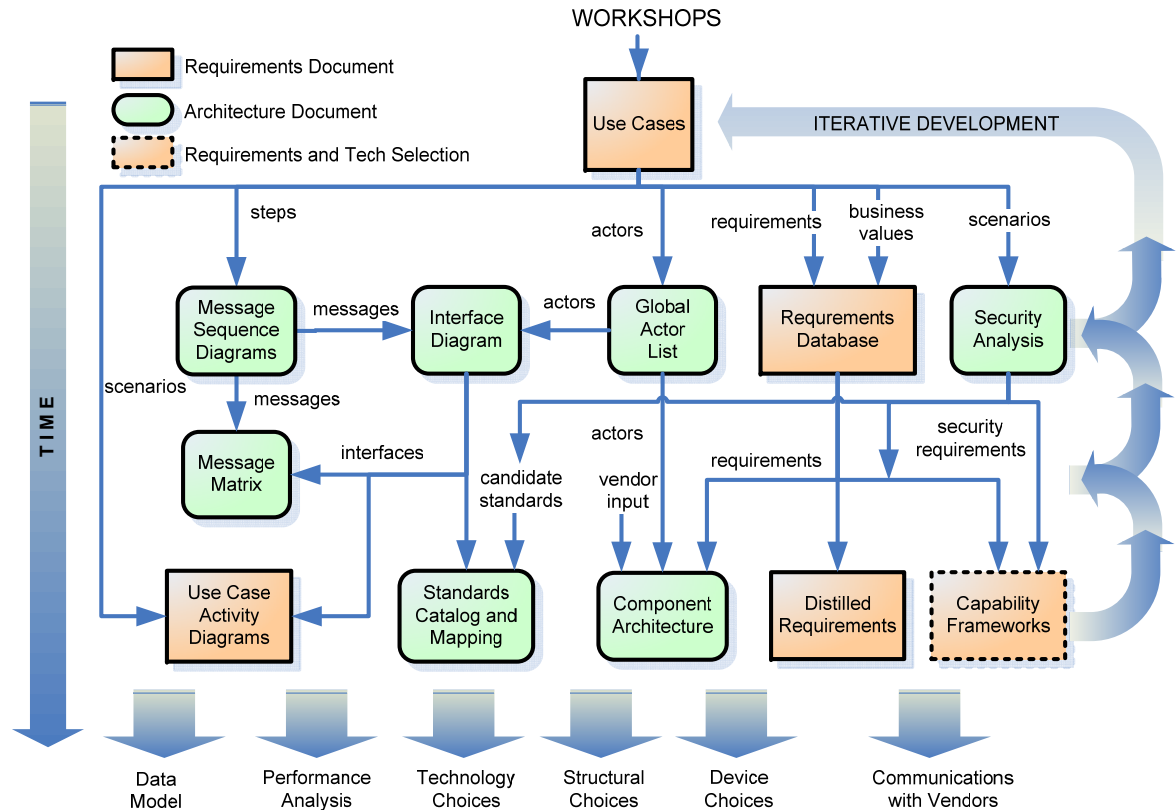
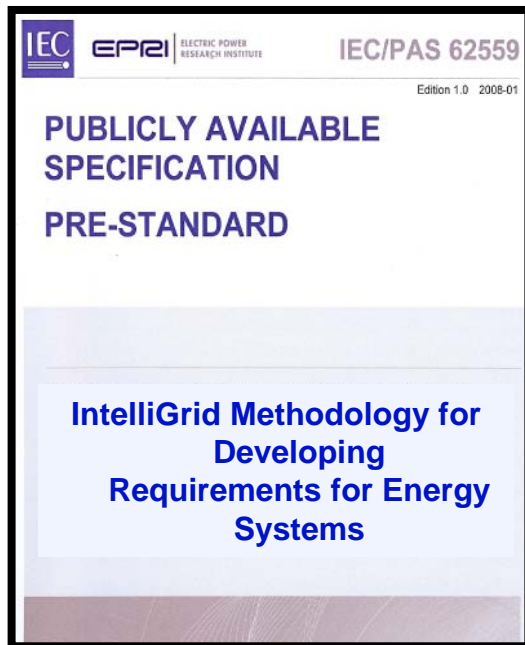
Developing Use Cases and Deriving Requirements



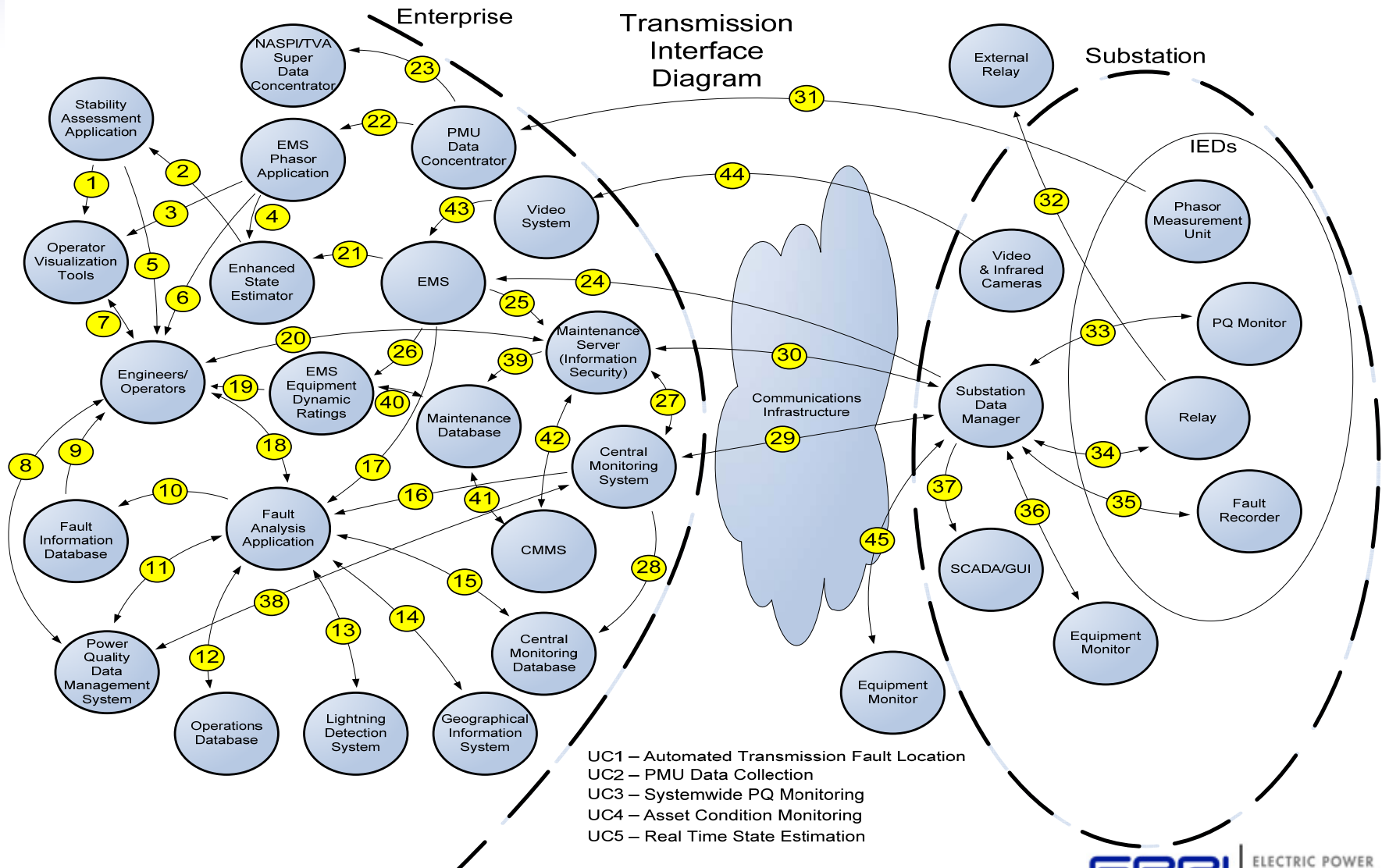
Examples of Use Cases for Deriving Requirements

Transmission	1. Transmission Fault Location
	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

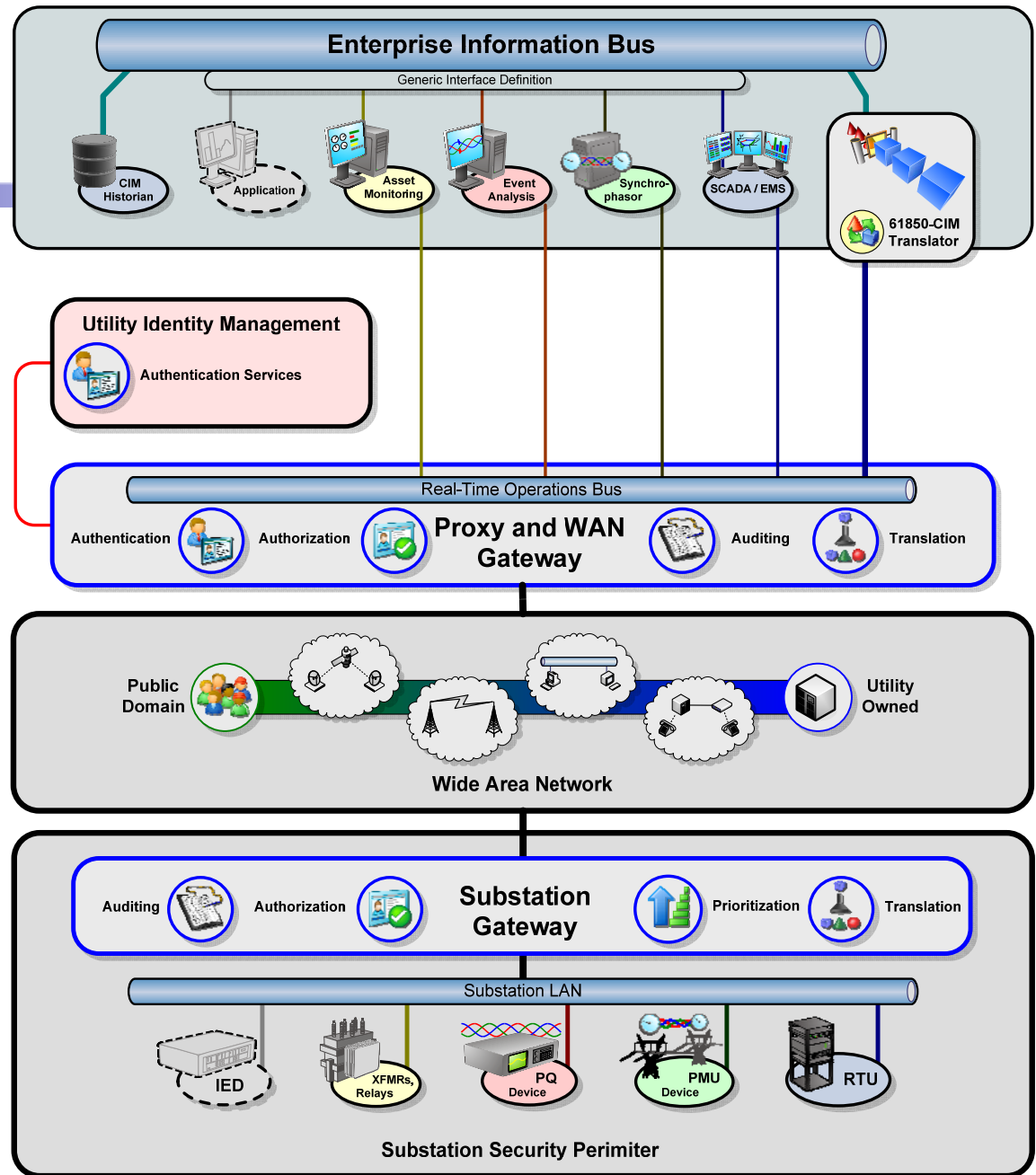
Use a consistent methodology



Documenting interfaces

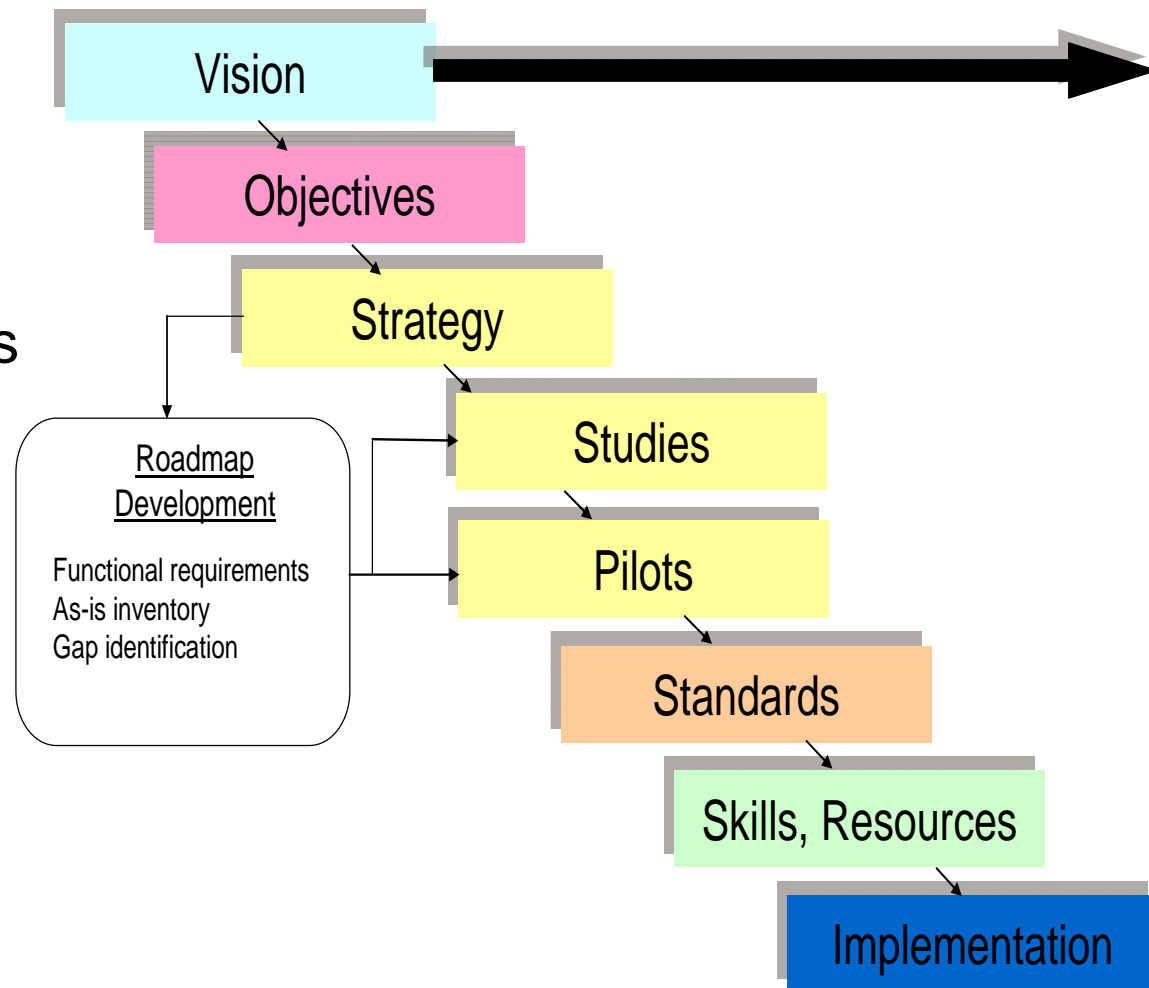


Develop the architecture specifications based on the requirements (including security)



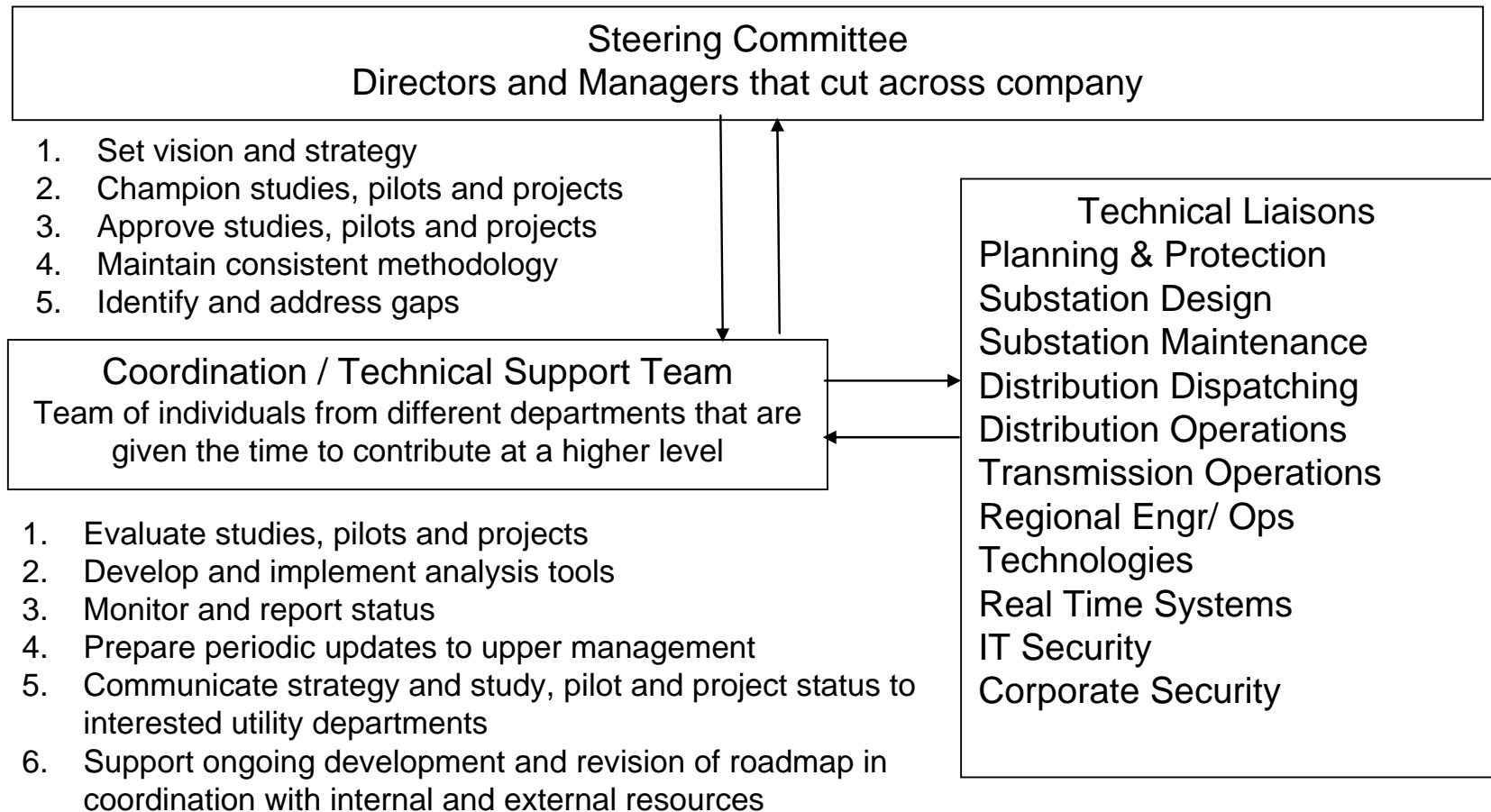
Utility Specific Smart Grid Roadmaps

- 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





FirstEnergy[®]

*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.energex.com/cgi/wa.exe?SUBED1=IEEE-PES-IGCC>