

EPRI

ELECTRIC POWER
RESEARCH INSTITUTE

Modernizing the Electric Grid: States and the Private Sector Working Together to Enhance the Nation's Power System

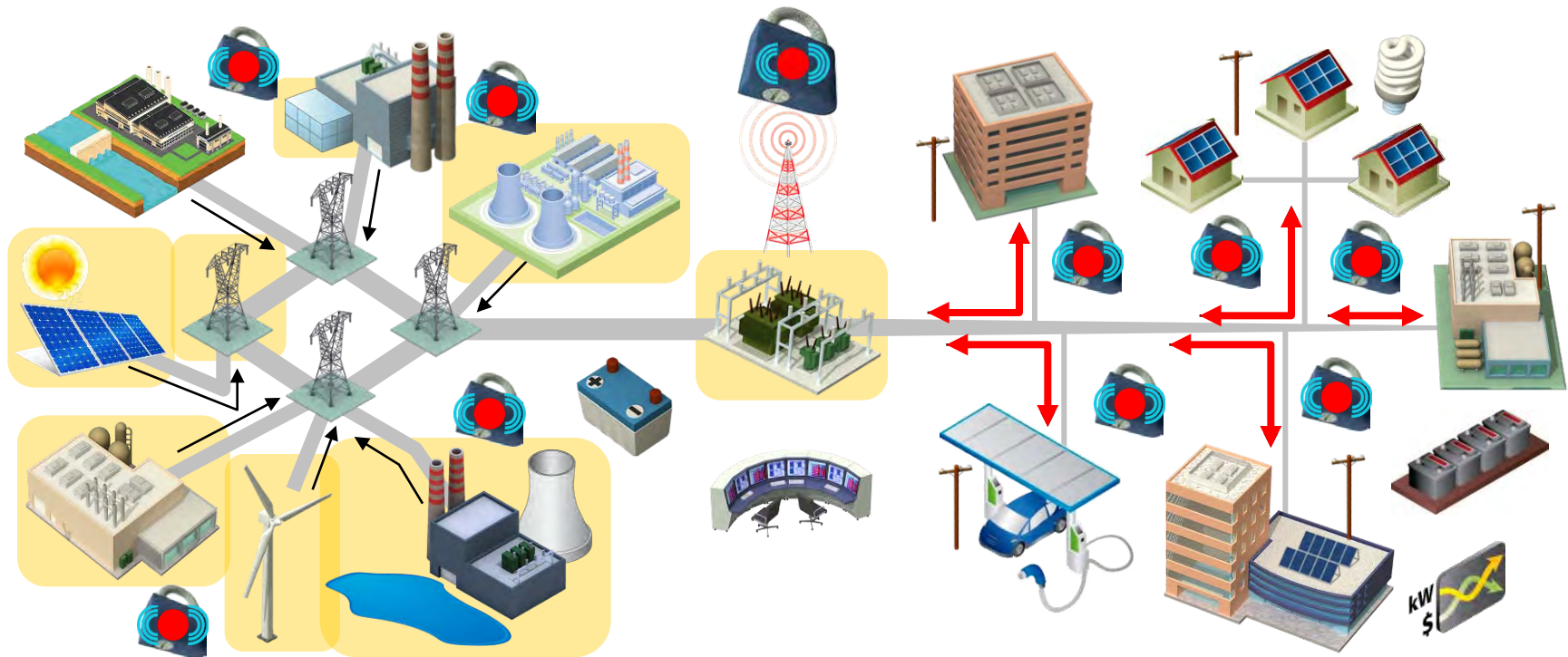
Barbara Tyran

Director, Washington & State Relations

February 10, 2012

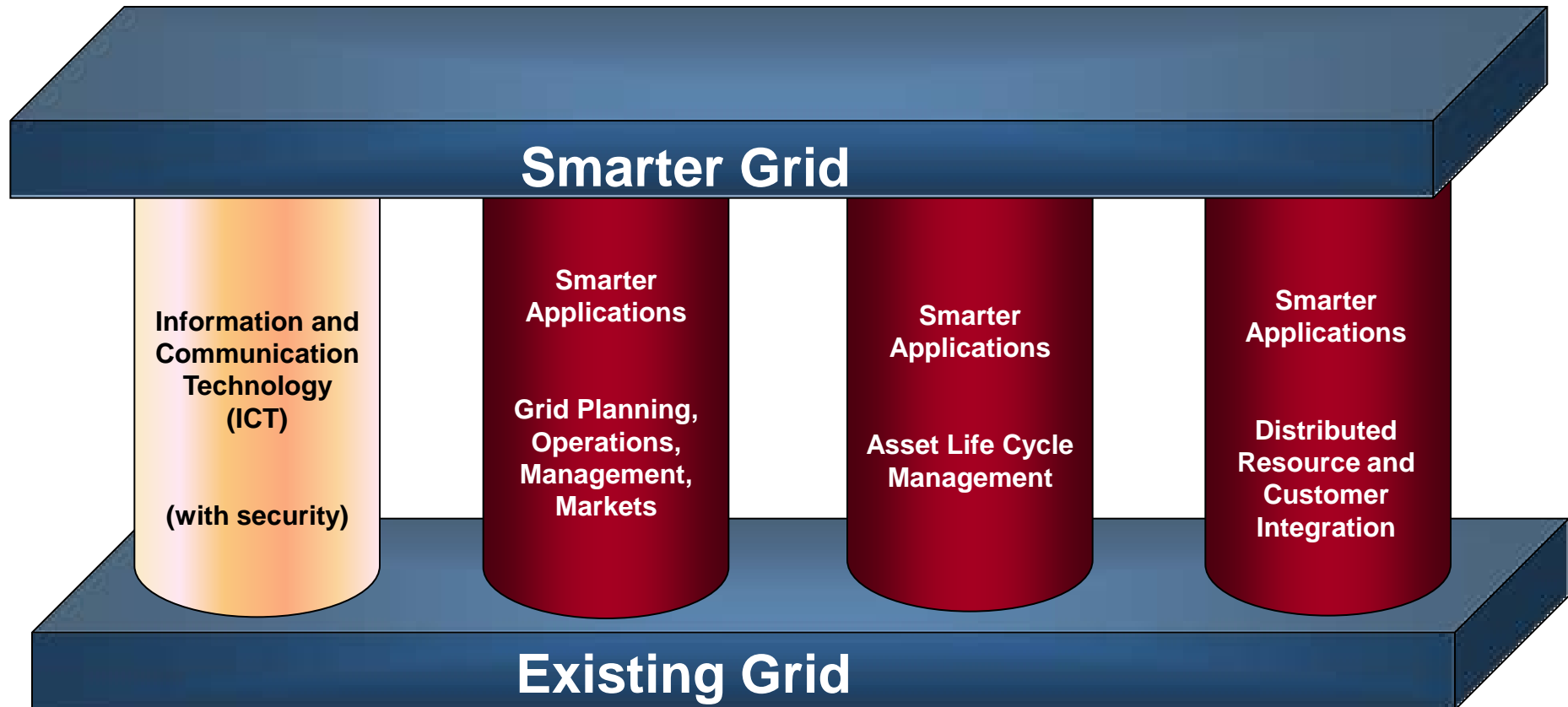
ASERTTI-NASEO Forum

Our Challenge – Tomorrow's Power System



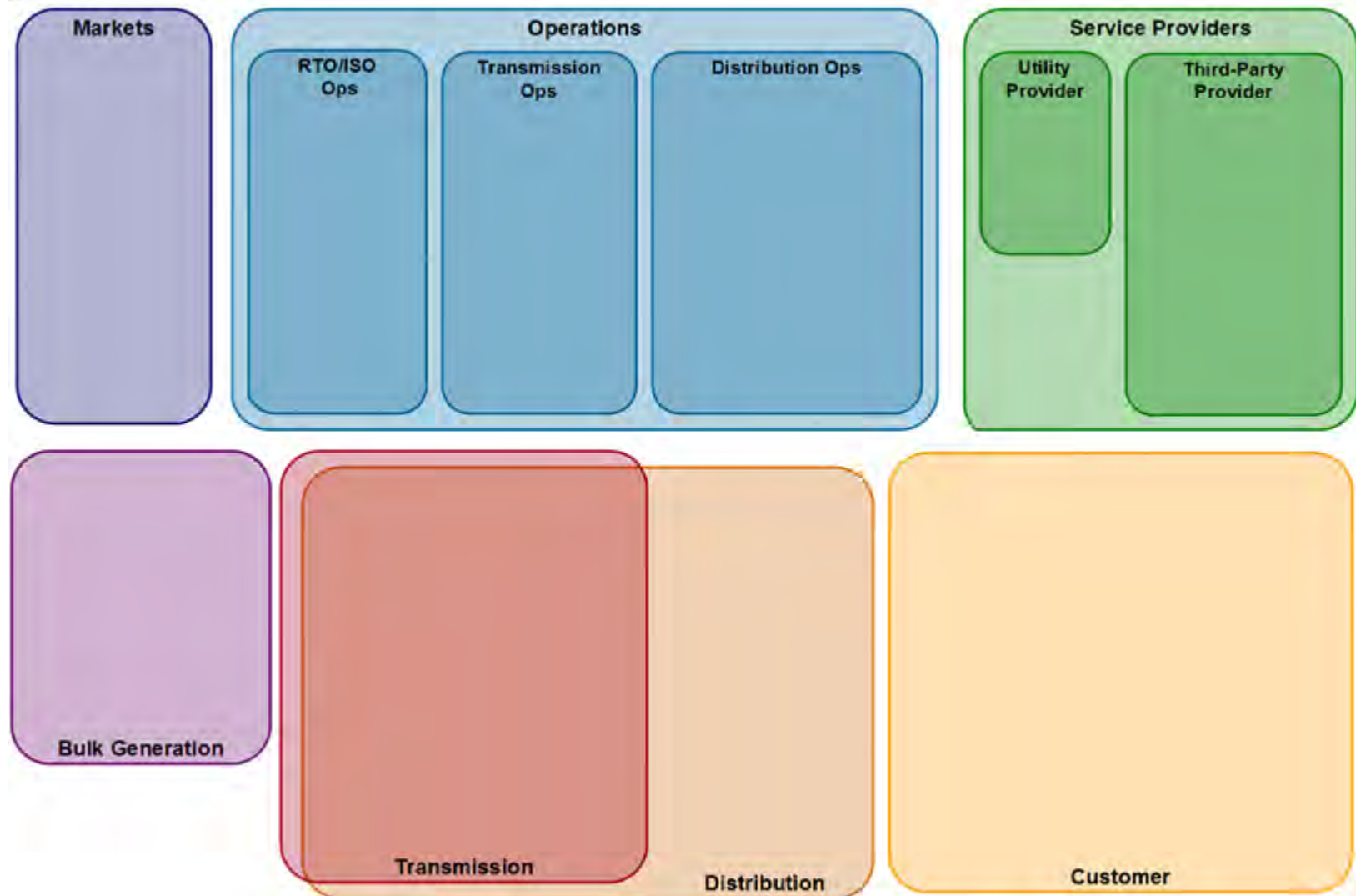
**Future Power System will require new technologies,
infrastructure, and control systems**

Smarter Grid is Built on the Applications



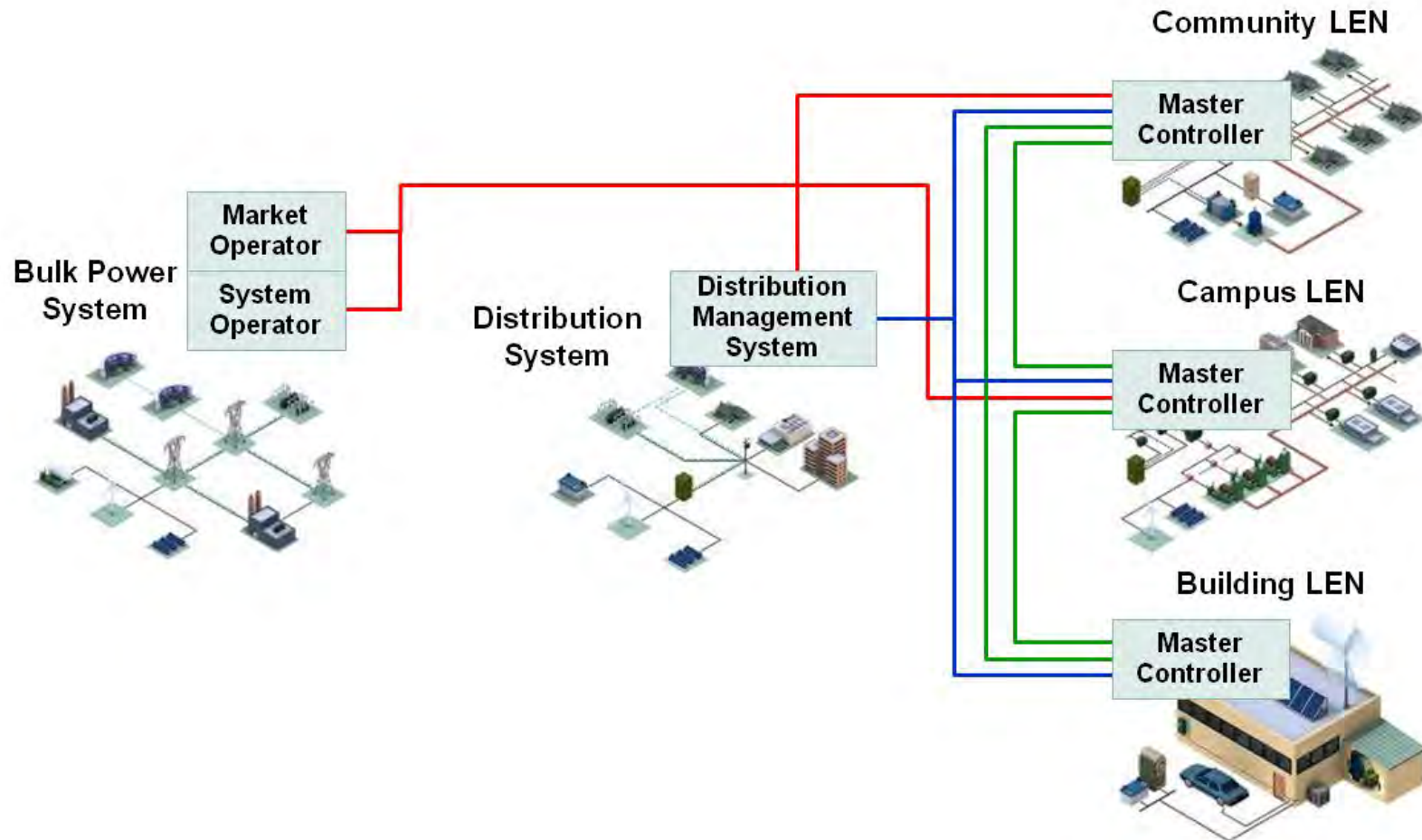
Smart Grid Needs

Smart Grid Architecture – interoperability standards



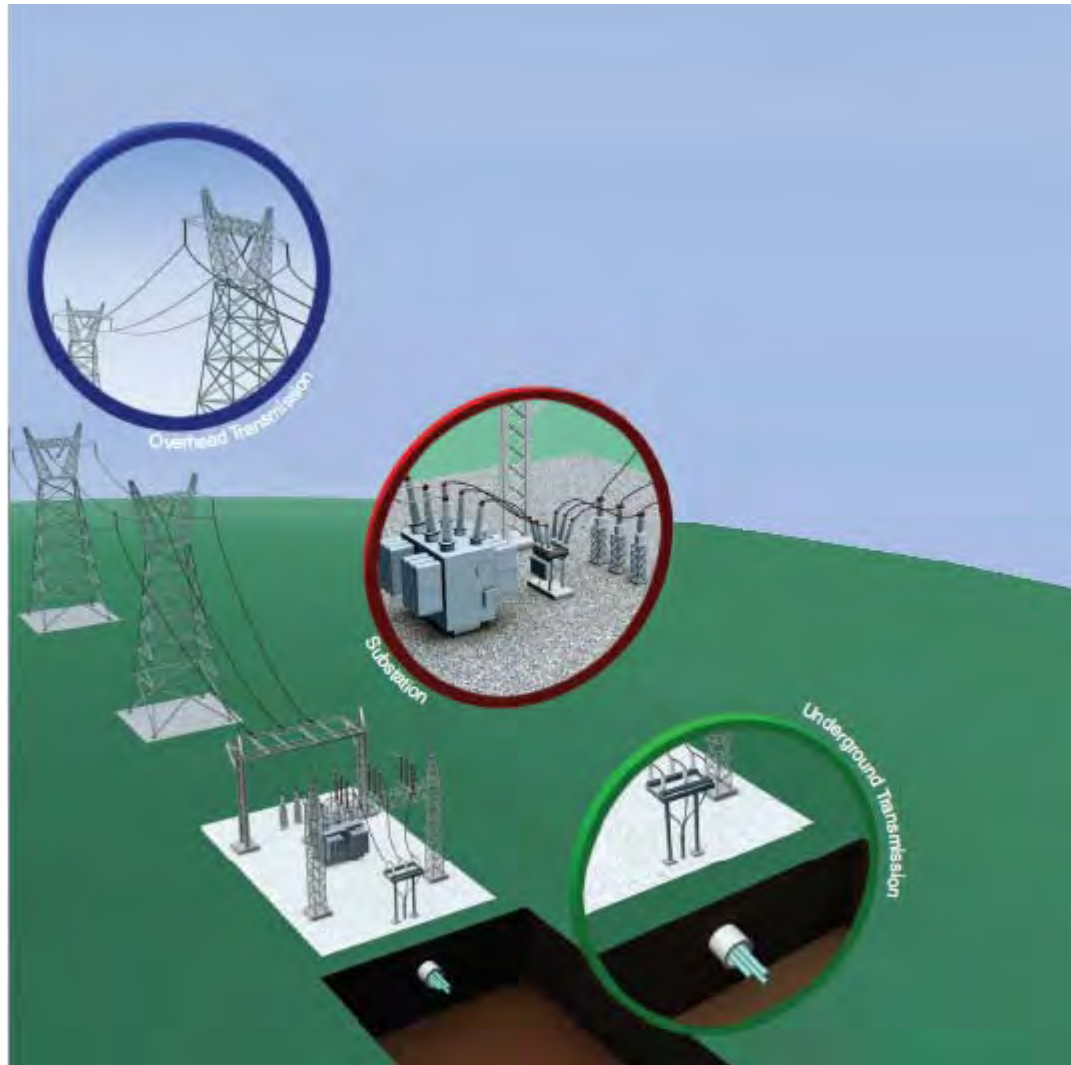
Smart Grid Needs

Integrated Distribution Controls



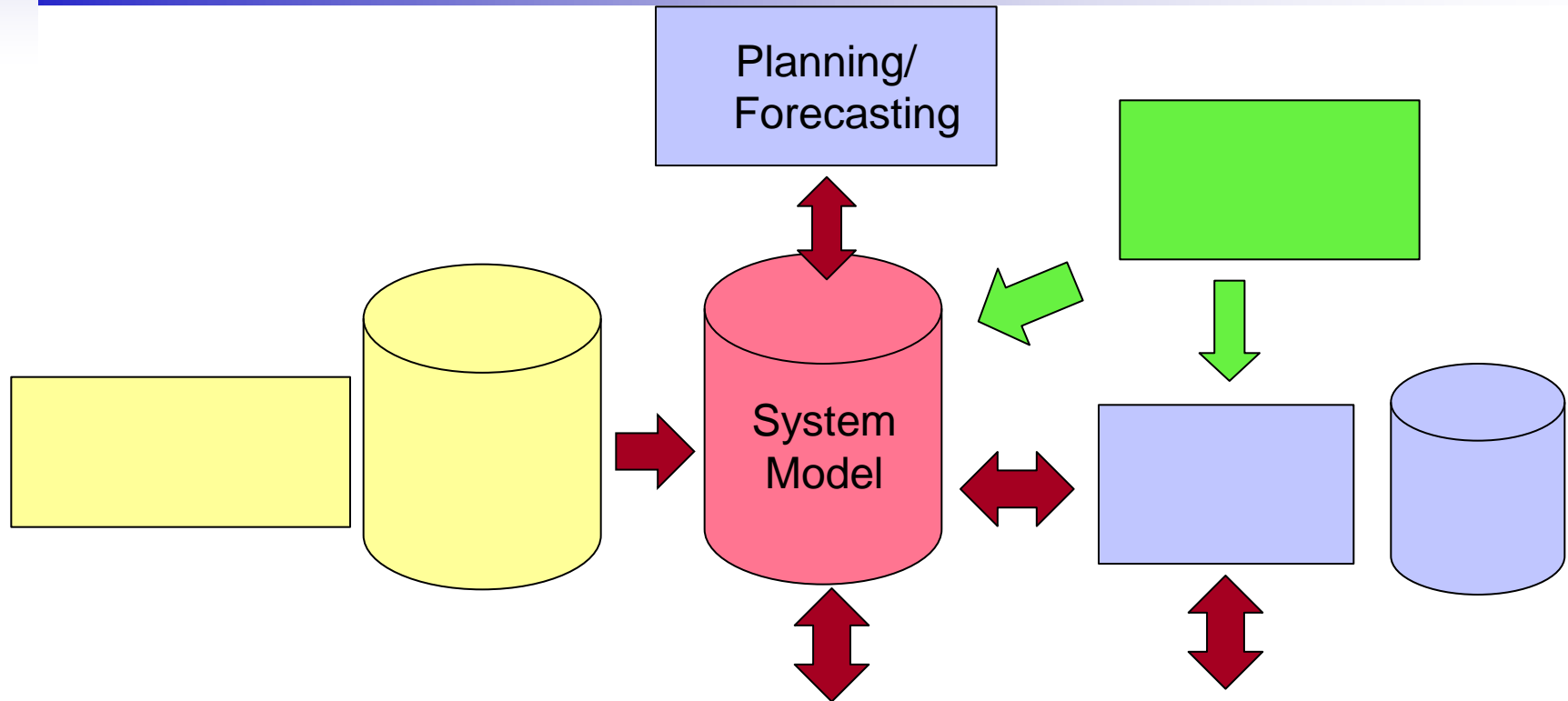
Smart Grid Needs

Sensors and System Monitoring Technologies



Smart Grid Needs

Modeling and Simulation to plan real-time operations



Distribution Management Applications

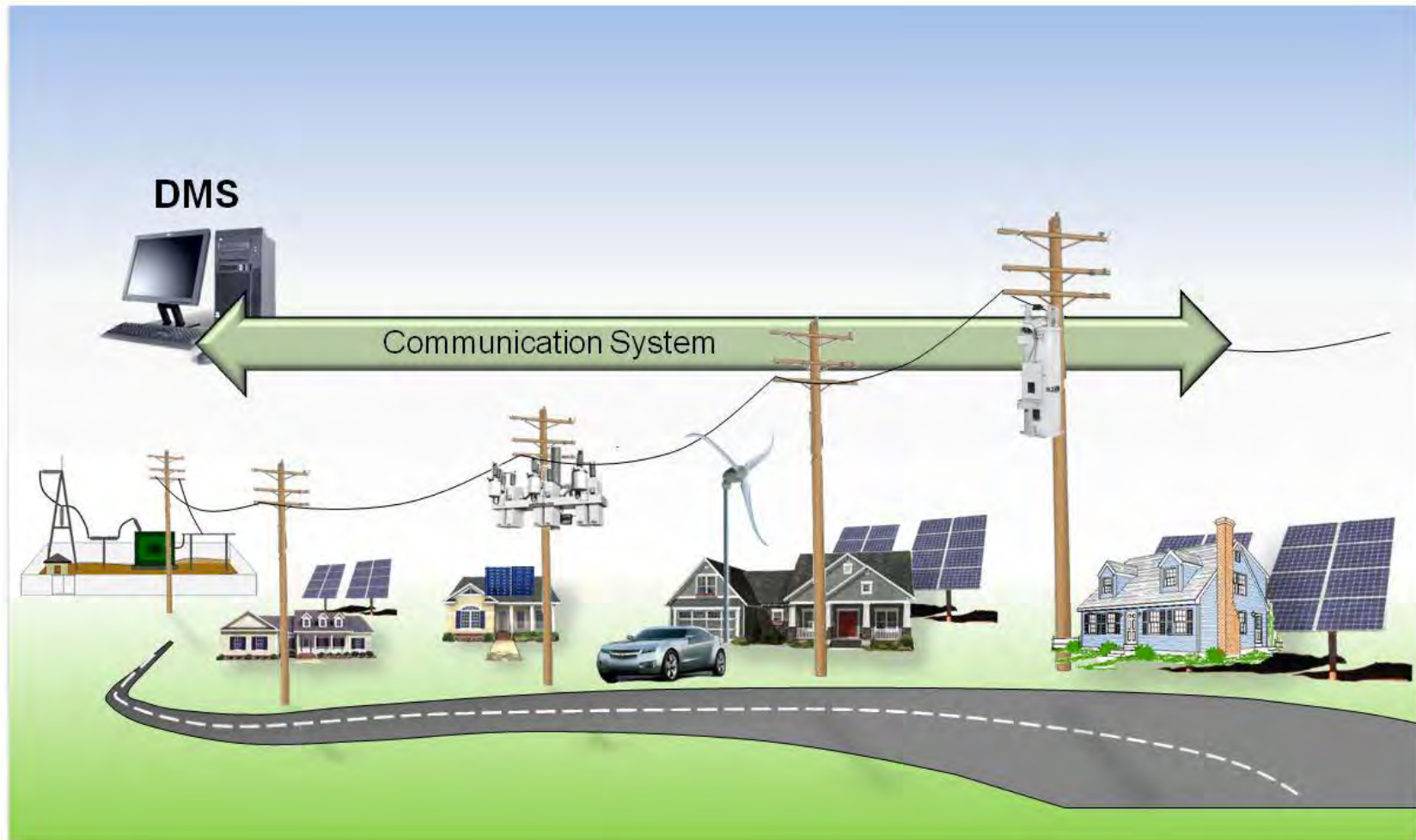
Efficiency

DG

DSM,
PHEV

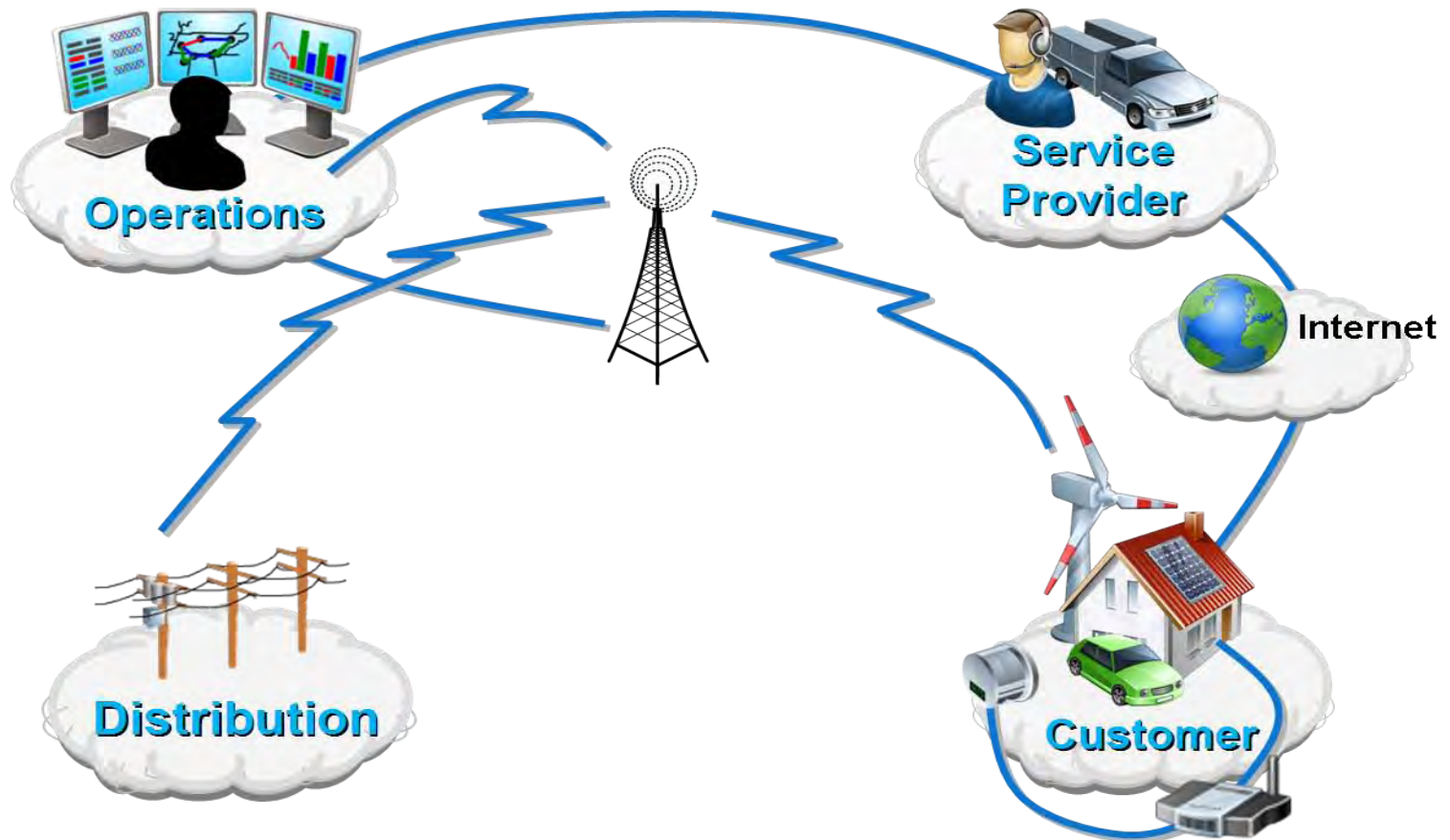
Smart Grid Needs

***Integration of renewables, storage, electric vehicles –
using distributed management systems***



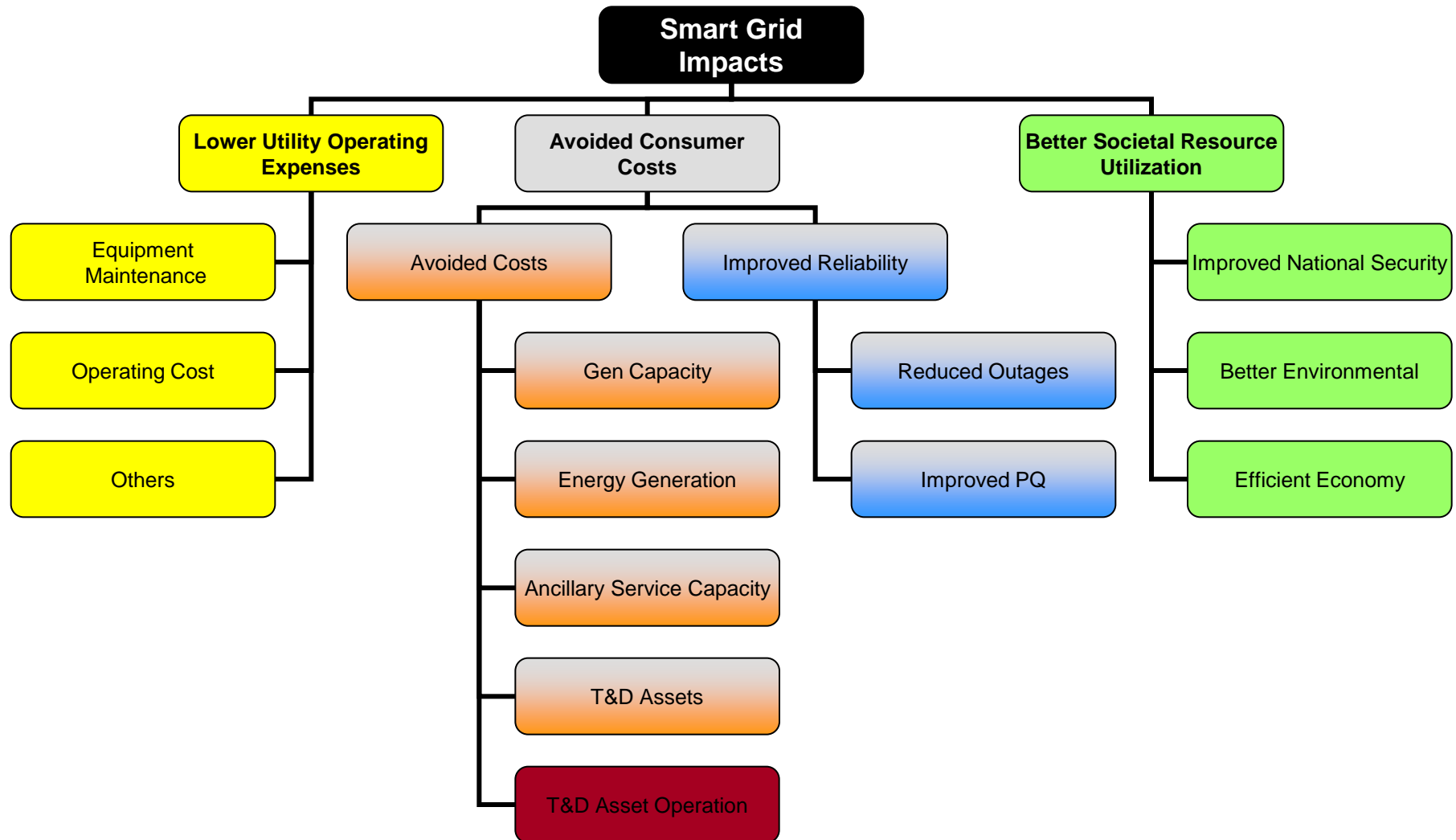
Smart Grid Needs

Integration of customer systems with two-way communications

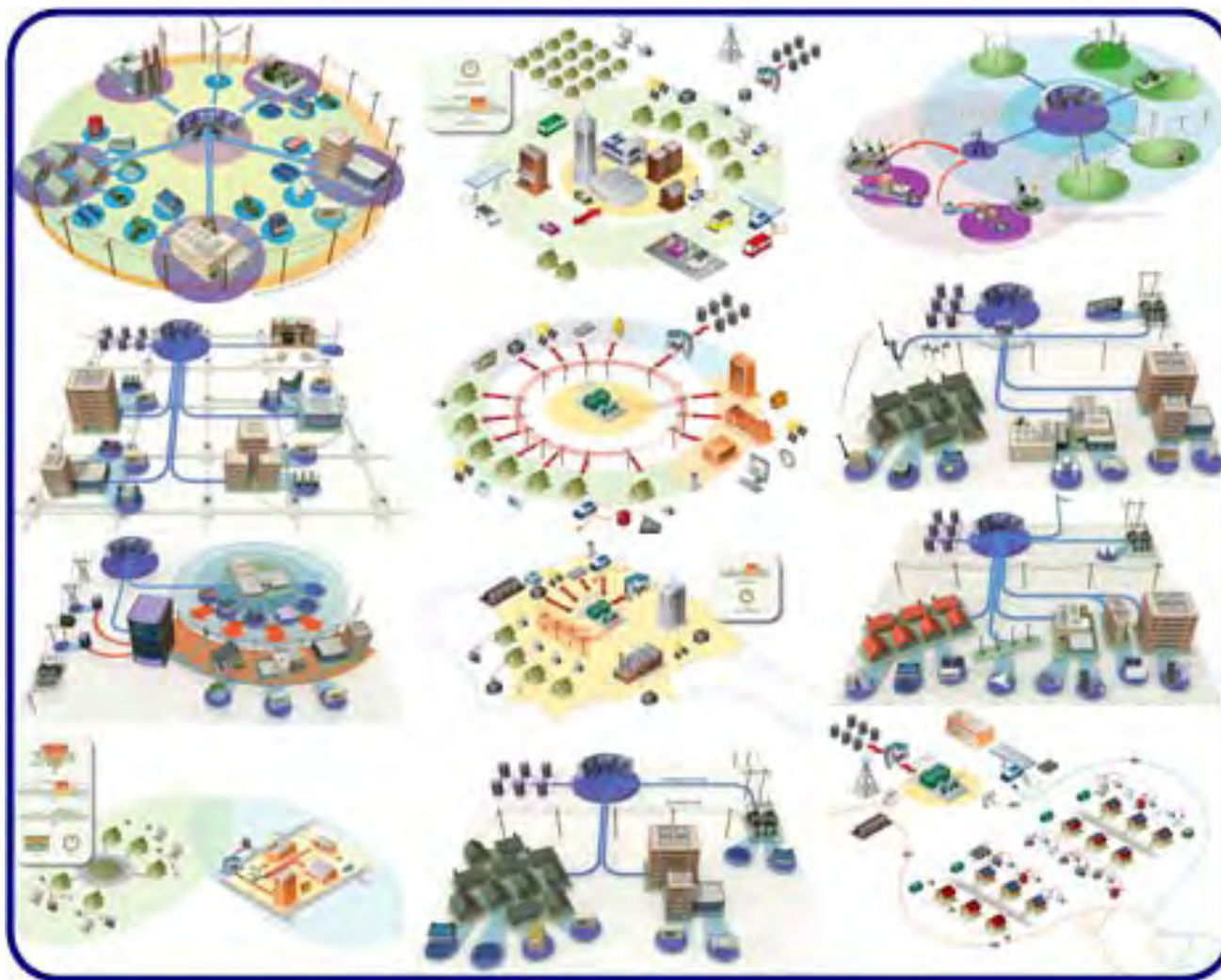


Smart Grid Needs

Market integration to Realize Shareholder Value

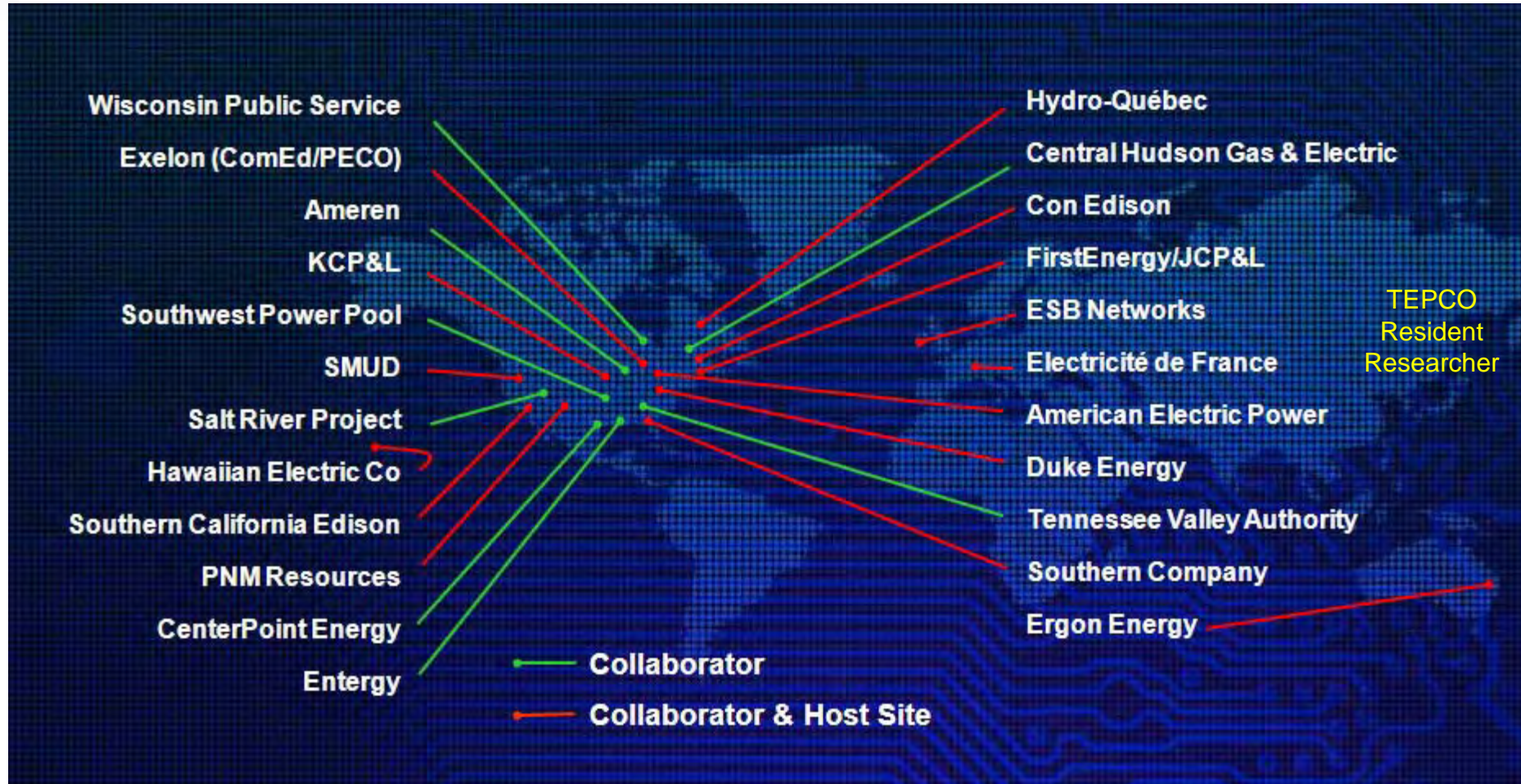


Demonstrations



EPRI Smart Grid Demonstration Projects

23 Utilities, 15 Large Scale Demonstrations



Collaboration from Smart Grid Demonstrations

Primary Integrated Technologies & Applications		Smart Grid Demonstration Members																
		Host Site Collaborators												Collaborators				
		American Electric Power	Con Edison	Duke Energy	Electricité de France	ESB Networks	Exelon (NED)	FirstEnergy	Hydro Quebec	NCPDL	NWEA Resources	Sacramento Municipal Utility District	Southern California Edison	Southern Company	Anaren	CenterPoint Energy	Central Hudson Gas and Electric	Entergy
Distributed Energy Resources	Demand Response Technologies																	
	Electric Vehicles																	
	Thermal Energy Storage																	
	Electric Storage <= 100 kWh (Utility Local Storage, Customer Storage,...)																	
	Electric Storage > 100 kWh (Typically at substations or near renewables...)																	
	Solar Photovoltaic																	
	Wind Generation																	
	Conservation Voltage Reduction (voltage management and related)																	
Generators and Standards	Distributed Generation (Microturbine, Fuel Cell, Diesel Generator, Biogas,...)																	
	Customer Domain (SEP, BACnet, HomePlug, WMR, etc.)																	
	Transmission & Distribution (IEEE 61850, 60870, DNP3, IEEE 1547)																	
	Operations Domain (IEEE 61968/61970, MultiSpeak, OpenADR,...)																	
	Cyber Security (Authentication, Certificates, Encryption, Intrusion Detection,...)																	
	AMI or AMR																	
	RF Mesh or Tower																	
	Public or Private Internet																	
Programs	Cellular Based (3G): (1xRTT, GPRS, EVDO, CDMA,...)																	
	WIMAX (4G): (WIMAX [IEEE 802.16], LTE,...)																	
	Price Based (RTP, DA, CPP, PTR, TOU, Block,...)																	
	Incentive Based (DR, DLC, Ancillary Services, Interruptible, Bidding,...)																	
	Integration with System Operations (RT Visibility of DER, DMS Integration)																	
	Integration with System Planning (Visibility of DER in planning,...)																	
	Modeling and/or Simulation Tools																	
State of Deployment	Planning																	
	Deploying																	
	Data Collection																	
	Analysis																	

Cross Collaboration Opportunities

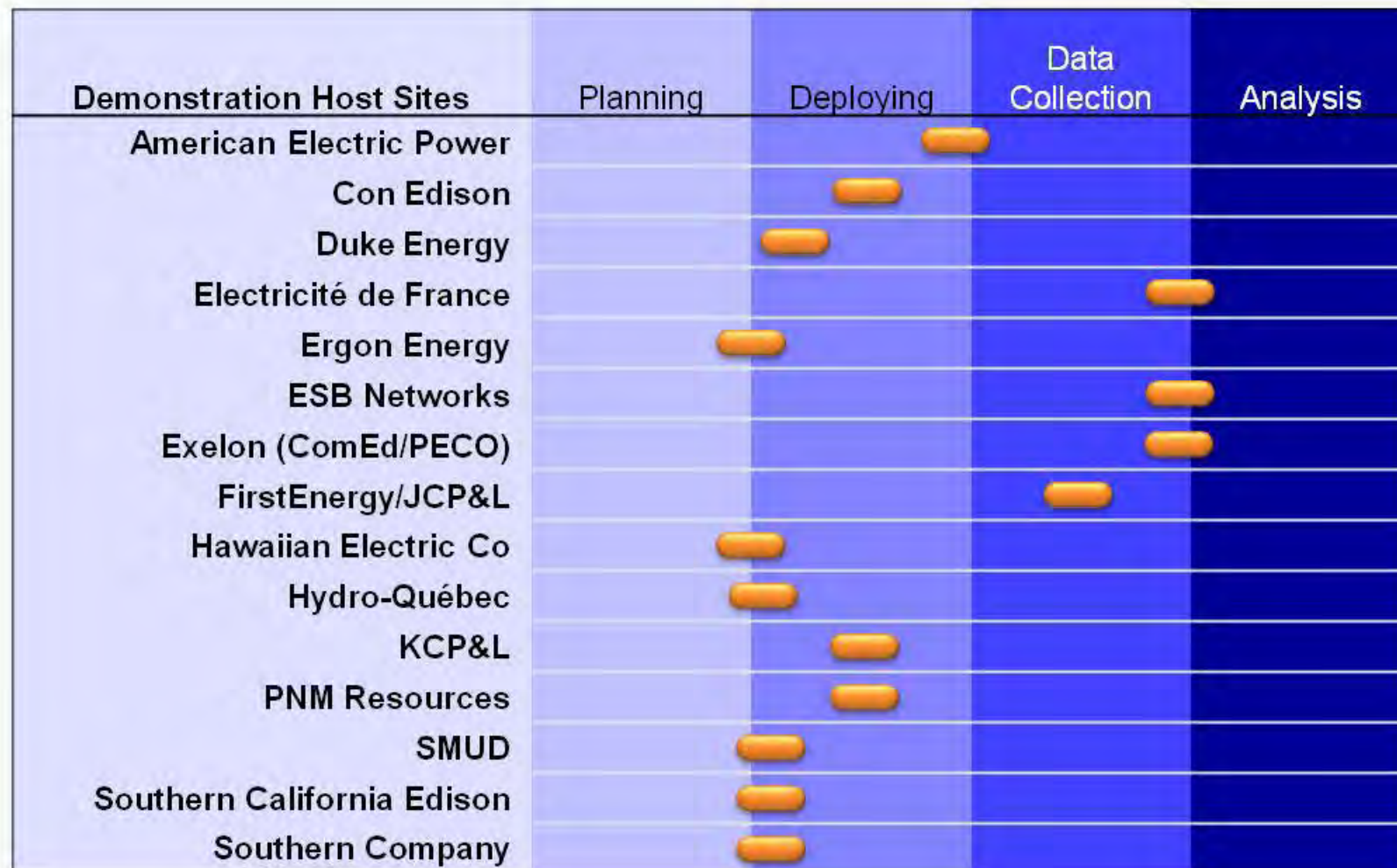
- Areas of Interest
- Similar Project Learnings

■ Technologies and Applications Integrated in the Demonstration

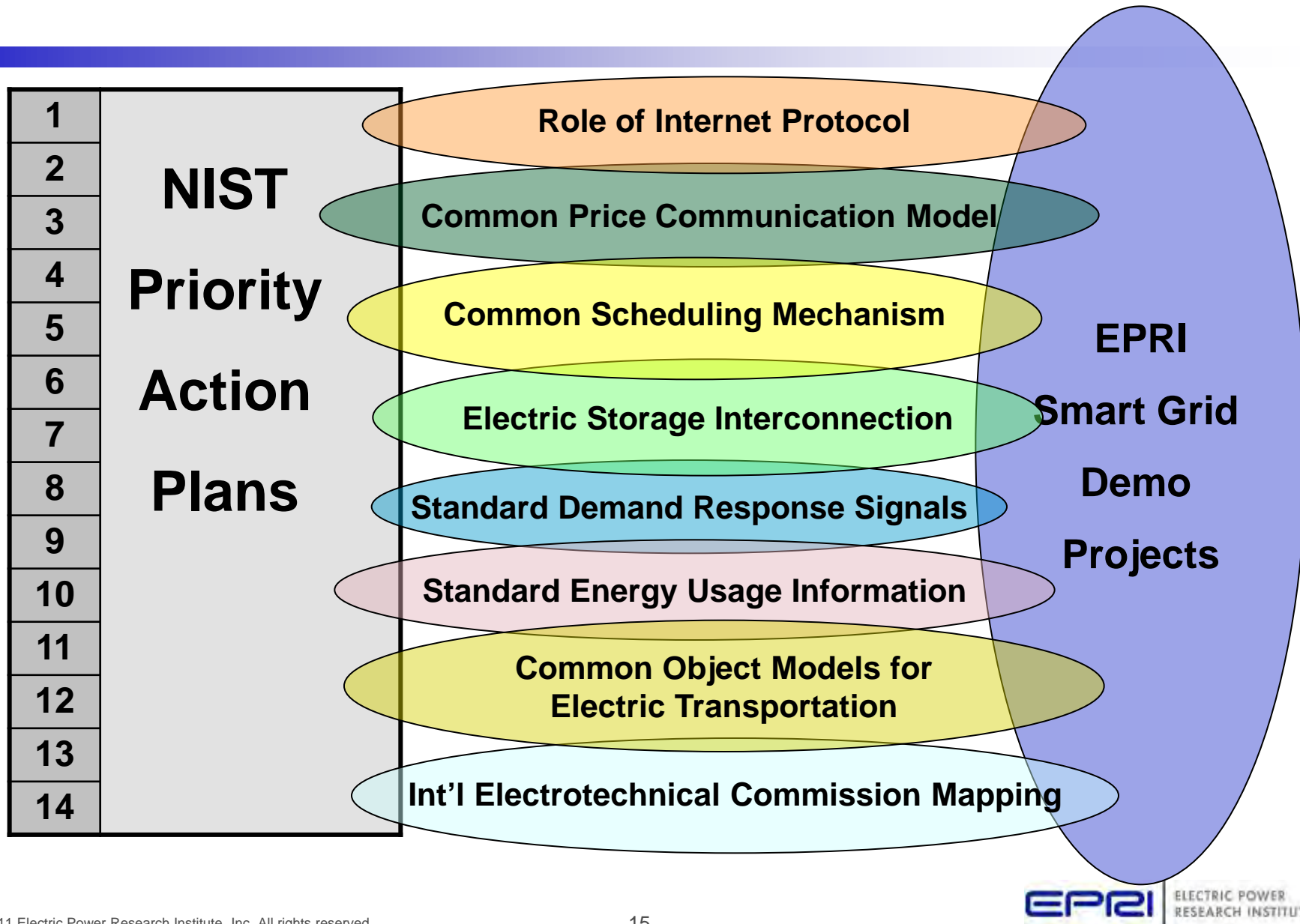
■ Cross-collaborative teams share early technology transfer in targeted topics across member projects. Results and lessons support existing and emerging projects to advance integration of Distributed Energy Resources.

● Demonstration "State of Deployment" in mid-2011

Status of Host-Site Demonstrations



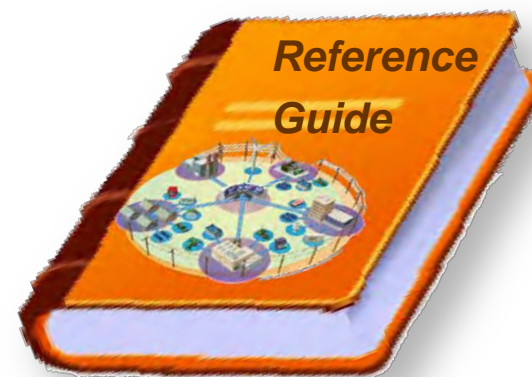
Shared Learning – Interoperability Standards



Shared Learning: Smart Grid Reference Guide

Smart Grid Reference Guide

- Focus: Integration of Distributed Energy Resources
- Overall Resource of Research Results from Demonstration Projects beginning in 2008
- First Draft: 2012 with Updates in 2013 & 2014
- Next revision will include a multimedia format with text, live presentations recordings, and training videos



“Encyclopedia” of Smart Grid Technologies, Applications & Case Studies

Shared Learning – Cost/Benefit Analysis -- developed by EPRI and DOE

To maximize *learning*, methodologies must be credible & results must be verifiable by others

Methodological Approach for Estimating the Benefits and Costs of Smart Grid Demonstration Projects

1020342

- Jointly funded by DOE and EPRI
- Provides framework for estimating benefits & costs
- Provides definitions, concepts & data sources

EPRI Project Manager
M. Wakefield

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- Provides a manual for practical application with step by step instructions
- Includes templates for working through the CBA process

EPRI
Guidebook for Cost/Benefit Analysis of Smart Grid Demonstration Projects
Volume 1 Measuring Impacts

2011 TECHNICAL UPDATE

Knowledge Transfer: Smart Grid Resource Center

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American Electric Power Service Corporation (AEP) Smart Grid Demonstration. [READ MORE >>](#)

A Smart Grid is one that incorporates information and communications technology into every aspect of electricity generation, delivery and consumption in order to minimize environmental impact, enhance markets, improve reliability and service, and reduce costs and improve efficiency.

SMART GRID IN THE NEWS

[Most Recent](#) [Archive](#)

[Vanderbilt Energizes Nashville With Electric Car Charging Station](#) - October 10, 2011

[A Green Energy Dream Grows in the Sahara](#) - October 4, 2011

[New Battery Could Be Just What the Grid Ordered](#) - September 28, 2011

[Smart Grid: Slow Buildout Begins](#) - September 26, 2011

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UPCOMING EVENTS

[Smart Grid Demonstration Advisory Meeting](#) 
Date: October 18-20, 2011
Location: Kansas City, Missouri

[EPRI Smart Grid Roadmap Workshop](#) 
Date: November 15-16, 2011
Location: Tempe, Arizona

[Power Delivery & Utilization Program Advisory Council Meeting](#) 
Date: February 13-15, 2012
Location: Huntington Beach, California

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Industry Coordination

- Use Case and Information Repository
- Cost Benefit Analysis Methodology & Framework
- Smart Grid Interoperability Standards



Questions

