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# Smart Grid – Balancing Value and Risk

Tom Turco, *moderator*  
Deloitte Consulting LLP



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*Consumers Energy*

*Count on Us*

# Smart Grid – Balancing Value and Risk

Susan C. Swan

Vice President-Smart Grid Development

Consumers Energy



# Consumers Energy - An Introduction

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- Principal subsidiary of CMS Energy
- 7500 employees
- \$6.8B in annual sales
- 1.8M Electric, 1.7M Gas Customers
- 70,000 miles of electric lines
- 27,000 miles of pipelines
- Generation- fleet of 28 plants/facilities
- Mix of coal, natural gas and hydro
- 37,000 GwH per year

# Our Michigan Investment Plan

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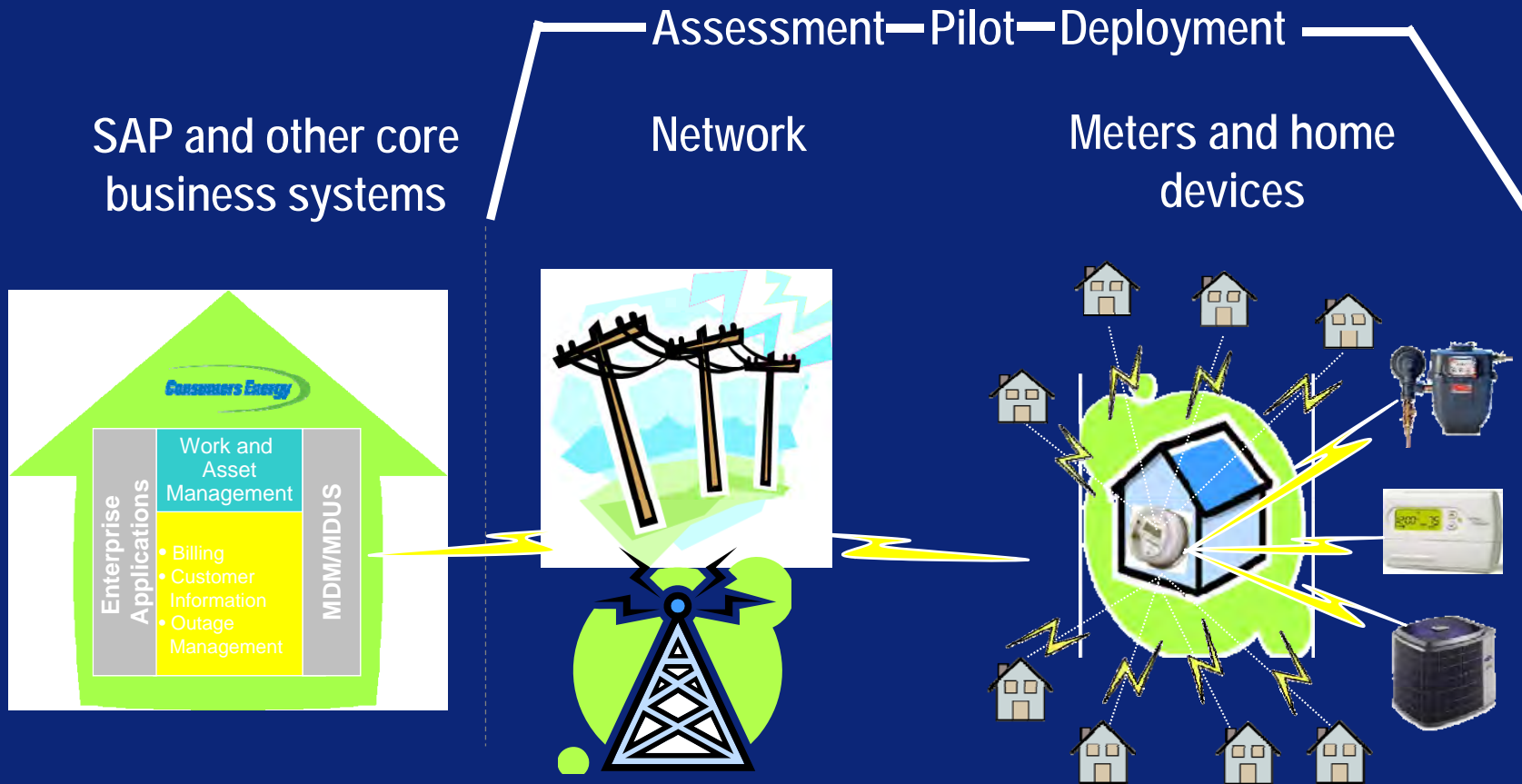
- “Growing Forward” business strategy
- Projects that support Balanced Energy Initiative
  - Doubling renewable power supply
  - Energy efficiency programs
  - Technology investments
  - Improving reliability of electric distribution system
  - Purchase of a natural gas plant

# Building the Business Case

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- Company and customer benefits align
  - Avoided peaking capacity (and energy) increases
    - Energy conservation & improved efficiency
    - Load management
  - Reduced energy losses/costs
    - Theft detection, metering accuracy
    - Meter reading
    - Managing receivables
  - Customer Knowledge= Customer Savings
    - Customer participation is the key

# Smart Grid Program Elements



Sequencing the Smart Grid Program

# Program Approach

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- Before we begin meter mass deployment we will:
  - Assess and pilot meter and communications technology
  - Establish interoperability and security standards
  - Collaborate with industry leaders to share learnings
  - Seek customer input
  - Align with regulators on our approach and process
  - Validate benefits can be realized at roll-out

# Scope of Work

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- Testing, assessment & field pilots
- Modifications to SAP and other computer systems
- Pilots for customer programs (dynamic pricing, direct load management)
- Development of revenue opportunities
- Limited testing of distribution grid technology



Questions?

The logo features the text "Consumers Energy" in a bold, italicized, blue sans-serif font. This text is positioned within a horizontal, light blue swoosh that tapers at both ends, resembling a stylized "C" or a protective shield.

***Consumers Energy***

*Count on Us*



# Smart Grid / Smart Meter / Smart Future

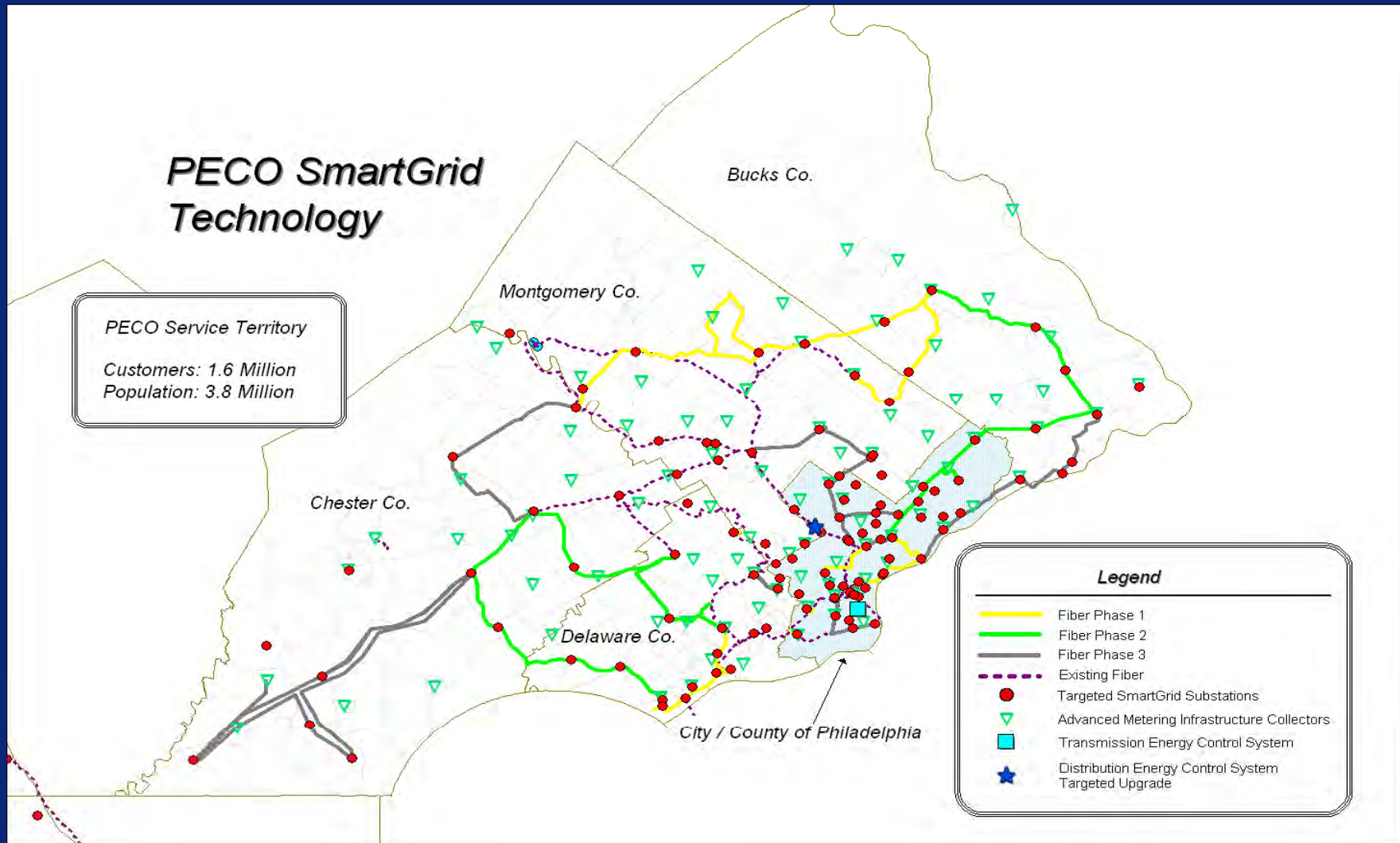
Mary E. Ludford

Vice President, Smart Grid/Smart Meter

PECO



# Smart Future Greater Philadelphia Project Geography



# Smart Grid Investment Grant Program Components

## Smart Meters (AMI)

- Install AMI Communications Network
- Build MDMS, Middleware & Integrate Systems
- Deploy 600,000 smart meters
- Customer acceptance testing

## Communications Support Systems:

- Install 340 miles of fiber optic construction through 61 substations
- Install Tier 2 backhaul communications to support telemetry backhaul, AMI and DA
- Update Distribution Management System (nearing end of life)

## Distribution Automation

- Deploy 100 Reclosers that sense problems and limit their impact
- Install 30 Underground Vacuum Circuit Breakers to modernize the network
- Communicate with 300 more existing devices to improve service

## Intelligent Substation:

- Remote Terminal Unit upgrades and migration to IP centric telemetry at 61 substations
- Installation of substation distribution line relays at 7 substations
- Install disturbance monitoring equipment at 31 substations

## Smart Home/Business

- Enables real-time usage and pricing statistics

## Smart Meters (AMI)

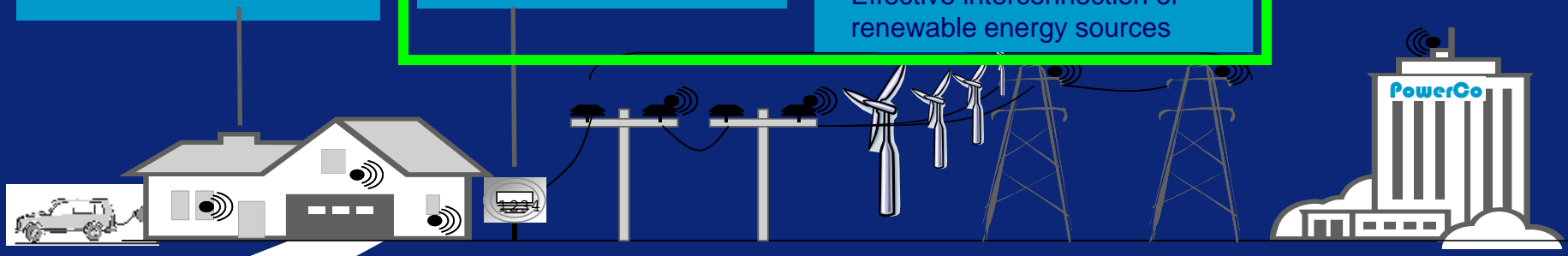
- A method to enable two-way information flow
- System status, customer outage status, usage and pricing signals delivered to and from location

## Smart Distribution System

- Real-time reporting of status and outages
- Automated controls of relays and reclosers. Efficient field force management
- Effective interconnection of renewable energy sources

## Smart Utility

- More efficient data collection, processing and back office functions



# Balancing Value and Risk

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## PECO's Smart Grid/Smart Meter Program

### Sources of Value

- Accelerate smart grid network deployment
- Help customers better understand and manage their energy needs
- Enhance the customer service experience
- Demonstrate industry leadership by testing innovative applications

### Key Risks

- Project execution risk
  - Multiple critical path items
  - Accelerated timetable
- Technology risk
  - Selection
  - Procurement
  - Integration
  - Cyber security
- Are we transformational?
  - Dynamic rates
  - Customer acceptance

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# Smart Grid

Maureen Coveney  
Director, Information Technology  
and Business Intelligence  
San Onofre Nuclear  
Generating Station Portfolio  
Southern California Edison



# Utilities - An Industry in Transit








The global need for **Operational Efficiency, Energy Efficiency and Sustainability** causes fundamental changes of generation, distribution and metering infrastructures and drives innovation of paradigm shifting new business processes.

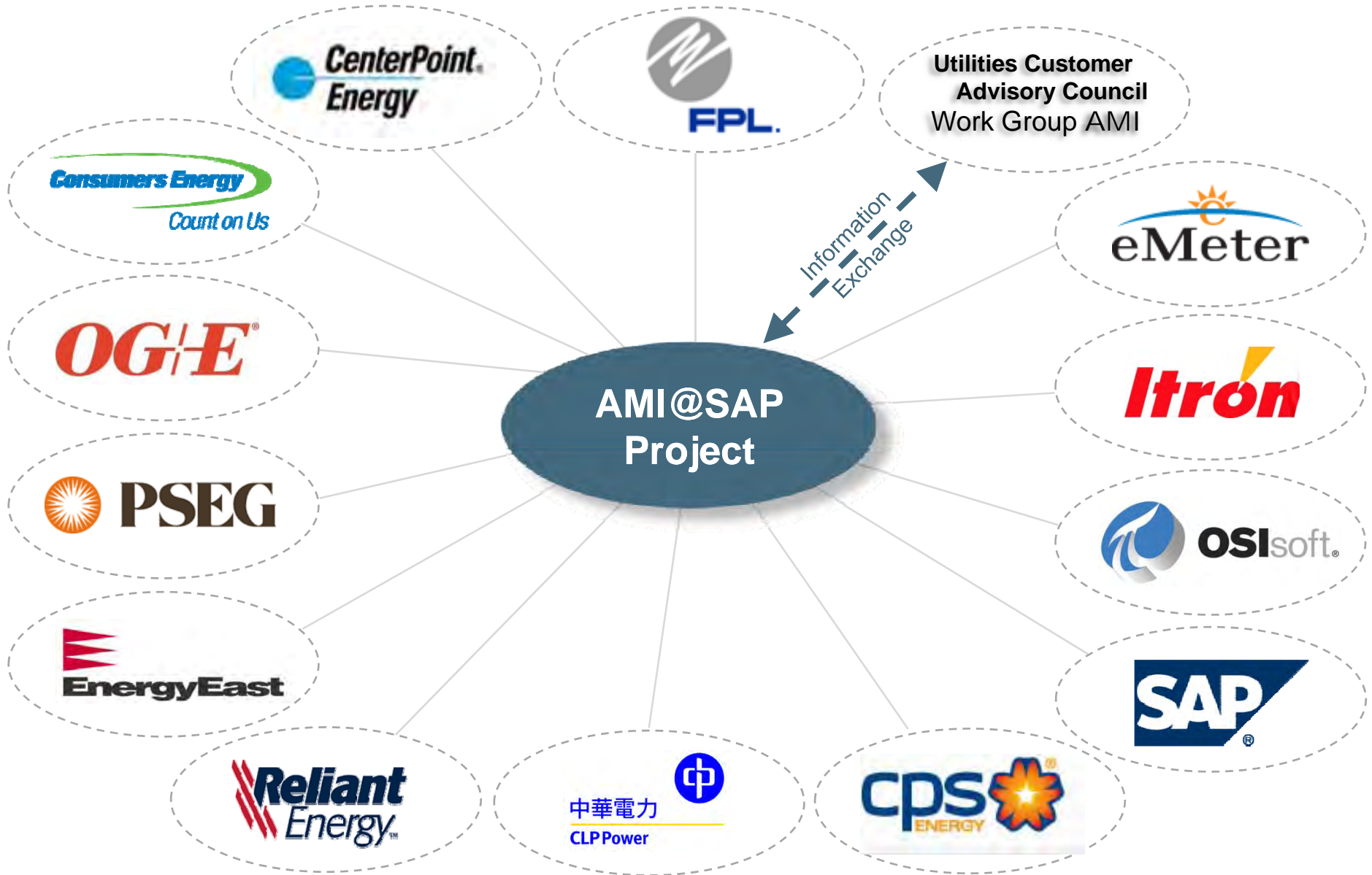
The ability of **Smart Grids** to optimally manage Distributed Generation and the Demand Side of all consumers hinges on its comprehensive integration to Information and Communication Technology.

# Meter-to-Back Office Value Chain



<b>In-Home Devices</b>		<b>Multi-vendor Communication Architecture</b>					<b>MDM</b>	<b>Back-Office</b>	<b>Customer Interaction</b>
									
<b>Endpoint Devices</b>	<b>Home Area Network</b>	<b>Smart Meter</b>	<b>Local Area Network (LAN)</b>	<b>Collector</b>	<b>Wide Area Network (WAN)</b>	<b>AMI Head End</b>	<b>Data collection &amp; storing</b>	<b>CRM / Billing / Asset Mgmt</b>	<b>Internet / IVR / Call Center</b>
Devices in the home that can be remotely updated and controlled by the utility.	Network connecting consumer products and endpoint devices	Measures, collects, transmits and stores energy and event data. Configured remotely.	Transmits data between meters and a collector.	Collects, stores and transmits messages to and from multiple meter points.	Transmits data between collector and AMI head end.	Controls meters & comms network.	Central repository for meter & event data collected from all AMI Head Ends. Dispatches AMI Head Ends.	System of record for all customer and commercial data and the related processes that leverage AMI.	Most processes are directly or indirectly initiated by the customer and are the consequence of or result in customer services and have an impact on the customers bill.

# The AMI@SAP Lighthouse Council



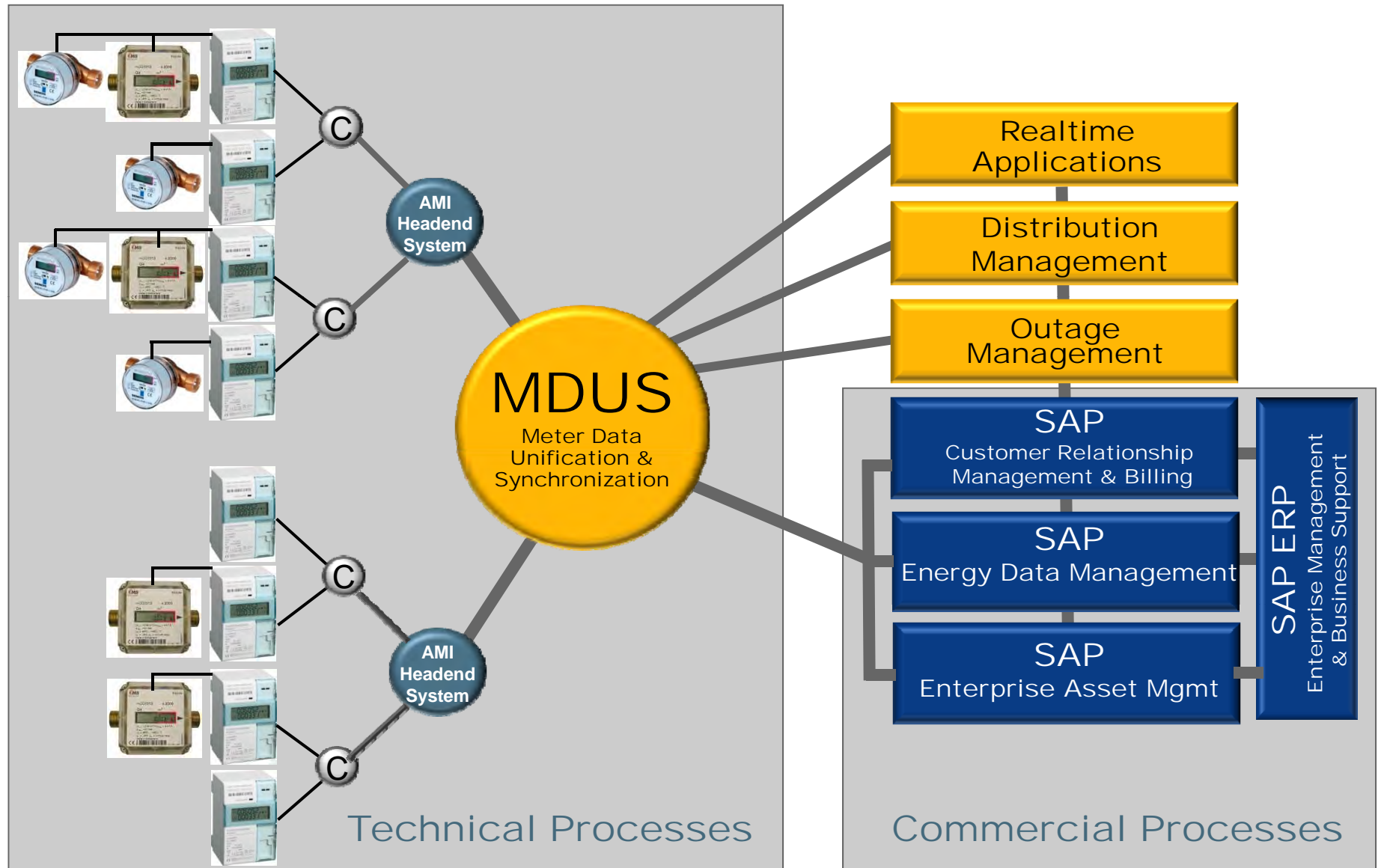
# AMI Use Cases – Equal Upgraded SAP Business Processes



Billing & Customer Service	Customer Interface	Delivery	Energy Procurement	Field Services & System Recovery	Installation & Maintenance
<b>B1</b> Multiple clients read demand and energy data	<b>C1</b> Customer reduces demand in response to pricing and/or grid event	<b>D1</b> Distribution operator curtails/limits customer load for grid management	<b>E1</b> Real-time operations curtails/limits load for economic dispatch	<b>S1</b> AMI system recovers after power outage, communications or equipment failure	<b>I1</b> Utility installs, provisions and configures AMI system
<b>B2</b> Utility remotely limits or connects / disconnects customer	<b>C2</b> Customer has access to and reads recent energy usage and cost at his or her site	<b>D2</b> Distribution operators optimize network based on data collected by the AMI system	<b>E2</b> Utility procures energy and settles wholesale transactions using AMI system data		<b>I2</b> Utility manages end-to-end life-cycle of the meter system
<b>B3</b> Utility detects tampering or theft at customer site	<b>C3</b> Customer uses prepayment services	<b>D3</b> Customer provides distributed generation			<b>I3</b> Utility upgrades AMI system to address future requirements
<b>B4</b> Contract meter reading for other utilities	<b>C4</b> External clients use the AMI system to interact with customer devices	<b>D4</b> Distribution operator locates outage using AMI data and restores service			

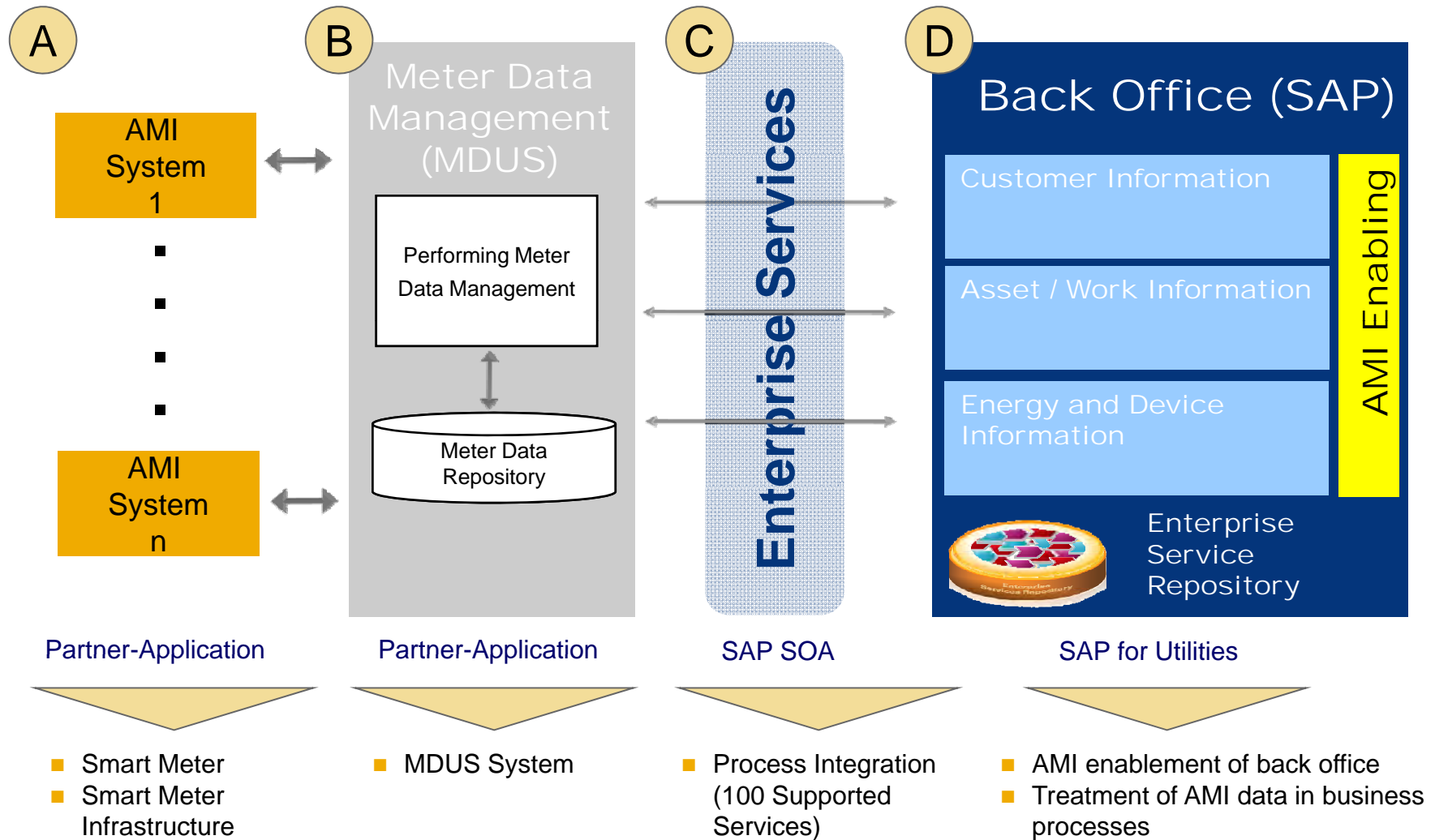
Source: Southern California Edison

# Reference System Architecture (source: SAP AMI Lighthouse Council)

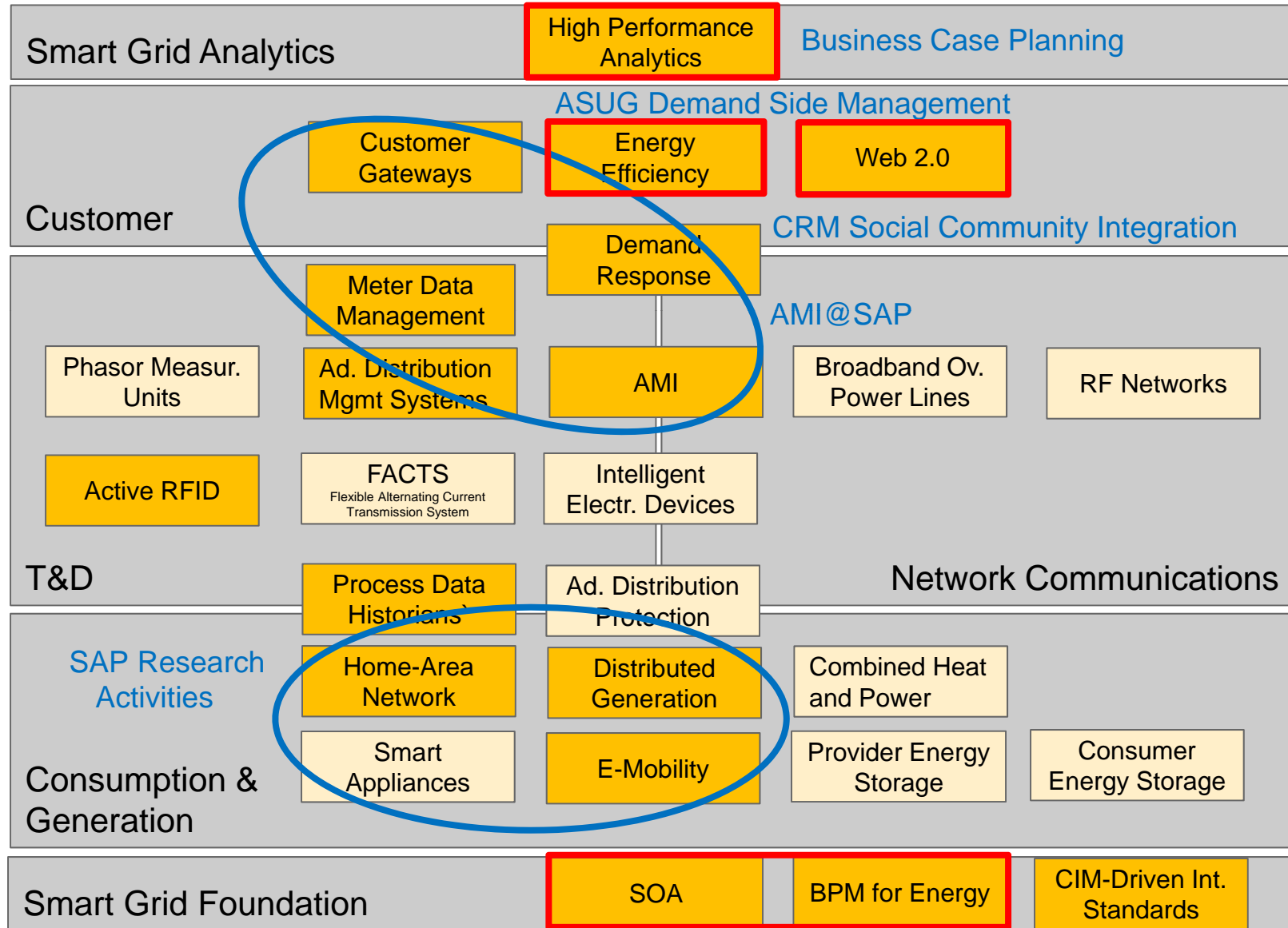


# AMI Investment Viewed in Segments

B + C = Standard



# SAP Approach to the Smart Grid



Netweaver SOA / BPM / PI



# Smart Grid

Philip Mezey

Senior Vice President and COO, North America  
Itron Inc.



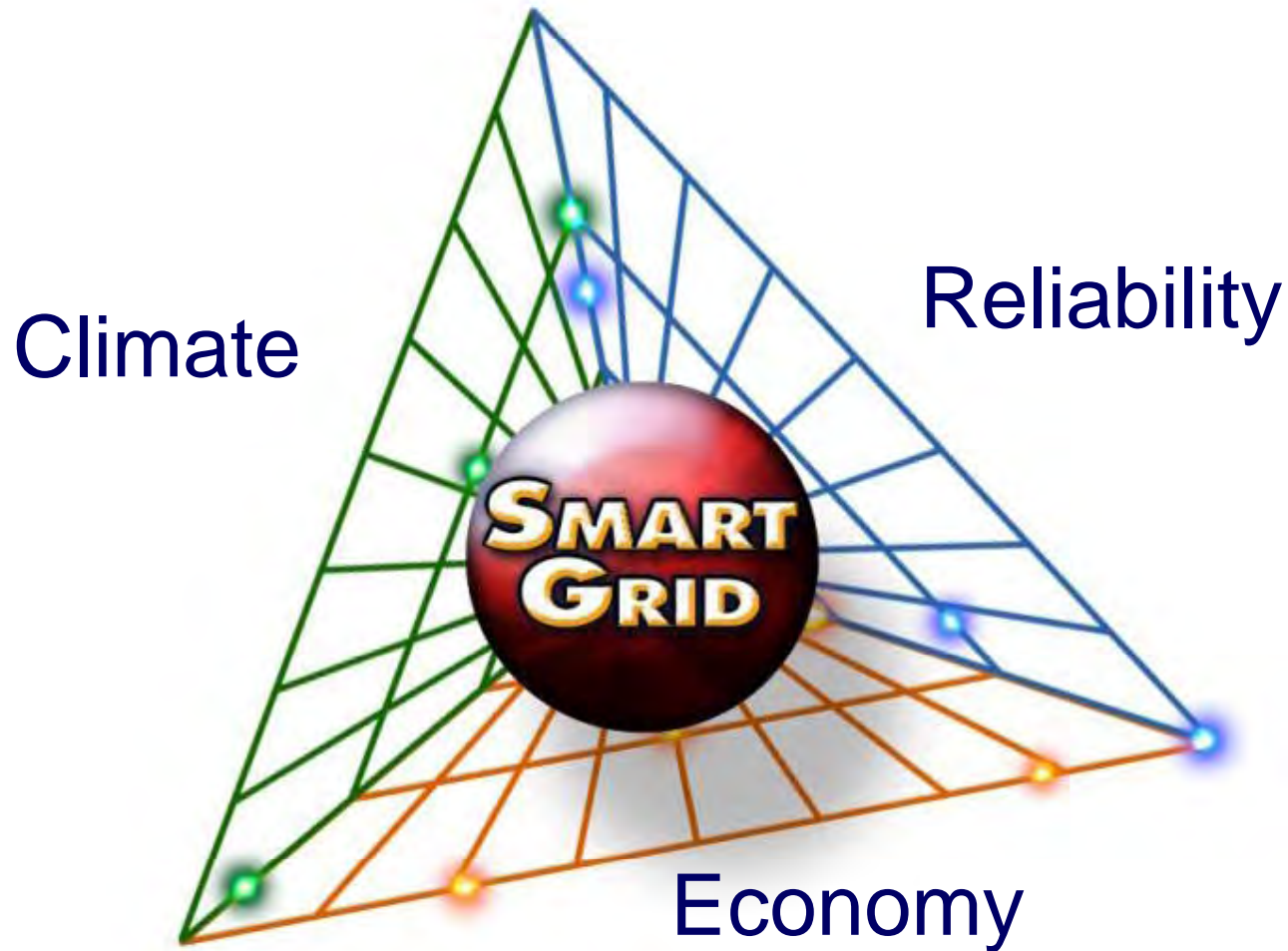


# About Itron

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- Market Leader in Automation
- Leading Worldwide Supplier of Meters
- Leading Software Provider for Meter Data Collection
- Manufacturing Expertise
- Financial Strength
- Global Strategy

# Value Propositions of Smart Grid



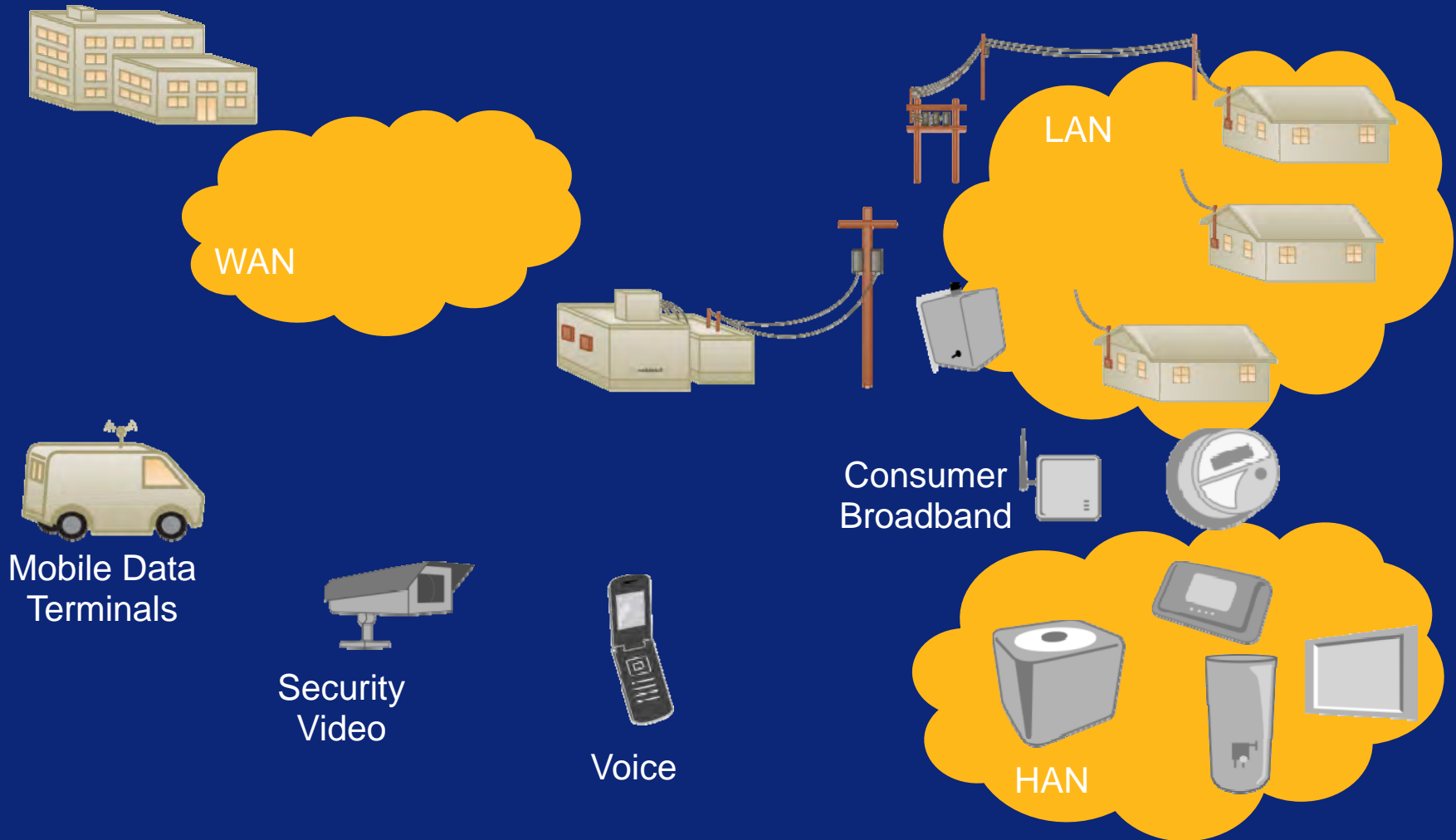


# Business Case Values

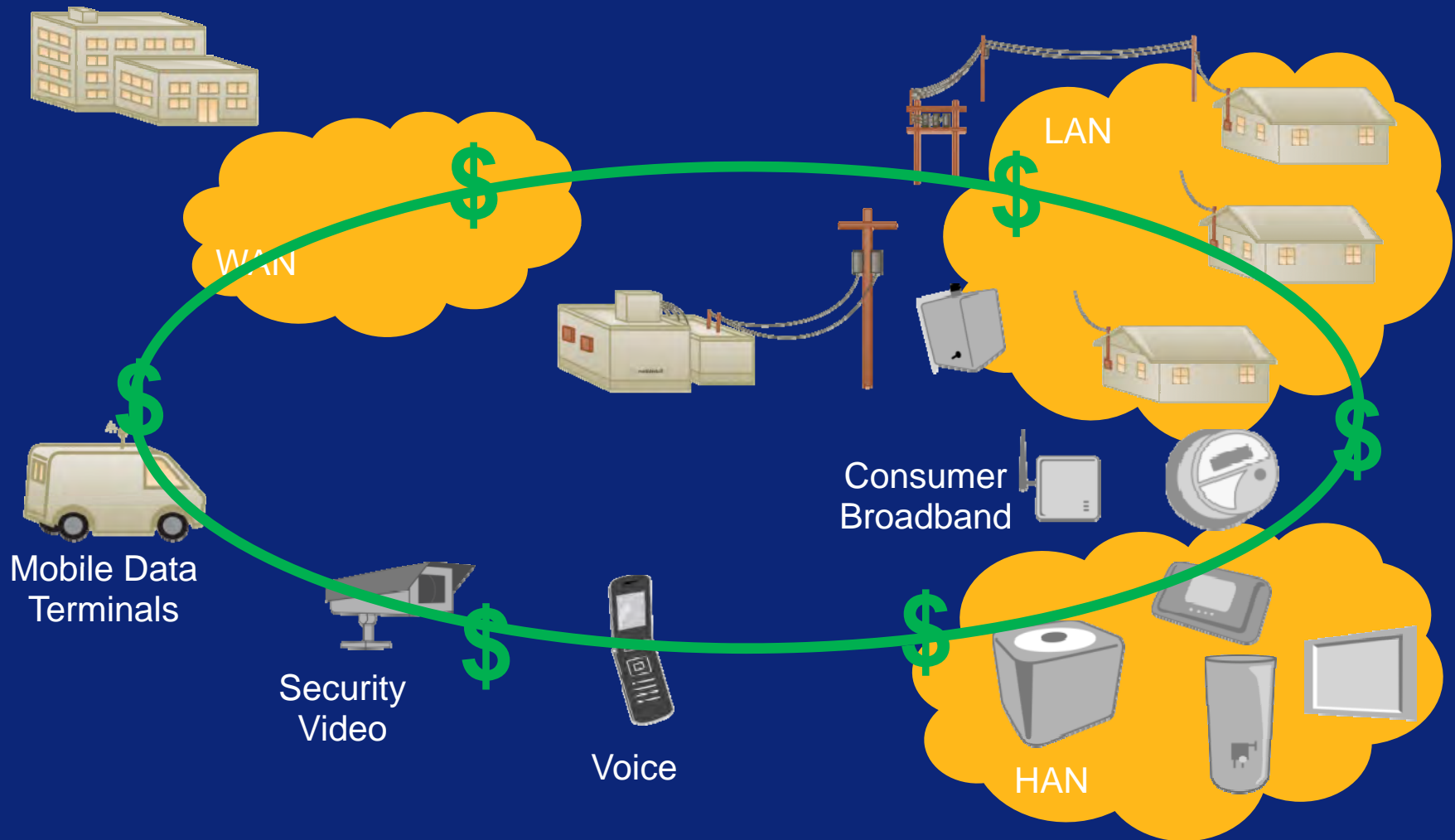
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	SDG&E	SCE
Meter Reading Automation	32%	27%
Access and Re-Bill	2%	9%
Unmetered Energy Usage	10%	0%
Avoided Energy and Capacity	34%	38%
Outage Management	1%	2%
Capital Efficiency/Deferral	2%	6%
Other Customer Service & Operations	1%	0%
Other Management	19%	19%

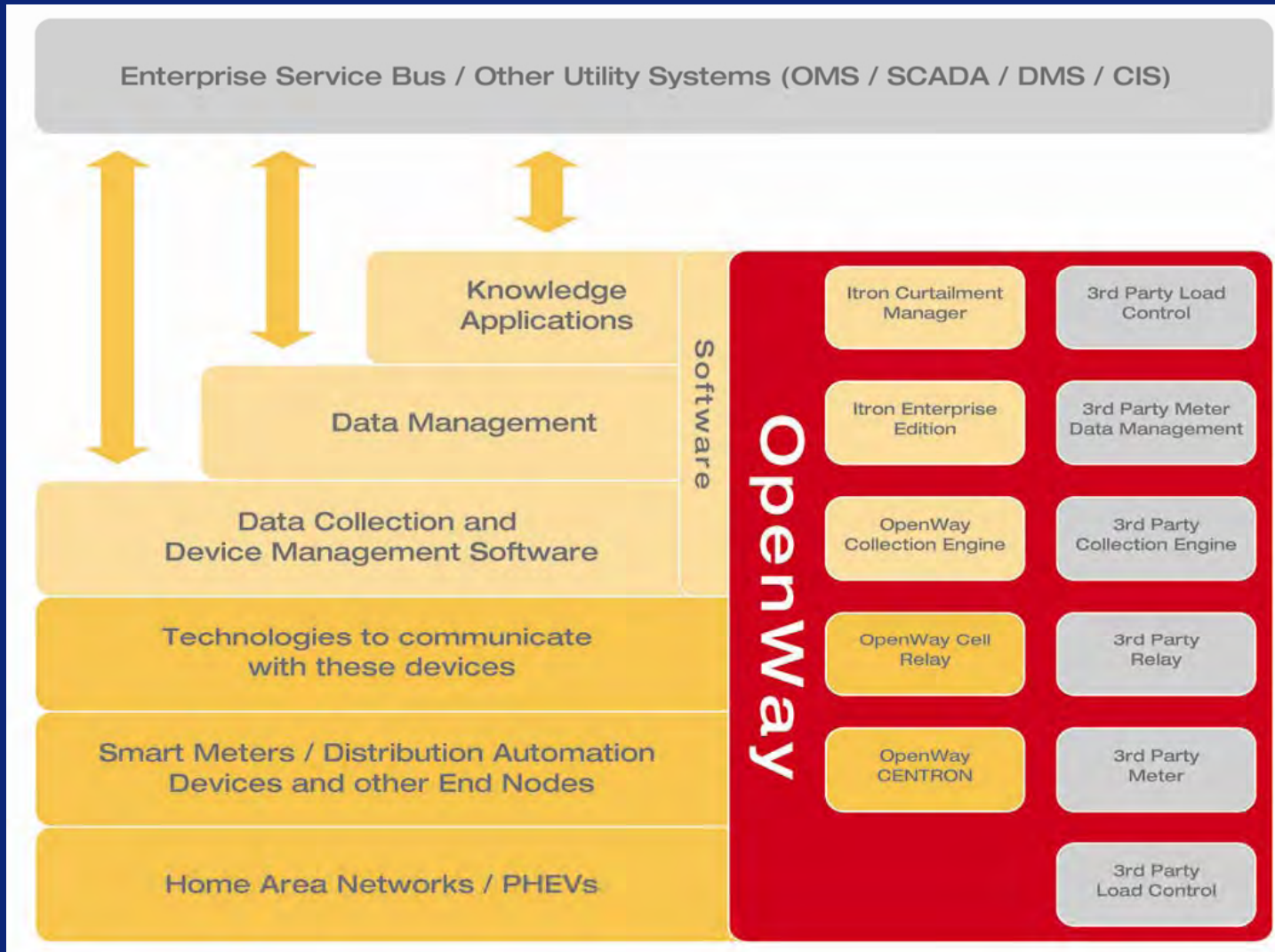
# How Smart Metering Relates to the Smart Grid



# Prudency in Investment



# Standards and Security



# Future Proofing

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# Smart Grid

Robert E. Curry, Jr.  
Commissioner  
Public Service Commission of  
the State of New York



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