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Trends and Market Overview of Global Smart Grid Development

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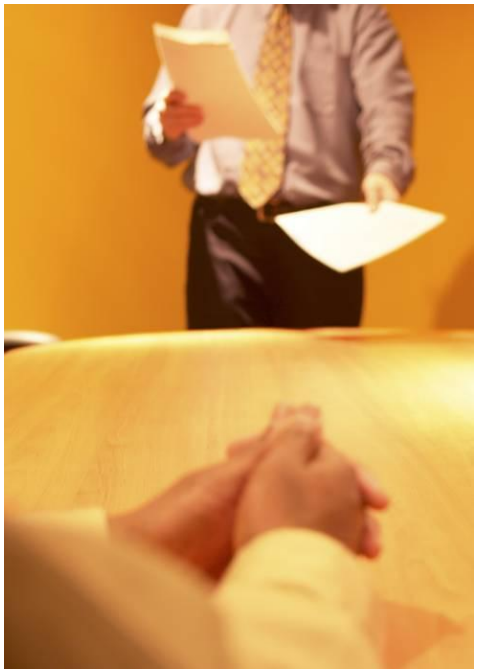
About IDC Energy Insights

- A global provider of **research-based advisory and consulting services** focused on market and technology developments impacting the global energy industry
- **Part of IDC** – the premier global provider of market intelligence and advisory services for the information technology, telecommunications, and consumer technology markets
- Research led by a **global team of 17 full-time analysts** with deep energy industry experience, and supported by nearly 1,000 IDC analysts located in over 100 countries
- Serving **clients** that include utilities, oil & gas companies, technology vendors, government agencies and investors



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Three focused research areas

Smart Grid

Providing research and analysis of the role of information and communications technologies in utility smart grid initiatives

Clean Energy

Tracking developments in solar, energy storage, smart buildings, plug-in electric vehicles and other clean energy technologies

Intelligent Oil & Gas

Providing research and analysis of the role of information and communications technologies in the global oil & gas industry

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Agenda

- Intelligent Utilities: The Big Picture
- The Smart Grid
  - What makes a power grid Smart?
  - Key issues facing Smart Grid strategy
  - The Smart Grid transformation layers
- Key Areas of Smart Grid investment and challenges
- Worldwide Smart Meter market overview
- 5 things to keep in mind...

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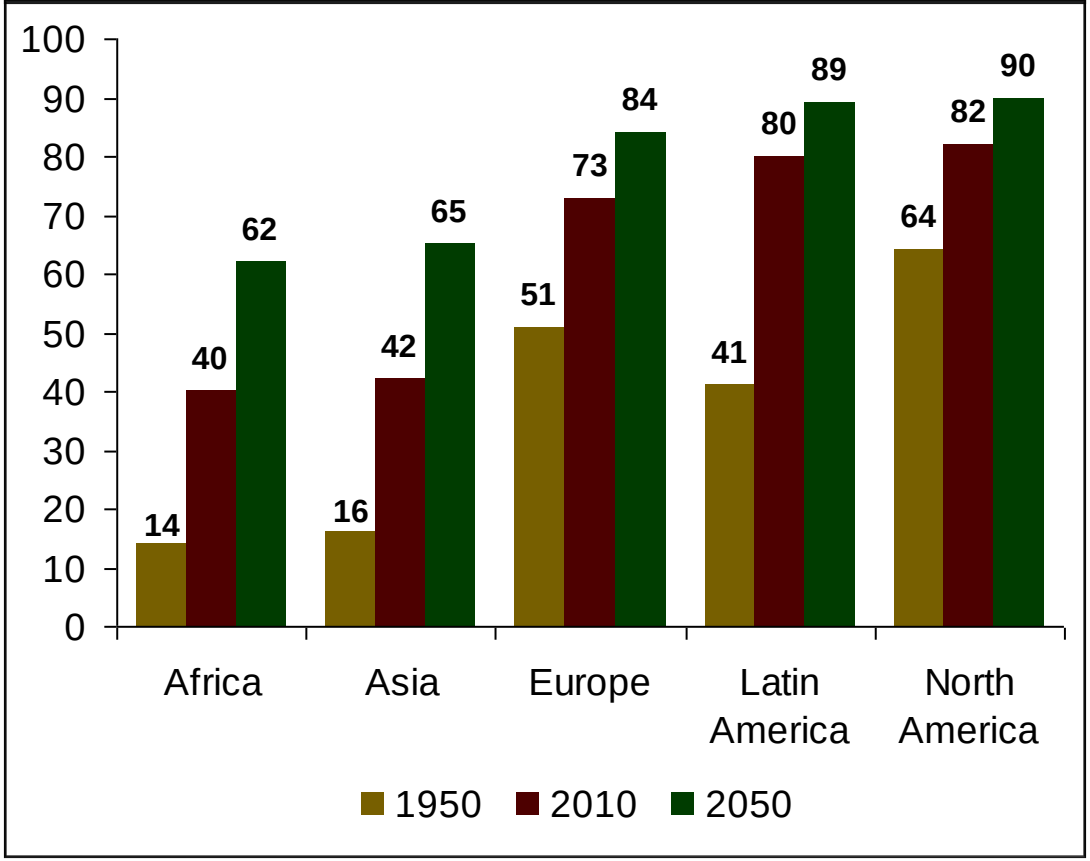
Rapid Urbanization is Shaping Future Demand

The Percent of the Population Living in Urban Areas is Projected to Rise Rapidly in the Less Developed Regions—Asia, Africa and Latin America



"The 19th century was a century of empires, the 20th century was a century of nation states, the 21st century will be a century of cities"

– Wellington Webb, former Mayor of Denver

Source: UN Population Division, *World Urbanization Prospects: The 2009 Revision, Executive Summary (2009)*

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Intelligent technologies shaping Smart Cities

Citizens

Businesses

Energy

Water

Communications

Transportation

Buildings

City Services

City Infrastructure

Intelligent Devices

Pervasive Broadband Networks

Analytics and Social Media

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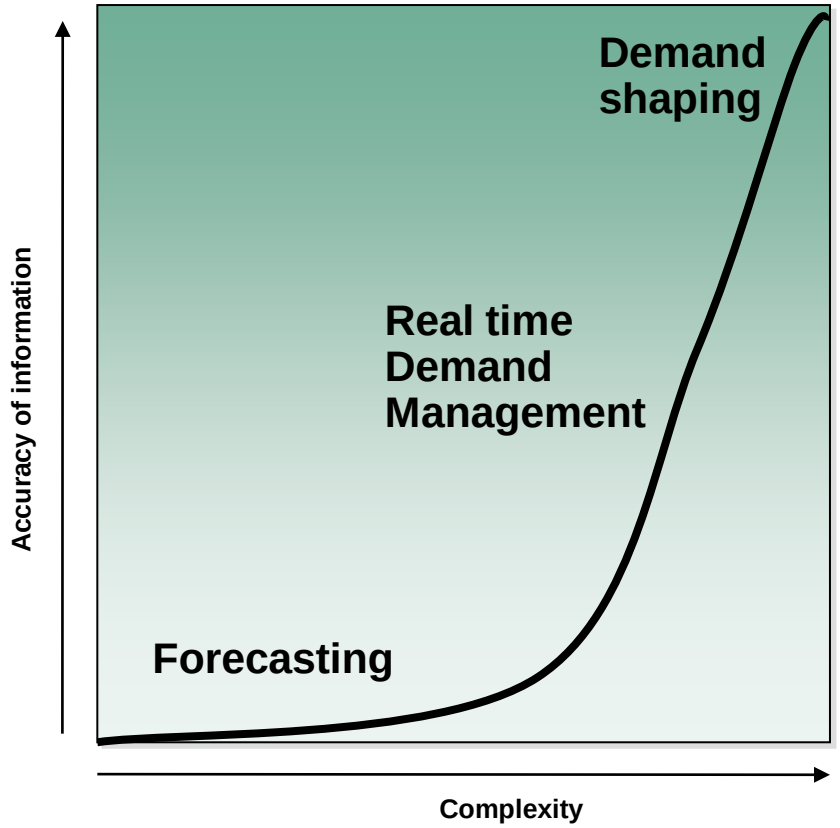
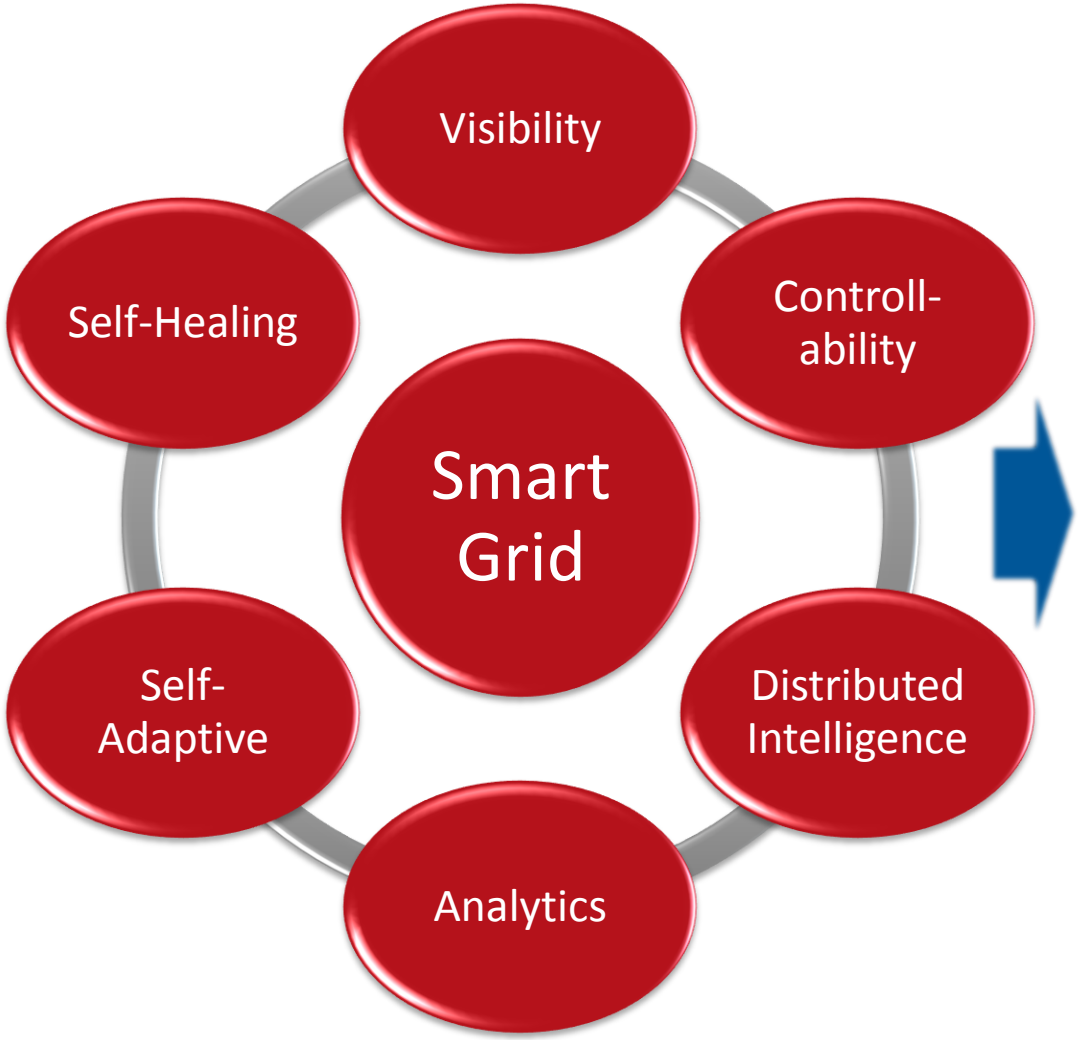
Intelligent Utilities: The Big Picture

- Ability to predict demand
- Balancing demand and supply in the most optimized way (profitability, cost, revenue, environment...)
- Finally, ability to shape demand
  - Pricing
  - Incentives
  - Behavioural change



What Makes a Power Grid Smart?



Smart Metering

Sensing & Communication

Visualization & Operation

Analytics & Decision Support

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Key issues facing a Smart Grid strategy

1. Interoperability Standards

2. Future-Proofing Utility Systems Architecture

3. Redefining Utility Business Models and Incentives

4. The Integration of Large Amounts of Renewable Energy

5. Consumer Adoption of Smart Grid Services

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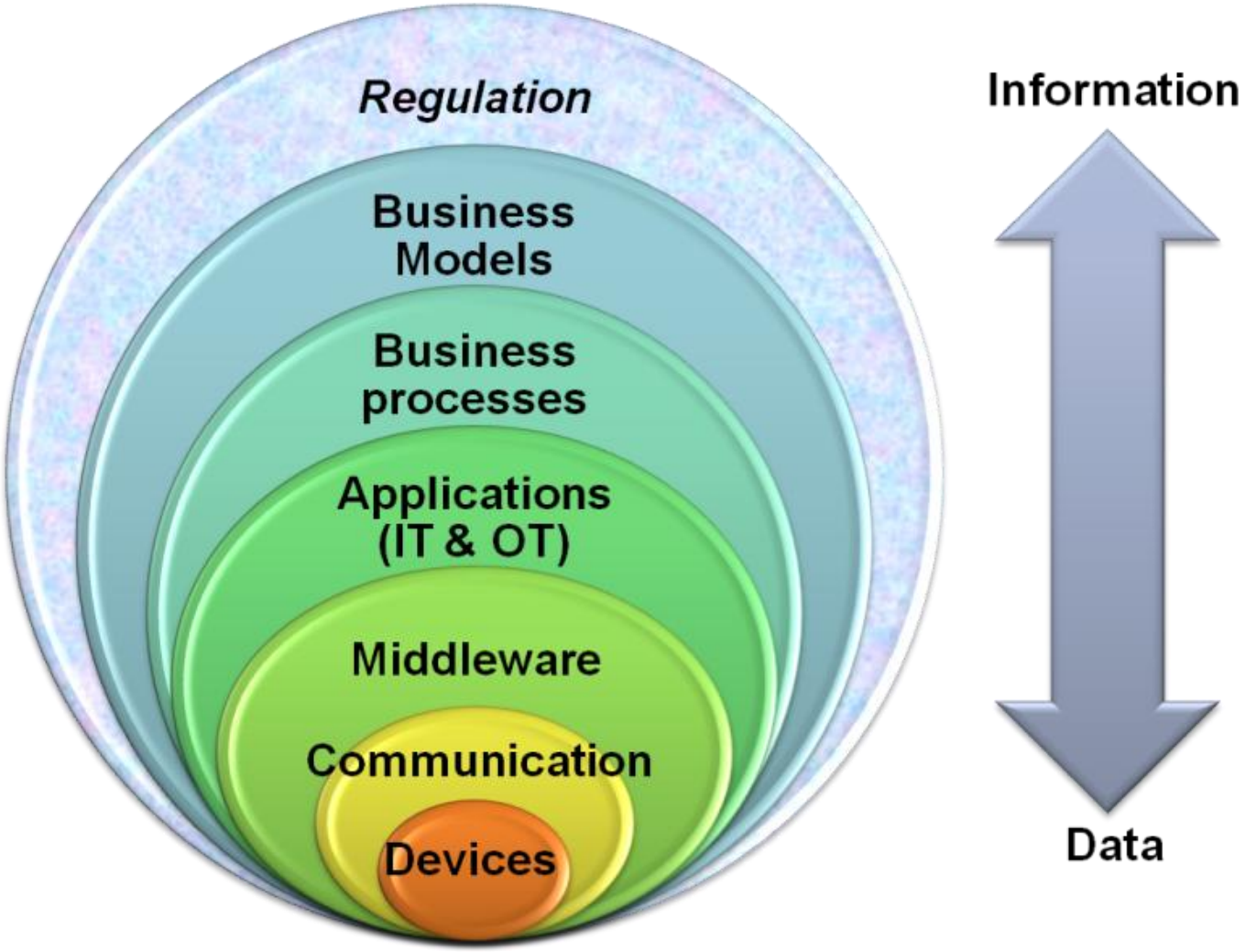
Smart Grid Transformation layers



Source: IDC Energy Insights, 2010

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Top 3 Focus Areas for Smart Grid Investment

36%

Advanced Metering Infrastructure (AMI)

26%

Marketing, Billing and Customer Contact

18%

Cyber-security and Data Integrity

Increased efficiency and process compliance….

IDC Energy Insights Study, 2011

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Top 3 Challenges

IDC Energy Insights Study, 2011

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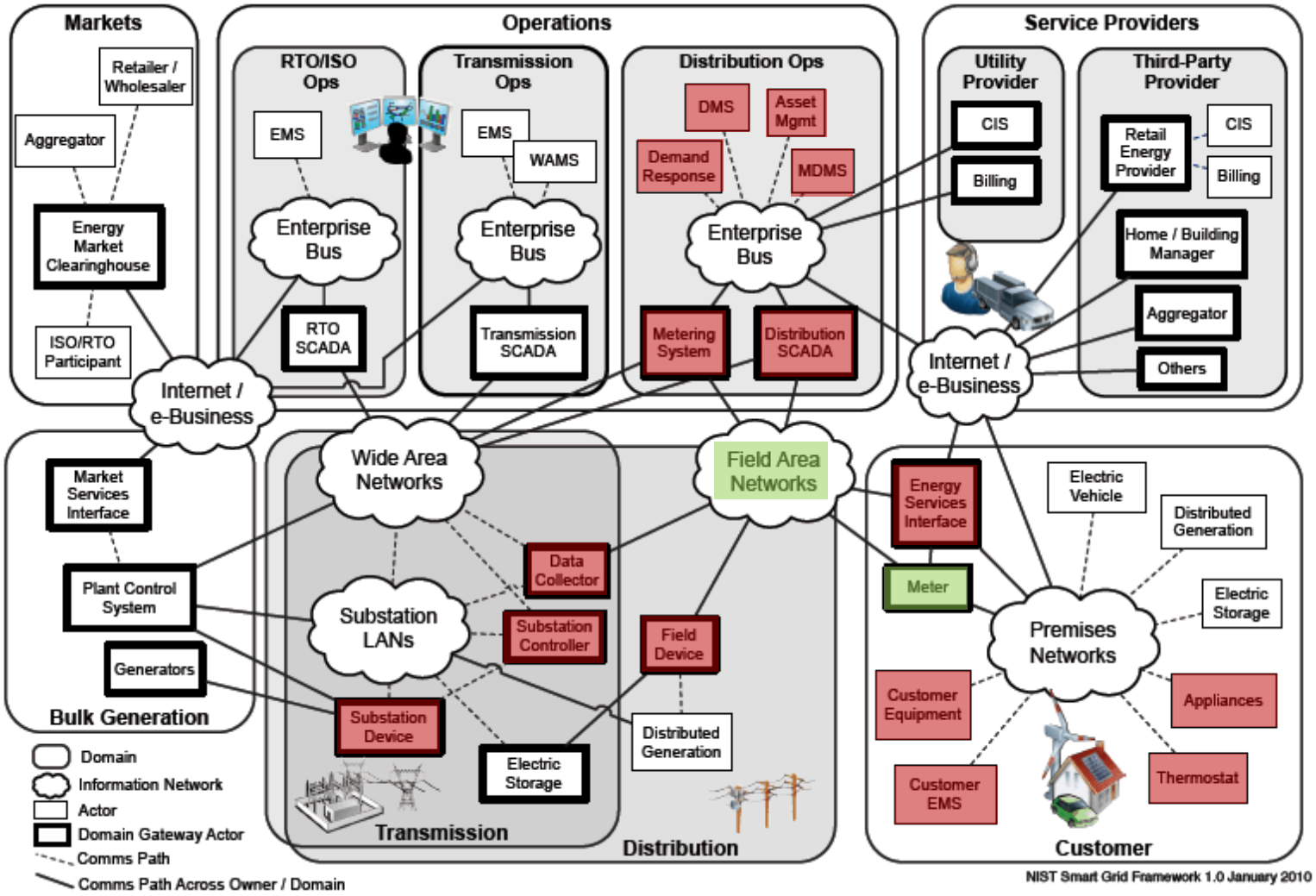
The Role of Smart Meters



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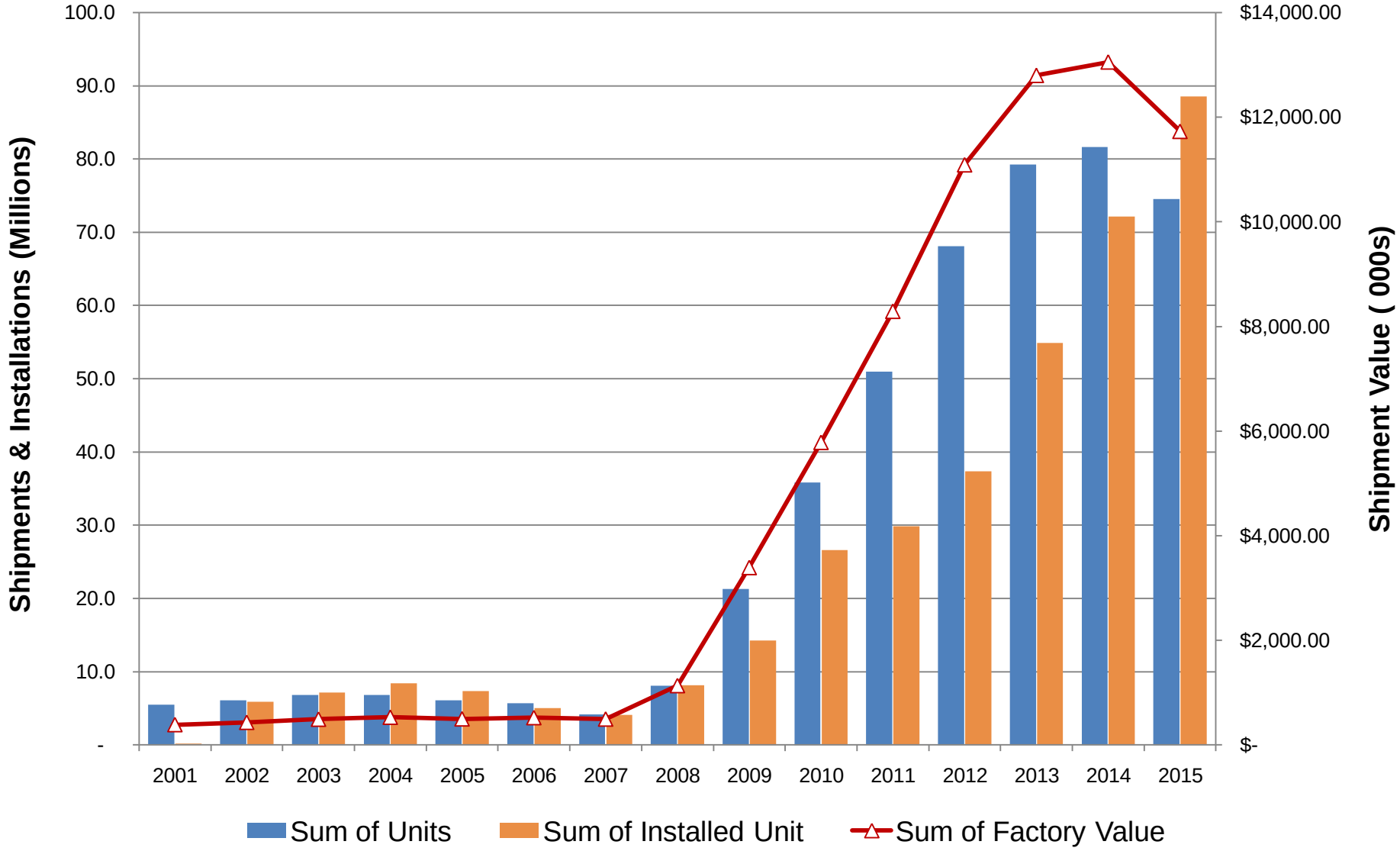
Worldwide Smart Meter Forecast



Source: IDC Energy Insights Quarterly Smart Meter Tracker, 2011

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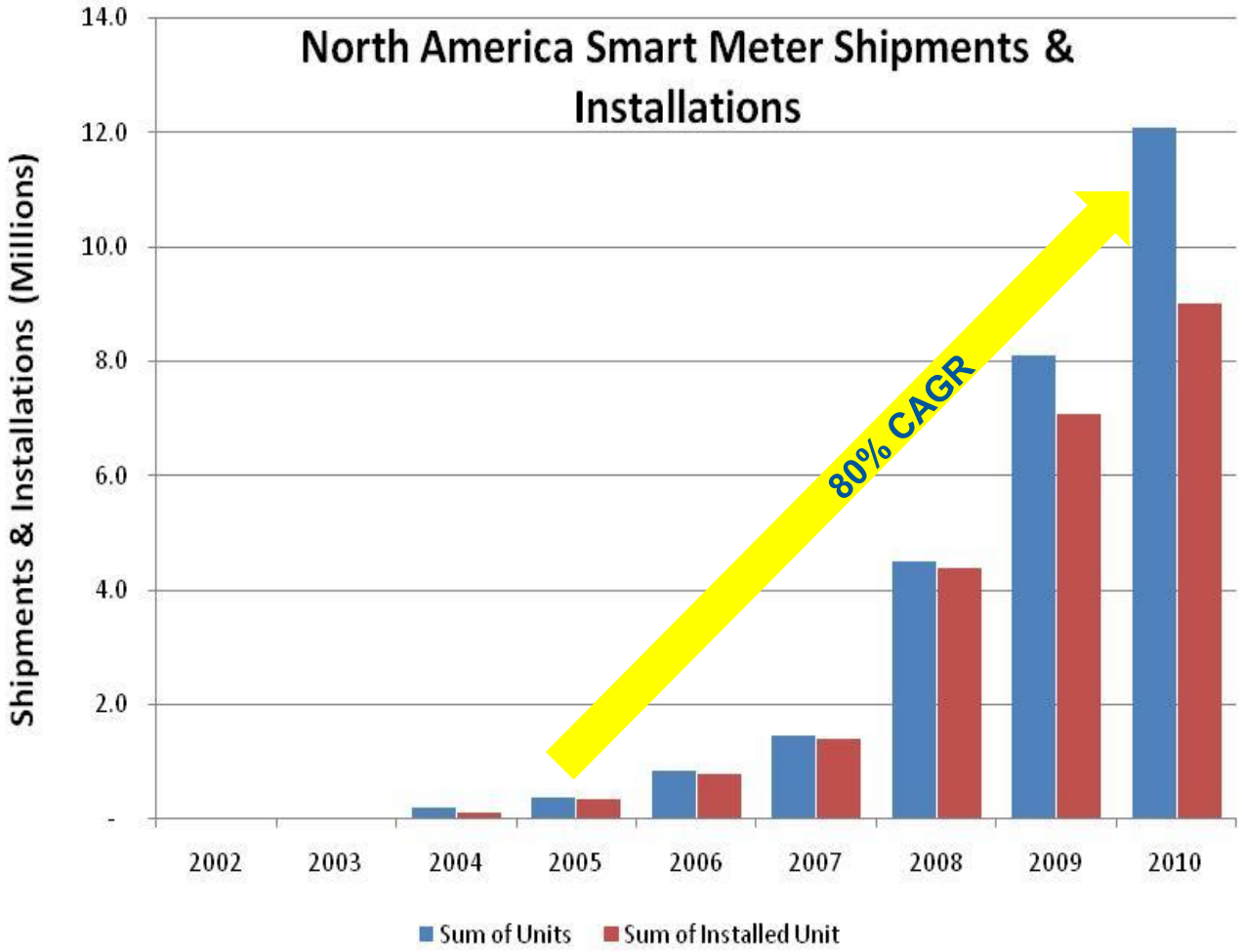
North America Smart Meter Market Overview



Source: IDC Energy Insights Quarterly Smart Meter Tracker, 2011

Highlights

- *Market size has grown at a CAGR of 80% from 2005-2010*
- *23.2 Million installed smart meters at end of 2010*
- *2010 – 12.1M meters shipped; est. $1.6B value*
- *2010 – 49.2% YoY growth in shipped meters*
- *Solid inventory levels at utility level*
- *Big contracts signed in 2010 making way for growth in coming years*
- *Purchase decisions will become slower and under more scrutiny with less stimulus funding available, but growth is inevitable*
- *Security and standardization main decision making obstacles today*

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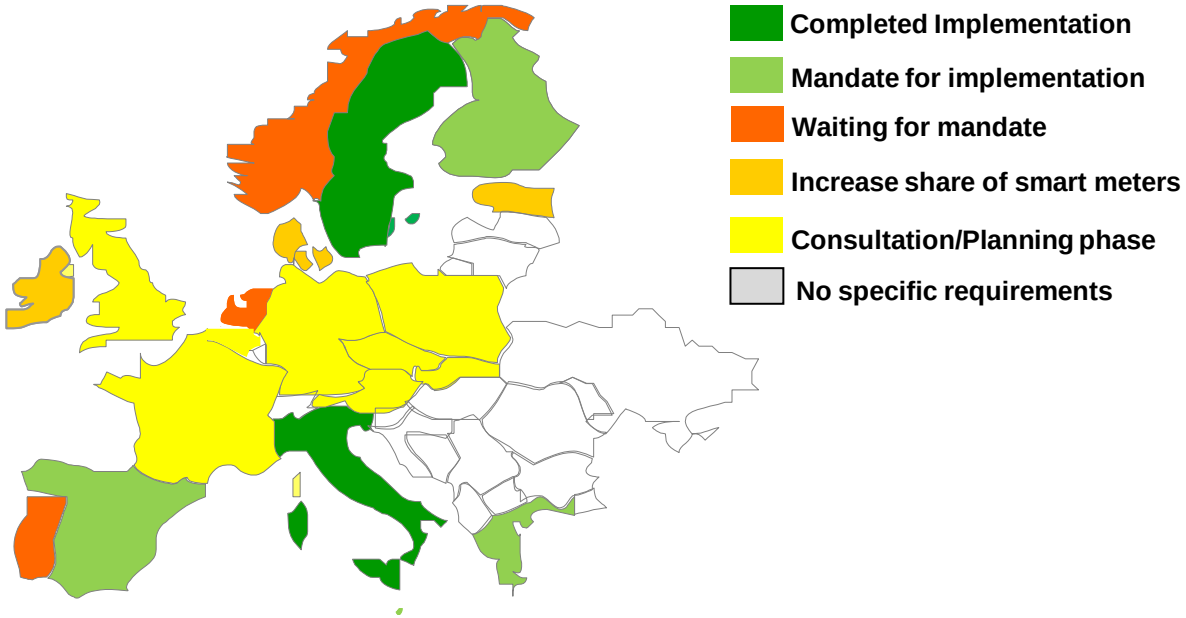
EMEA Smart Meter Market Overview



- 45M installed by end of 2010 – Italy 78% of EMEA IB today
- Many EU countries won't present economic assessment for smart metering until 2012
- Mandate will drive growth from 2013-2020

Highlights

- *Italy began first large-scale global smart meter deployment in 2001 – 33m+ meters*
- *Few countries followed in early deployments - Finland, Sweden, Spain*
- *EU Mandate of 80% meters to be 'smart' by 2020 – IDC estimates 234M by 2020*
- *Contracts are being decided upon today for large EU countries*
- *UK, France, Spain will lead next round of growth*
- *45M meters installed by end of 2010*
- *Middle East pilots part of grid upgrade*
- *Africa still a ways away, focus on pre-paid and lack of infrastructure workarounds*

Source: IDC Energy Insights Quarterly Smart Meter Tracker, 2011

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Rest of World Highlights

Asia Pacific (excluding Japan)

- *China will be one of the main catalysts for smart meter growth globally over the next 10 years*
- *China growth will change the global vendor dynamics from 5-7 big players to a wide range of emerging cost effective manufacturers*
- *Australia was an early adopter for APAC, recent consumer speculation has slowed deployments*
- *Still deciding upon best route in regards to communication standards*
- *South Korea & India will be next big round of APAC deployments*
- *India has smart grid networks being developed but lacks the infrastructure and standardization other countries have today*

Japan

- *3 major deployments underway from big 3 utilities*
- *Estimating roughly 19M units shipped and 13M installed over next 5 years*

Latin America

- *Pilots in place in Brazil, Mexico, Caribbean*
- *Deployment pace still undetermined*

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The Smart Grid Journey:
5 things to keep in mind…

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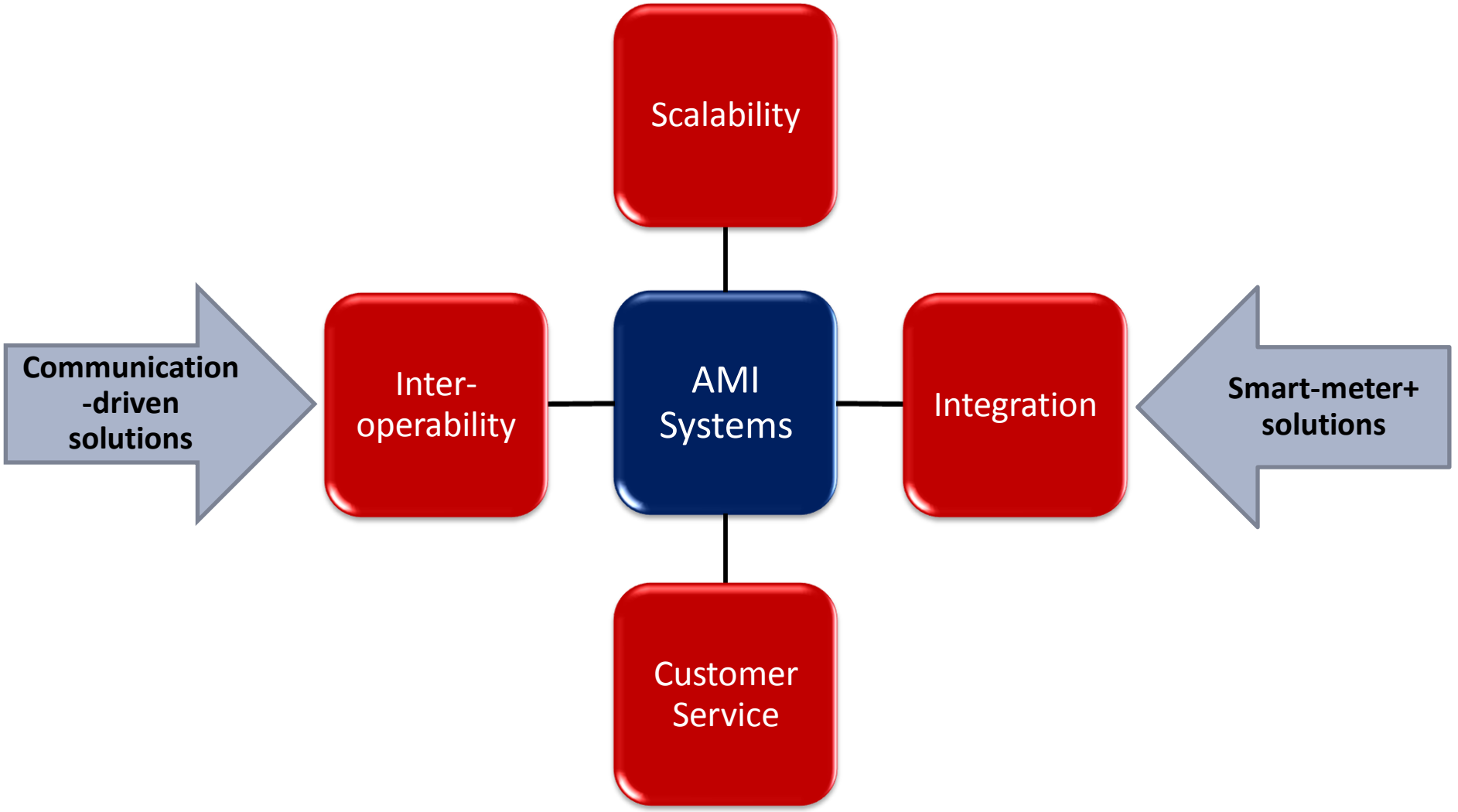
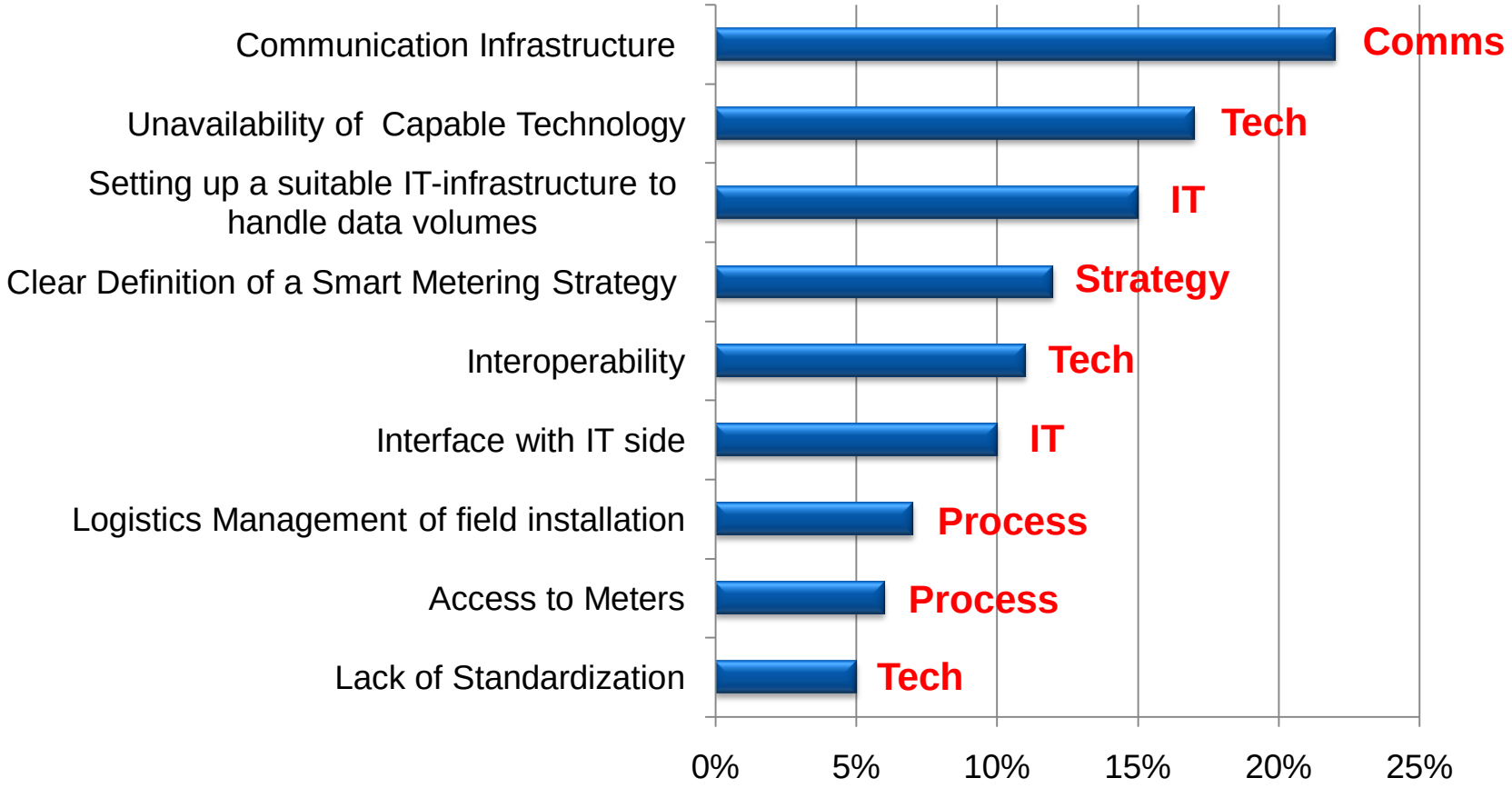
#1: AMI – Key considerations…



#2: Smart metering is not just about field devices

Major difficulties utilities are facing in implementing and operating smart meters



Source: IDC Energy Insights AMI Survey, 2010

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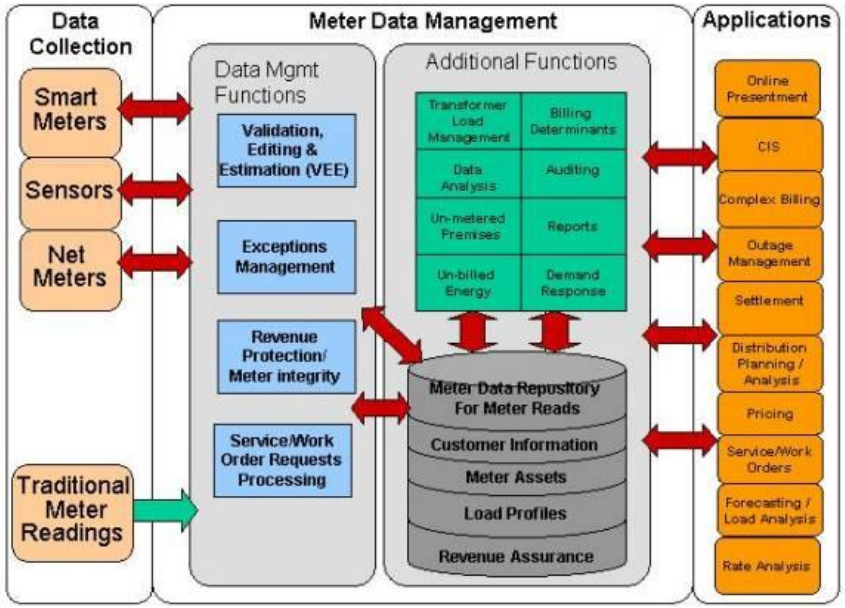
#3: Meter Data Management must be mainstream

- MDM … the workhorse of smart metering!
- MDM acts as:
  - An application for processing meter data
  - A data repository for interval and registry meter data
  - A source of near-real-time information about metering points
- The MDM system rationalizes, cleans, and manages data to establish a "system of record" of meter and interval data, which can then be securely used in a variety applications to support:
  - customer-facing operations
  - meter operations
  - operational intelligence



#3: Meter Data Management must be mainstream

- An MDM implementation needs to be evaluated in the context of each company's IT enterprise architecture
- Utilities should leverage their need to invest in or modify their existing MDM solution to reconsider their entire master data management solution and to support the short- and long-term needs of business processes to reduce duplication
- A key component of new “meter-to-cash” cycle
- Utilities should evaluate the possibility of adopting the software-as-a-service/cloud option as a valid alternative to on-premises installation

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#4: Pilot projects should reflect real-life scenario

- Detailed installation process
  - Use pilots to learn not just about technologies but to define how to prevent incorrect installations that can occur requiring additional onsite field visits (and additional costs)
  - Simplify the installation process to ensure success in large-scale rollouts
- Installation Planning and Scheduling (Geographic approach)
- Procurement and Logistics Coordination
- Meters are an additional asset to manage
- Managed services might be an option to consider

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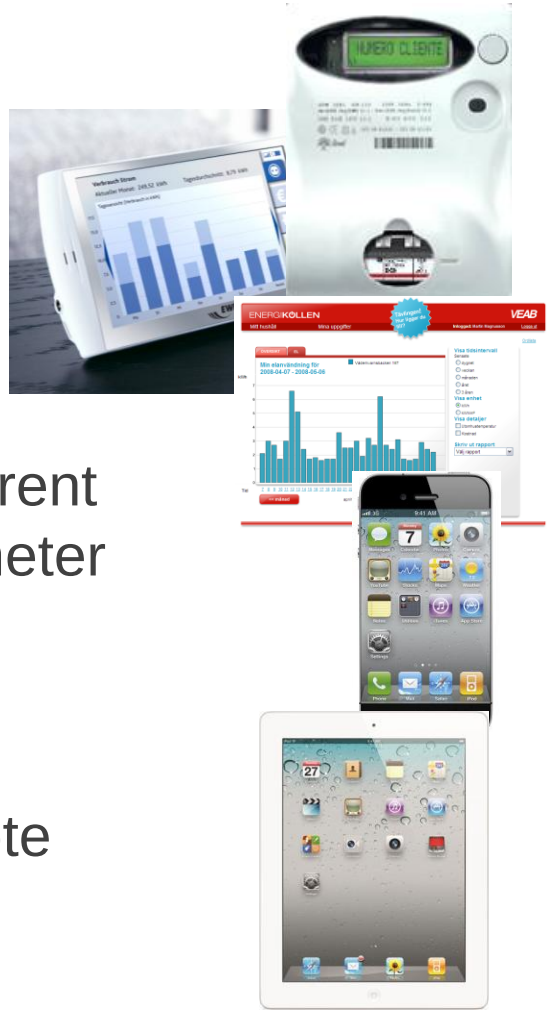
#5: Be Sure Customers Really Support Smart Metering

- Do not take the customer participation for granted !
- Security and data privacy concerns
- Different functionalities to be enabled by different devices. What need to be supported by the meter and what by “something else”?
- Customers have different values
- Focus more on consumer programs to promote smooth acceptance of smart metering



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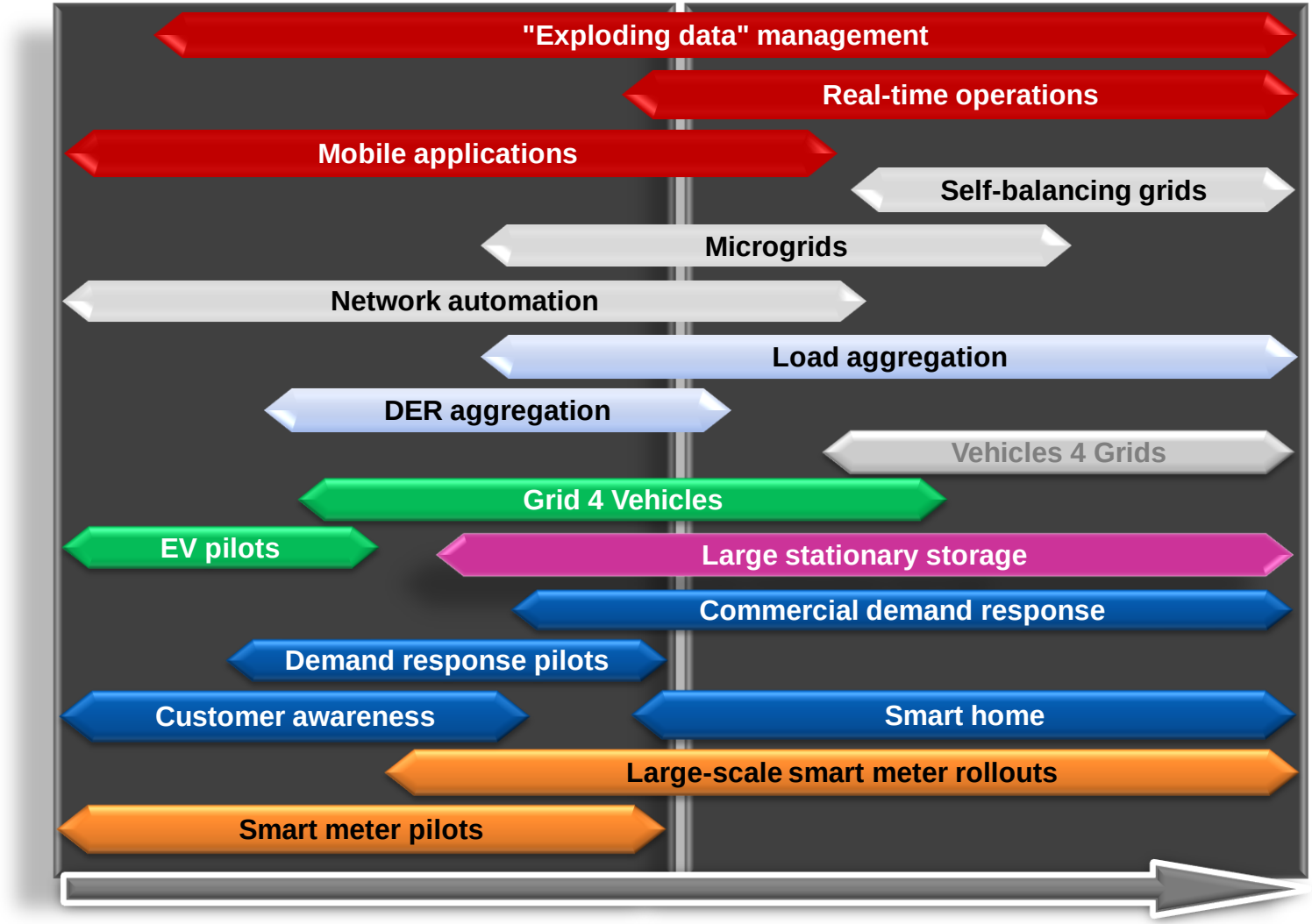
Roadmap to Smart Utility



Summary

- Smart Meter for Smart Grid... Not just smart meters for billing
- Smart Meters are not the end of the story – it's just the beginning!
- Put the customer at the center of the Smart Grid journey
- Explain and create the value for the end customers. Leverage social networking tools, portals, smartphones etc.
- Minimize risks & costs by involving all stakeholders, internal and external, since the beginning of the project

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With over 20 years of industry experience, Debashis Tarafdar has worked with various organizations in operations, consulting, planning, and business development functions. His domain knowledge spans from utilities and manufacturing industry to logistics and distribution. He has also assisted organizations to use information technology to enhance their business and operational efficiency.

Debashis spent ten years in the power generation and distribution industry in operations, maintenance, consulting and strategic planning. He had acquired extensive experience in plant operations, demand management, efficiency and revenue improvement, as well as, loss prevention, asset management, and meeting environmental and regulatory compliance.

In his current role, Debashis is responsible for managing Asia/Pacific Utility IT Strategy research, providing reports, trends and in-depth analysis of ICT priorities and deployment strategies in key utilities segments, smart grid initiatives, as well as identifying emerging agenda and revenue opportunities for ICT providers.

Prior to joining IDC Asia/Pacific, Debashis was with Singapore Computer Systems Limited, where he was responsible for providing solutions and business process consulting to various local/multi-national companies. With strong domain expertise in enterprise resource planning, demand management, supply chain management, maintenance, repair & overhaul (MRO), business intelligence and enterprise application integration, his key role was to help organizations leverage technology, adopt streamlined business processes, industry best practices and global standards.

Debashis graduated from the Indian Institute of Technology with a Bachelor of Technology (Honors) in Mechanical Engineering. He also holds a Master of Business Management from the same university.